

# GRAPHITE.

## Sheets & Gaskets | SIGRAFLEX®.

**WS 3862 | WS 3865 | WS 3885 | WS 3888 | WS 3875 DB | WS 3830 IB | WS 3870 DB**

### DESCRIPTION

IDT-graphite sheets and seals consist of high quality SIGRAFLEX® material. For the production of SIGRAFLEX® products, flaked natural graphite is used which has a good crystalline structure. The high purity of SIGRAFLEX® is determined by the raw materials and ensured by the quality of mechanical, chemical and thermal cleaning processes.

Graphite sheets are manufactured without reinforcement, metal-reinforced and/or waterproofing whilst the metal reinforcement can be done with sheet reinforcement or smooth stainless steel foils. The graphite sheets have higher strength, gas tightness, scratch resistance and non-adhering surfaces thanks to the special waterproofing.

### PROPERTIES

- Low permeability towards gases and liquids
- Flexible, soft, good adaptability
- Very good media resistance, specifically against corrosive substances and chemicals [resistance chart available upon request]
- Does not present a health risk and is environmentally friendly
- Temperature range from -200 °C to approx. 550 °C [upward to 450 °C please consult the manufacturer]; special construction [FD33] up to 600 °C
- Ageing resistant, no embrittlement, since no binders or elastomer matrix
- Long-term stable compression and recovery characteristics
- Good temperature change resistance and constant diffusion rate
- Complies with TA Luft 2002 [VDI 2440/2200] leakage requirements
- No cold and warm flow until maximum permissible surface pressure
- High pressure stability
- The tightness of the flange connection remains intact in the event of a fire [Fire Safe Test]

### APPLICATIONS

- Non-metallic gaskets for pipeline flanges, device and container flanges, pumps and valves
- Wide range of applications, primarily in the chemical and petrochemical industry, natural gas industry, power stations and thermal oil and heating plants
- Also used in food and pharmaceutical applications depending on the gasket construction
- Used if there are increased requirements such as for blow-out resistance [technical tightness] as per TRBS 2152 T.2

- Can be used for very high operating pressures and/or temperatures
- No special requirements for flange sealing surfaces
- Non-metallic layer for corrugated metal and Kammprofile serrated gaskets as well as insert for spiral gaskets
- For designs with inner eyelets, used for increased requirements for cleanliness and blow-out resistance [technical tightness]
- Possible for use for oxygen, ethylene and propylene oxide applications [BAM-test report]

### PRODUCT RANGE

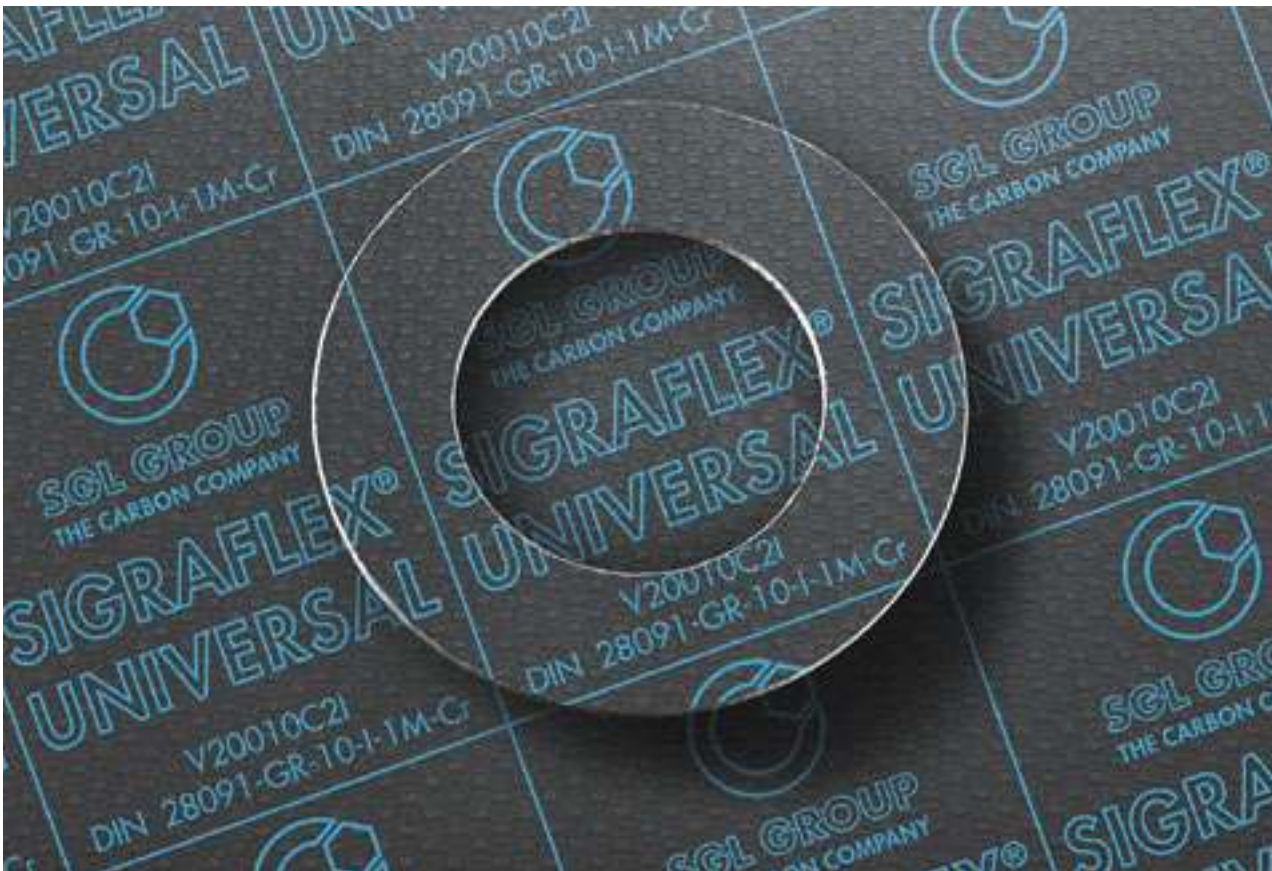
Technical delivery conditions as per DIN 28091

- Sheets
  - Available dimensions: 1000 x 1000 mm and 1500 x 1500 mm [standard format]
  - Available thicknesses: 1.0; 1.5; 2.0; 3.0, 4.0 mm
- Foil/sheet/tape
  - SIGRAFLEX®-foil/gasket sheet
  - SIGRAFLEX®-tape
  - SIGRAFLEX®-foil pressed into packing rings
- Non-metallic gaskets
  - Dimensions: as per DIN EN 1514-1 and DIN EN 12560-1 or ASME B 16.21 as well as non-standard sizes, made from:
    - SIGRAFLEX® UNIVERSAL [WS 3862]
    - SIGRAFLEX® UNIVERSAL PRO [WS 3865]
    - SIGRAFLEX® SELECT [WS 3830] \*
    - SIGRAFLEX® HOCHDRUCK [WS 3885]
    - SIGRAFLEX® HOCHDRUCK PRO [ WS 3888]
    - SIGRAFLEX® MF [WS 3870] \*
    - SIGRAFLEX® Special type [WS 3875] \*

Gaskets made from above mentioned materials are also available with inner eyelets and/or outer eyelets.

[\*] Designs are only available with flanges.

**Additionally: IDT Profile Overview | FD Series**



### ADDITIONAL DESIGNS

- Envelope gaskets made from TFM™ with SIGRAFLEX® EMAIL [WS 3825] insert
- Kammprofile serrated/corrugated metal gaskets with graphite layers made from SIGRAFLEX® foils
- Spiral wound gaskets with SIGRAFLEX® graphite filler

### OPTIMISED TECHNOLOGY CLEAN ENVIRONMENT

IDT only processes graphite qualities by SGL Group. SIGRAFLEX® UNIVERSAL and SIGRAFLEX® HOCHDRUCK are among the materials which have been established in the market for years. They are considered state-of-the-art and have proven their value in all industrial applications.

With the commencement of the increased requirements of TA Luft in 2002, it had become necessary to develop new production technologies and product variations to comply with the required emission reductions. The product ranges SIGRAFLEX® PRO, SIGRAFLEX® SELECT and SIGRAFLEX® MF were introduced to meet these requirements and were - mostly with eyelet design - standardised by plant operators.

Based on this environmental and safety relevant background as well as in harmony with applicable environmental protection regulations, various IDT-sealing systems were optimised with

regards to their design and production, so that they complied both with the TA Luft requirements as well as the calculatory strength and tightness certificate following DIN EN 1591-1 which has been required since the inception of VDI 2290 in 2012.

The optimised sealing systems are labelled with the IDT environmental label for Low Emission [LE]. Subsequent calculations of pipe classes following DIN EN 1591-1 were carried out on the basis of the VCI-guideline for the assembly of flange connections in process plants and have shown that the leakage rate of  $10^{-2} \text{ mg}/[\text{s} \cdot \text{m}]$  could be adhered to with all LE versions; in parts even with a bolt quality of 5.6.

In addition to increased leakage requirements and due to higher process temperatures in plants, it also has become necessary to produce the graphite with an increased oxidation protection and to equip it with an oxidation inhibitor which is applied directly to the structure of the graphite foil. SIGRAFLEX® APX-foil sets the standard for these applications and has a significantly improved temperature resistance in comparison to standard graphite qualities.

# GRAPHITE.

## SIGRAFLEX® UNIVERSAL PRO & SELECT.

Product designation	Non-metallic gasket, SIGRAFLEX® UNIVERSAL PRO	Non-metallic gasket with inner eyelet, SIGRAFLEX® UNIVERSAL PRO	Non-metallic gasket with inner eyelet, SIGRAFLEX® SELECT
Product name	WS 3865	WS 3865 IB	WS 3830 IB
Product image			
Profile No.	FD01	FD10	FD10
Features	Sealing system made from SIGRAFLEX® UNIVERSAL PRO; waterproofed, with sheet reinforcement insert made from 0.1 mm stainless steel 316L; standard thickness 2.0 mm. Complies with TA Luft and VDI 2290 <sup>1</sup> , is blow-out resistant, sturdy, high strength and easy to handle.	Sealing system made from SIGRAFLEX® UNIVERSAL PRO; waterproofed, with sheet reinforcement insert made from 0.1 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4571; standard thickness 2.0 mm. Complies with TA Luft and VDI 2290 <sup>1</sup> , is blow-out resistant, sturdy, high strength and easy to handle. Good gas tightness.	Sealing system made from SIGRAFLEX® SELECT; waterproofed, with sheet reinforcement insert made from 0.1 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4571; standard thickness 1.6 mm. Complies with TA Luft and VDI 2290 <sup>1</sup> , is blow-out resistant, sturdy, high strength and easy to handle.

### OPERATIONAL DATA

Pressure	Max. 100 bar	Max. 160 bar	Max. 100 bar
Temperature	-250 °C to 550 °C <sup>3</sup>	-250 °C to 550 °C <sup>3</sup>	-250 °C to 550 °C <sup>3</sup>




### APPROVALS

TA Luft 2002 [VDI 2440/2200]	<b>X</b>	<b>X</b>	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]			
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>	<b>X</b>
KTW-guideline			
Fire Safe Test	<b>X</b>	<b>X</b>	<b>X</b>
FDA			
EG 1935/2004			
Blow-out resistance	<b>X</b>	<b>X</b>	<b>X</b>
Germanischer Lloyd			
Features			

<sup>1</sup> Complies with VDI 2290 only in combination with a leakage certificate as per EN 1591-1 | <sup>3</sup> upward to 450°C please consult the manufacturer

# GRAPHITE.

## SIGRAFLEX® HOCHDRUCK.

Product designation	Non-metallic gasket, SIGRAFLEX® HOCHDRUCK	Non-metallic gasket with inner eyelet, SIGRAFLEX® HOCHDRUCK
Product name	WS 3885	WS 3885 IB
Product image		
Profile No.	FD01 	FD10 
Features	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; standard thickness 2.0 mm.</p> <p>Complies with TA Luft, is blow-out resistant, sturdy, is high strength and easy to handle. Operating pressures up to 250 bar. Suitable for use for liquefied natural gas [LNG] and liquefied petroleum gas [LPG]: Application on ships, terminals and storage tanks.</p>	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4751; standard thickness 2.0 mm.</p> <p>Complies with TA Luft, is blow-out resistant, sturdy and is high strength and easy to handle. Operating pressures up to 250 bar and high gas tightness.</p>

### OPERATIONAL DATA

Pressure	Max. 250 bar	Max. 250 bar
Temperature	-250 °C to 550 °C <sup>3</sup>	-250 °C to 550 °C <sup>3</sup>

### APPROVALS

TA Luft 2002 [VDI 2440/2200]	at 60 Mpa [nut/groove]	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]	<b>X</b>	<b>X</b>
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>
KTW-guideline		
Fire Safe Test	<b>X</b>	<b>X</b>
FDA		
EG 1935/2004		
Blow-out resistance	<b>X</b>	<b>X</b>
Germanischer Lloyd	<b>X</b>	
Features	Evaluation as per food laws, LNG/PNG, TRD 401, US Coast Guard	

<sup>3</sup> upward to 450°C please consult the manufacturer

Product designation	<b>Non-metallic gasket with inner eyelet and pre-compressed edge, SIGRAFLEX® HOCHDRUCK</b>	<b>Non-metallic gasket with inner and outer eyelet and/or centering ring, SIGRAFLEX® HOCHDRUCK</b>
Product name	<b>WS 3885 HB</b>	<b>WS 3885 DB/WS 3885 DB-ZR</b>
Product image		
Profile No.	FD11 	FD30  FD33 
Features	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4571; standard thickness 2.0 mm.</p> <p>Complies with TA Luft, is blow-out resistant, sturdy, is high strength and easy to handle. High operating pressures up to 250 bar, suitable for seals which have only low surface pressures. Highly gas-tight.</p>	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; inner and outer double eyelet made from stainless steel 1.4571; standard thickness 2.0 mm.</p> <p>Complies with TA Luft, is blow-out resistant, sturdy, is high strength and easy to handle. Operating pressures up to 250 bar. For use at high operating temperatures. Highly gas-tight. Suitable for tongue/groove [FD30] and raised face flanges [FD33]</p>

**OPERATIONAL DATA**

Pressure	Max. 250 bar	Max. 250 bar
Temperature	-250 °C to 550 °C <sup>3</sup>	-250 °C to 600 °C <sup>3</sup>






**APPROVALS**

TA Luft 2002 [VDI 2440/2200]	<b>X</b>	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]	<b>X</b>	<b>X</b>
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>
KTW-guideline		
Fire Safe Test	<b>X</b>	<b>X</b>
FDA		
EG 1935/2004		
Blow-out resistance	<b>X</b>	<b>X</b>
Germanischer Lloyd		
Features		

<sup>3</sup> upward to 450°C please consult the manufacturer

# GRAPHITE.

## SIGRAFLEX® HOCHDRUCK PRO.

Product designation	Non-metallic gasket, SIGRAFLEX® HOCHDRUCK PRO	Non-metallic gasket with inner eyelet, SIGRAFLEX® HOCHDRUCK PRO
Product name	WS 3888	WS 3888 IB
Product image		 
Profile No.	FD01 	FD10 
Features	Sealing system made from SIGRAFLEX® HOCHDRUCK PRO; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; standard thickness 2.0 mm. Complies with TA Luft and VDI 2290 <sup>1</sup> , is blow-out resistant, sturdy, is high strength and easy to handle. Operating pressures up to 250 bar. Highly gas-tight.	Sealing system made from SIGRAFLEX® HOCHDRUCK PRO; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4571; standard thickness 2.0 mm. Complies with TA Luft and VDI 2290 <sup>1</sup> , is blow-out resistant, sturdy, high strength and easy to handle. Operating pressures up to 250 bar. Highly gas-tight.

### OPERATIONAL DATA






Pressure	Max. 250 bar	Max. 250 bar
Temperature	-250 °C to 550 °C <sup>3</sup>	-250 °C to 550 °C <sup>3</sup>

### APPROVALS

TA Luft 2002 [VDI 2440/2200]	<b>X</b>	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]		
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>
KTW-guideline		
Fire Safe Test	<b>X</b>	<b>X</b>
FDA		
EG 1935/2004		
Blow-out resistance	<b>X</b>	<b>X</b>
Germanischer Lloyd		
Features		





<sup>1</sup> Complies with VDI 2290 only in combination with a leakage certificate as per EN 1591-1 | <sup>3</sup> upward to 450°C please consult the manufacturer



Product designation	<b>Non-metallic gasket with inner eyelet and pre-compressed edge, SIGRAFLEX® HOCHDRUCK PRO</b>	<b>Non-metallic gasket with inner and outer eyelet and/or centering ring, SIGRAFLEX® HOCHDRUCK PRO</b>
Product name	<b>WS 3888 HB</b>	<b>WS 3888 DB/WS 3888 DB-ZR</b>
Product image		
Profile No.	FD11 	FD30  FD33 
Features	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK PRO; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; optimised inner eyelet made from stainless steel 1.4571; standard thickness 2.0 mm.</p> <p>Complies with TA Luft and VDI 2290<sup>1</sup>, is blow-out resistant, sturdy, high strength and easy to handle. High operating pressures up to 250 bar, suitable for seals which have only low surface pressures. Highly gas-tight.</p>	<p>Sealing system made from SIGRAFLEX® HOCHDRUCK PRO; waterproofed, inserts without adhesives made from 0.05 mm stainless steel 316L; inner and outer double eyelet made from stainless steel 1.4571; standard thickness 2.0 mm.</p> <p>Complies with TA Luft, is blow-out resistant, sturdy, is high strength and easy to handle. Operating pressures up to 250 bar. High gas tightness. Suitable for tongue and groove [FD30] and raised face flanges [FD33].</p>
<b>OPERATIONAL DATA</b>		
Pressure	Max. 250 bar	Max. 250 bar
Temperature	-225 °C to 550 °C <sup>3</sup>	-250 °C to 600 °C <sup>3</sup>
<b>APPROVALS</b>		
TA Luft 2002 [VDI 2440/2200]	<b>X</b>	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]		
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>
KTW-guideline		
Fire Safe Test	<b>X</b>	<b>X</b>
FDA		
EG 1935/2004		
Blow-out resistance	<b>X</b>	<b>X</b>
Germanischer Lloyd		
Features		

<sup>1</sup> Complies with VDI 2290 only in combination with a leakage certificate as per EN 1591-1 | <sup>3</sup> upward to 450°C please consult the manufacturer

# GRAPHITE. SIGRAFLEX® MF.

Product designation	<b>Non-metallic gasket with inner eyelet, SIGRAFLEX® MF</b>	<b>Non-metallic gasket with inner and outer eyelet, SIGRAFLEX® MF</b>
Product name	<b>WS 3870 IB</b>	<b>WS 3870 DB</b>
Product image		
Profile No.	FD10 	FD30 
Features	<p>Sealing system consisting of three components: with optimised inner eyelet for minimum leakage and maximum safety whilst highly chemically resistant.</p> <p>Complies with highest requirements to keep the operating medium clean. Parts in contact with media are FDA-conform. Very good media resistance [specifically against corrosive substances and chemicals]. No adhesion to the flange surface; low assembly effort.</p> <p>Complies with TA Luft and VDI 2290<sup>1</sup>.</p>	<p>Sealing system made from three components: with inner and outer eyelet for minimal leakage and maximum safety whilst highly chemically resistant.</p> <p>Complies with highest requirements to keep the operating medium clean. 100% chamfering of the graphite due to inner and outer eyelets. Parts in contact with media are FDA-conform. Very good media resistance [specifically against corrosive substances and chemicals]. No adhesion to the flange surface; low assembly effort.</p> <p>Complies with TA Luft and VDI 2290<sup>1</sup>.</p>

## OPERATIONAL DATA

Pressure	Max. 160 bar	Max. 160 bar
Temperature	-200 °C to 300 °C	-200 °C to 300 °C

## APPROVALS

TA Luft 2002 [VDI 2440/2200]	<b>X</b>	<b>X</b>
BAM oxygen	<b>X</b>	<b>X</b>
BAM EO/PO [Ethylene-/Propylene oxide]		
DVGW [DIN 3535-6]	<b>X</b>	<b>X</b>
KTW-guideline		
Fire Safe Test	<b>X</b>	<b>X</b>
FDA	<b>X</b>	<b>X</b>
EG 1935/2004	<b>X</b>	<b>X</b>
Blow-out resistance	<b>X</b>	<b>X</b>
Germanischer Lloyd		
Features		

<sup>1</sup> Complies with VDI 2290 only in combination with a leakage certificate as per EN 1591-1