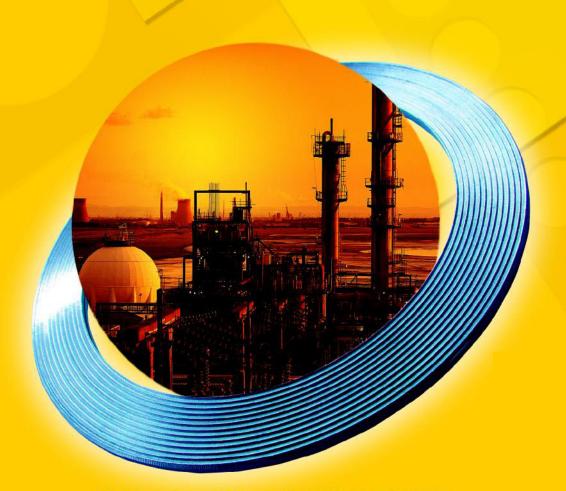


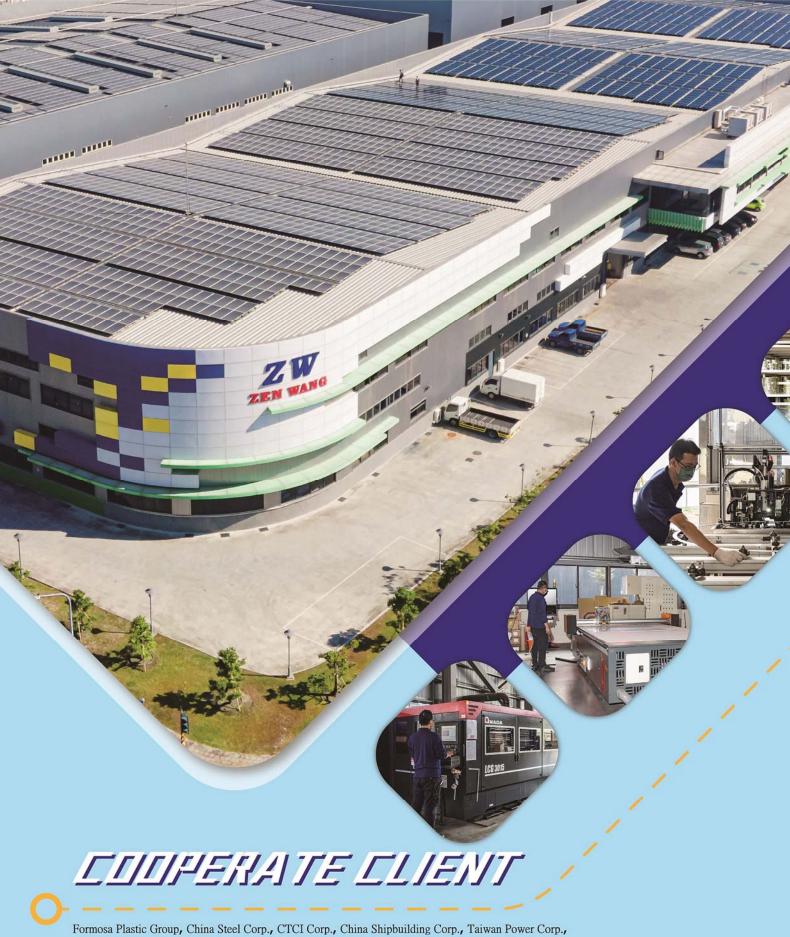


Global Sourcing • Local Service

# Sealing Materials and Sealing Gaskets



The Most Cost-Effective Static Sealing Solution



The Chemours (Taiwan) Co., Ltd., Chang Chun Group, Dairen Chemical Corp., CPDC (China Petrochemical Development Corp.), YFY (Yuen Foong Yu) Group, HPPC (Ho-Ping Power Co.), NSMC (Nimic Ship Management Co., Ltd.), Shihlien Energy Technology Co. and lots of chemical industries and steel works.



















ZEN WANG was established in 1992. It is a company specializing in the design, manufacturing and service of gaskets. For many years, it has been adhering to the principle of "processing the best gasket materials in the world into products that are most suitable for customer applications in Taiwan" (Global Sourcing, Local Service)". The company's high-quality business philosophy and continuous improvement of technology, thanks to the cultivation and guidance of our customers, the products cover all sealing applications (Sealing Application) and comply with various international industrial standards, such as JIS, CNS, EN, ASME-ANSI, BS, ASTM and other specifications.

ZEN WANG has a deep understanding of today's industry trends and customer needs. Rapid and flexible production, precision, high output and qualification rate, and emphasis on environmental protection have become the only way to win in the market; therefore, it is closely related to process stability and environmental safety. Sealing gaskets have gradually attracted the attention of users. However, there are many materials and forms of sealing gaskets, and they are constantly being introduced. The correct selection is not easy. Our company adheres to the entrepreneurial spirit of technology and service. In addition to accumulating many years of production In addition to application experience, we are agents for many well-known foreign manufacturers such as FLEXITALLIC, FRENZELIT, GORE, APS, etc. We hope to provide customers with instant and satisfactory "ZEN WANG SEALING GASKETS" at any time.

We has advanced and complete gasket production equipment and a rich inventory of gasket raw materials, including non-asbestos gaskets, non-asbestos graphite gaskets, graphite gaskets, graphite rings, graphite belts, metal mesh graphite gaskets, metal Reinforced graphite gaskets, pure PTFE gaskets, pure PTFE coated gaskets, expanded PTFE gaskets, expanded PTFE strips & tapes, oil-resistant paper gaskets, cork rubber gaskets, various rubber gaskets and O-rings, metal scroll gaskets, toothed composite gaskets, metal-coated gaskets, metal corrugated gaskets, metal rings, hollow metal rings, braided packing of various materials, fireproof insulation materials (glass fiber, ceramic fiber, mica), insulation groups, safety protective covers, etc. can be supplied in a short time.

ZEN WANG has taken a steady first step, and its products have been designated and selected by major private companies. The industries include petrochemical plants (Petrochemical), refineries (Refining), steel plants, power plants, solar energy industry, shipbuilding, ships, Fluid/gas/vapor transportation, valves, etc. "Growing with customers" is our company's consistent belief. ESG is an important issue for the growth of modern enterprises. Let our sealing technology and products help you achieve the management goals of creating a friendly environment, fulfilling social responsibilities and best corporate governance as soon as possible.









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NON-METALLIC GASKET







	T	Chula Number	Gasket Factor	Min. Loading Stress	Working R	ange	D
	Туре	Style Number	m	y (MPa)	Temperature (°C)	Pressure (bar)	Page
		ZW#659X system (Graphite filler)	3.0	69	-200~450 <sup>(1)</sup>	400	
	Spiral Wound Gasket	ZW#759X system (Expanded PTFE filler)	3.0	69	-200~260	400	5-8
	- F	ZW#859X system (Non-Asbestos filler)	3.0	69	-150~250	300	
-		ZW#959X system (Complex e.g.Mica/Graphite <sup>(2)</sup> )	3.0	52	-200~750	100	
		ZW#70X system		Graphite 28	Graphite -200~450 <sup>(1)</sup>	Graphite 400	
	Kammprofile Gasket	ZW#80X system (Convex)	2.0	ePTFE 28	ePTFE -200~260	ePTFE 400	14
_		, , ,		Mica 40	Mica -100~1000	Mica 20	
뷺		ZW#5200/ZW#6200 (Single w/FG both sides)	3.25~3.75	38~62	Copper:-100~315	70	
ask	Metal Jacketed Gasket	ZW#5800/ZW#6800 (Double w/FG both sides)			Aluminum:-200~425		
Semi-Metallic Gasket		ZW#5100 (Corrugated)	2.5~3.5	20~45	304SS:-200~540 <sup>(3)</sup>	68	16
tall	Metal Corrugated Gasket	ZW#5000/ZW#5010	2.0	26	Graphite -200~450 <sup>(1)</sup>	150	
ŠΑ		·			ePTFE -200~260		
i i i		ZW#6600 Frenzelit novaphit <sup>®</sup> SSTC XP Frenzelit novaphit <sup>®</sup> MST XP	2.5 2.3	23 13	-200~550	250	27
Š		Flexitallic®RGS1			200%270	100	
		Flexitallic®RGS3	2.0 2.5	8 8	-200~370 -200~370	100 100	
	Matal Dainfarrad Combita	Flexitallic®RGS4	2.5	8	-200~370	100	29
	Metal Reinforced Graphite Gasket	Flexitallic®RGS-HP	2.5	20	-250~550 <sup>(1)</sup>	250	
	dasket	ZW#3600-N	2.0		250 550	230	
		ZW#3600-N	2.0	8	-200~450 <sup>(1)</sup>	150	
		ZW#3600-T	2.5	Ü	200 430	150	28
		ZW#3632 MRG	2.5	25	-200~550	250	
<b>—</b> (1)		EVVISOSE WING	Soft Iron:5.5	Soft Iron:124		250	
Metal Iic Gaske t	Metal Ring-Joint Gasket	ZW#5500 system	F5/Monel:6.0	F5/Monel:150	E.G.:304SS	Flange Rating	18-19
≥ - 8		200.00000000000000000000000000000000000	SS/Alloy:6.5	SS/Alloy:180	-250~540 <sup>(4)</sup>	150#~20000#	10 13
		ZW#3000 Frenzelit novapress® 260	2.5	22	-100~300	90	22
	Non-Asbestos Sheet Gasket	Flexitallic® SF 2400	3.2	20	-100~350	100	23
		ZW#8800 Frenzelit novapress® Basic	2.5	17	-50~300	85(water,steam),	24
		Frenzelit novapress <sup>®</sup> 850	2.5	5	-100~150	80(other)	25
	Fiber-reinforced Graphite	ZW#9500 Frenzelit novatec® Premium XP	2.8	13	-100~450	100	26
		ZW#3600-P Graphite Gasket/ZW#3700			(4)		
	Graphite	Graphite Tape/ ZW#3800 Graphite Ring	2.0	8	-200~450 <sup>(1)</sup>	150	28
-	Thermiculite® Gasket –	Flexitallic® Thermiculite® 815	2.0	17	-200~1000	200	
	High Temperature	Flexitallic <sup>®</sup> Thermiculite <sup>®</sup> 715	3.2	29	-40~454	140	30
	Dhlaganita Misa Caskets	Frenzelit novamica®200	2.8	33	200 1000	60	21
	Phlogopite Mica Gaskets	Frenzelit novamica®THERMEX	2.3	33	-200~1000	60	31
		Frenzelit isoplan 500 GREENLINE			300~500(1050)		
	Biosoluble Mineral Fibres	Frenzelit isoplan 750 GREENLINE	4.0	80	-200~750(850)	0.5	31
ket		Frenzelit isoplan 1000 GREENLINE			-200~1000(1050)		-
Gas	Carrania Filana Caaliat	Frenzelit isoplan 1100 GREENLINE	4.0	00	-200~1100(1150)	0.5	21
Non-Metallic Gasket	Ceramic Fibre Gasket	Frenzelit isoplan 1100	4.0	80	-200~1100	0.5	31
leta	Filled PTFE Gasket	Flexitallic <sup>®</sup> Sigma500 Sigma511	1.4	13	-200~260	85(1.5T)	22
≥	Filled PTFE Gasket	Sigma511 Sigma533	1.4	16 16	-200~260	80(2.0T) 75(3.0T)	32
Š	Pure PTFE Gasket	ZW#7500	3.0	20	-100~150	10	
	Ture FITE Gasket	ZW#7530 \ ZW#7531 \ ZW#7535	3.0	20	-100~150 -100~150	20	33
	PTFE Envelope Gasket	ZW#7531 ( ZW#7531	3.0	20	-100~150	40	33
		Flexitallic <sup>®</sup> Sigma <sup>®</sup> 600	1.4	11	-250~260	85	33
		GORE® GR	2.5	19.3	-268~315	200	34
	Expanded PTFE Gasket	GORE® UPG (Style800)	2.4	10.6	-268~315	200	35
		GORE Gasket Tape, Joint Sealant(incl.500/600)	2.5	19.3	-268~315	200	36-37
		ZEALON expanded PTFE Joint Sealant, Tape	2.0	20.7	-268~260	200	39
		ZW#2200 CR, ZW#2300 NBR, ZW#2600 EPDM			-20~90		
	Rubber Sheet Gasket	ZW#2500 VITON(FKM)	0.5	0	-30~120	55	50
					-30~90		
	O'll Desert Deservition	ZW#2700 SBR					
	Oil-Proof Paper Jointing	ZW#2700 SBR ZW#2900	0.5	0	Max. 120	8	52
-	Oil-Proof Paper Jointing Sheet Gasket Cork Rubber Sheet Gasket		0.5	0		8 15~60	52 53

Note:(1) The max. temperature of Graphite is  $450^{\circ}$ C in air, and max.  $650^{\circ}$ C in reducing atmosphere. If over than  $450^{\circ}$ C, please contact with our technical division.

- (2) Spiral filler materials are available as per customer demand.
- (3) If metal gasket is with Graphite on both sides, the gasket max. temperature shall refer to Note(1).
- (4) Metal material properties please refer to page 19.
- (5) Most gaskets can't reach the working range in max. pressure and max. temperature at the same time. If similar requirement, please contact with us.
- (6) Chemical Compatibility Chart of various gasket materials are available, please contact with us.



Spiral Wound Gasket is made of alternate piles of V-preformed hoop and soft filler that are tightly and spirally wound together. According to the need of the mating flange, the gasket is provided with an outer ring, an inner ring or both outer and inner rings.

The outer ring serves as a compression stop, anti-blowout device, which properly centers the gasket on the flange. The inner ring acts as a compression stop and is used to fill the annular space between the flange bores and the gasket inside diameter to minimize turbulence of process fluids and erosion of flanges faces.

The spiral wound outer or inner rings are used primarily as reinforcement and are chosen instead of a solid metal ring, because of lower costs or because of limited space when the use of a solid metal ring would be prohibited due to the difficulty in fabrication or usage. ZW spiral wound gaskets can be



manufactured in accordance with all relevant gasket standards to suit various flange designation such as ASME/ANSI B16.5, API 605 (ASME B16.47 Series B), MSS SP-44 (ASME B16.47 Series A), AWWA, CNS, DIN and JIS. The size is available from OD 1/2" to 5000mm. Please note the gaskets for non-standard flanges or heat exchanger with partitions are also readily available. Low stress spiral wound gasket could replace normal non-metallic gasket in ANSI 150#/300# Flange under lower torque, about only 60% of traditional spiral wound gasket.

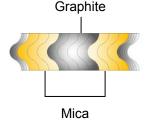
#### Style

Shape	Profile	Soft Filler Materials					
Snape	rione	Graphite	ePTFE	Non-Asbestos	Complex		
Basic		ZW#6590	ZW#7590	ZW#8590	ZW#9590		
With Outer Ring		ZW#6591	ZW#7591	ZW#8591	ZW#9591		
With Inner Ring		ZW#6592	ZW#7592	ZW#8592	ZW#9592		
With Inner and Outer Ring		ZW#6596	ZW#7596	ZW#8596	ZW#9596		
Double Spiral		Custom-mad	de				

#### %ZW#6596 had approved by API 6FB fire test

Complex means customize by two soft filler materials as the following, e.g.: Graphite, ePTFE, Non-Asb., Mica, Ceramic...etc.





e.g.: ZW#9596 (Mica / Graphite / Mica)

The complex soft filler, e.g. Mica, then Graphite, and then Mica, the construct designed for Mica filler covered the outside of Graphite filler to isolate oxygen. Graphite is flexible to meet the flange surface and allow the use of high temperature in the non-oxidizing space, and Graphite will not pollute the media.

#### Below Special styles are also available as per customer's requirement











# Working Range

Filler Material	Filler Material Temperature ( °C)	
Graphite	Graphite -200~450(air) /650(reducing atmosphere)	
Expanded PTFE	-200~260	400
Non-Asbestos	-150~250	300
Mica / Graphite	-200~750	100

# Selection Guide

•Selection Guide							
Flange Face	Raised Face	Flat Face	Male and Female	Tongue and Groove	Flat Face to Recess		
	Inapplicable	Inapplicable	Suitable 1/2"~24" 150#~600#	Suitable 1/2"~60" 300#~1500#	Suitable 1/2"~60" 300#~1500#		
	Inapplicable	Inapplicable	Suitable 1/2"~60" 150#~1500#	Inapplicable	Inapplicable		
	Suitable 1/2"~24" 150#~600#	Suitable 1/2"~24" 150#~600#	Inapplicable	Inapplicable	Inapplicable		
	Suitable 1/2"~60" 150#~1500#	Suitable 1/2"~60" 150#~1500#	Inapplicable	Inapplicable	Inapplicable		

# •Standard Thickness Selection

Gasket Thickness	Flange Nominal Size		
3.2 mm (0.125 in)	< φ 1500 mm		
4.5 mm (0.175 in)	< φ 3000 mm		
6.4 mm (0.250 in)			
7.2 mm (0.285 in)	φ 3500 mm ~ φ 5000 mm		



# The Identification of Metallic Winding Materials and Fillers

# The Color Coding on Outer Ring

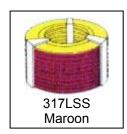
For clear identification, ZW spiral wound gaskets nominate a color-coding system around the outside edge of the outer ring, thus allowing full identification of both the winding strip and filler materials in according to ASME B16.20.

#### Metallic Winding Materials

The metallic winding material is designated by solid color identification around the outside edge of the outer ring











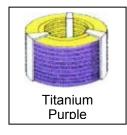








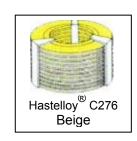


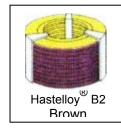


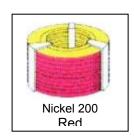


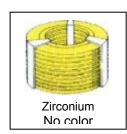




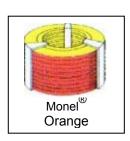






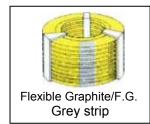


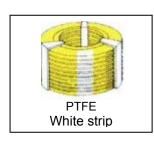


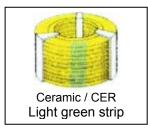


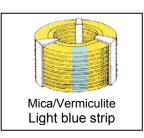
#### Non-Metallic Fillers Materials

The gasket filler materials are designated by a number of strips marked at equal intervals around the outside edge of the outer ring









<sup>\*</sup> Hastelloy® is a registered trademark of Haynes International. INCOLOY® and INCONEL® are registered trademarks of Inco Alloys International, Inc. MONEL® is a registered trademark of International Nickel.

仁 望 Zen Wang

Order Code

	Filler Material
6	Flexible Graphite
7	PTFE
8	Non-Asbestos
9	Complex

	Style
0	Basic
1	With Outer Ring
2	With Inner Ring
6	With Inner and Outer Ring

	Inner Ring Material						
S	Low Carbon Steel	Υ	Inconel 600, 625				
Е	304SS	Y1	Inconel X750				
L	304LSS	W	Incolel 800(H), 825				
_	316SS	Т	Titanium				
	316LSS	X1	Hastelloy B2,B3				
_	310SS	X2	Hastelloy C276				
	316Ti SS	Х3	Hastelloy C22				
	317LSS	Α	Aluminum				
J	321SS	С	Copper				
	347SS	В	Bronze				
R	410SS	Ζ	Zirconium 702				
U	430SS	11	Duplex S31803/S32205				
F	904LSS	12	Alloy 20				
М	Monel 400	13	Super Duplex S32750				
N	Nickel 200						

	Outer	Rino	g Material
S			Inconel 600, 625
	304SS	Y1	Inconel X750
L	304LSS	W	Incolel 800(H), 825
G	316SS	Т	Titanium
Н	316LSS	X1	Hastelloy B2,B3
0	310SS	X2	Hastelloy C276
Р	316Ti SS	Х3	Hastelloy C22
Q	317LSS	Α	Aluminum
J	321SS	С	Copper
K	347SS	В	Bronze
R	410SS	Ζ	Zirconium 702
U	430SS	11	Duplex S31803/S32205
F	904LSS	12	Alloy 20
M	Monel 400	13	Super Duplex S32750
Ν	Nickel 200		

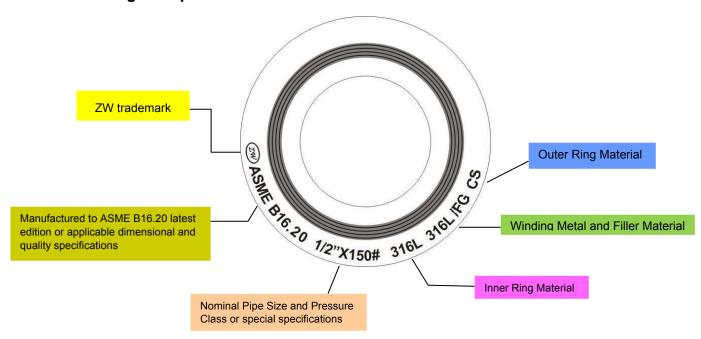
	Winding Strip Material						
Е	304SS	Υ	Inconel 600, 625				
L	304LSS	Y1	Inconel X750				
G	316SS	W	Incolel 800(H), 825				
Н	316LSS	Т	Titanium				
0	310SS	X1	Hastelloy B2,B3				
Р	316Ti SS	X2	Hastelloy C276				
Q	317LSS	Х3	Hastelloy C22				
J	321SS	Α	Aluminum				
K	347SS	С	Copper				
R	410SS	В	Bronze				
U	430SS	Ζ	Zirconium 702				
F	904LSS	11	Duplex S31803/S32205				
М	Monel 400	12	Alloy 20				
N	Nickel 200	13	Super Duplex S32750				

% Order example: ZW 6596 MME stands for a combination of Monel 400 winding, Graphite filler, Monel 400 inner ring, and 304SS outer ring.

**ZW # 6 5 9 0 - M M E** 

- The material of Inner ring should match the winding material.
- Winding metal strip thickness 0.15mm~0.23mm

# • Gasket Marking/Stamp follow ASME B16.20



# **Dimensions of Spiral Wound Gasket**



# for ANSI / ASME B16.5 Flanges

Basic ~ **ZW#6590** 

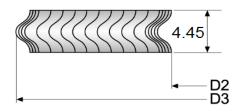
With Inner Ring ~ ZW#6592

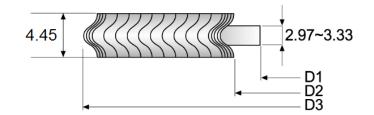
~ ZW#7590

~ ZW#7592

~ ZW#8590

~ ZW#8592





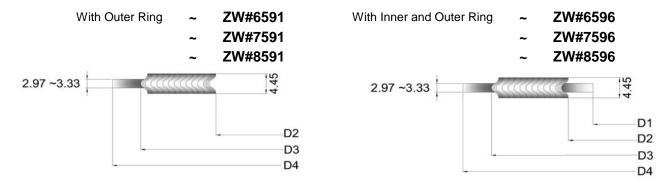
Flores	Style IR/ID	Large Male	and Female	Large Tongue	and Groove	Small Tongu	ie and Groove	
Flange Nominal	150-1500#	150-1500#		150-2	500#	150-2500#		
Size	D1	ID D2	OD D3	ID D2	OD D3	ID D2	OD D3	
1/2"	14.2	25.4	34.9	25.4	34.9	25.4	34.9	
3/4"	20.6	33.3	42.9	33.3	42.9	33.3	42.9	
1"	26.9	38.1	50.8	38.1	50.8	38.1	47.9	
1-1/4"	34.9	47.6	63.5	47.6	63.5	47.6	57.2	
1-1/2"	41.3	54.0	73.0	54.0	73.0	54.0	63.5	
2"	52.4	73.0	92.1	73.0	92.1	73.0	82.6	
2-1/2"	63.5	85.7	104.8	85.7	104.8	85.7	95.3	
3"	77.8	108.0	127.0	108.0	127.0	108.0	117.5	
3-1/2"	90.5	120.7	139.7	120.7	139.7	120.7	130.2	
4"	103.2	131.8	157.2	131.8	157.2	131.8	144.5	
5"	128.6	160.3	185.7	160.3	185.7	160.3	173.0	
6"	154.0	190.5	215.9	190.5	215.9	190.5	203.2	
8"	203.2	238.1	269.9	238.1	269.9	238.1	254.0	
10"	254.0	285.8	323.9	285.8	323.9	285.8	304.8	
12"	303.2	342.9	381.0	342.9	381.0	342.9	362.0	
14"	342.9	374.7	412.8	374.7	412.8	374.7	393.7	
16"	393.7	425.5	469.9	425.5	469.9	425.5	447.7	
18"	444.5	489.0	533.4	489.0	533.4	489.0	511.2	
20"	495.3	533.4	584.2	533.4	584.2	533.4	558.8	
24"	596.9	641.4	692.2	641.4	692.2	641.4	666.8	

# **Dimensions of Spiral Wound Gasket**



# per ASME B16.20

# for ANSI / ASME B16.5 Flanges



The gasket thickness means the metal strip, and the filler will protrude beyond the metal strip.

Flange Nominal	trickitess i	means the n	0#	and the filler	Will protruc		0#	ıp.	400#				
Size	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4	
1/2"	14.2	19.1	31.8	47.8	14.2	19.1	31.8	54.1	-	_	_	-	
3/4"	20.6	25.4	39.6	57.2	20.6	25.4	39.6	66.8	-	_	-	-	
1"	26.9	31.8	47.8	66.8	26.9	31.8	47.8	73.2	_	_	_	_	
1-1/4"	38.1	47.8	60.5	76.2	38.1	47.8	60.5	82.6	-	_	_	-	
1-1/2"	44.5	54.1	69.9	85.9	44.5	54.1	69.9	95.3	_	_	-	_	
2"	55.6	69.9	85.9	104.9	55.6	69.9	85.9	111.3	-	_	-	-	
2-1/2"	66.5	82.6	98.6	124.0	66.5	82.6	98.6	130.3	_	_	-	_	
3"	81.0	101.6	120.7	136.7	81.0	101.6	120.7	149.4	-	_	_	_	
3-1/2"	101.1	114.3	133.4	161.9	101.1	114.3	133.4	165.1	-	_	_	_	
4"	106.4	127.0	149.4	174.8	106.4	127.0	149.4	181.1	102.6	120.7	149.4	177.8	
5"	131.8	155.7	177.8	196.9	131.8	155.7	177.8	215.9	128.3	147.6	177.8	212.9	
6"	157.2	182.6	209.6	222.3	157.2	182.6	209.6	251.0	154.9	174.8	209.6	247.7	
8"	215.9	233.4	263.7	279.4	215.9	233.4	263.7	308.1	205.7	225.6	263.7	304.8	
10"	268.2	287.3	317.5	339.9	268.2	287.3	317.5	362.0	255.3	274.6	317.5	358.9	
12"	317.5	339.9	374.7	409.7	317.5	339.9	374.7	422.4	307.3	327.2	374.7	419.1	
14"	349.3	371.6	406.4	450.9	349.3	371.6	406.4	485.9	342.9	362.0	406.4	482.6	
16"	400.1	422.4	463.6	514.4	400.1	422.4	463.6	539.8	389.9	412.8	463.6	536.7	
18"	449.3	474.7	527.1	549.4	449.3	474.7	527.1	596.9	438.2	469.9	527.1	593.9	
20"	500.1	525.5	577.9	606.6	500.1	525.5	577.9	654.1	489.0	520.7	577.9	647.7	
24"	603.3	628.7	685.8	717.6	603.3	628.7	685.8	774.7	590.6	628.7	685.8	768.4	

<sup>\*</sup>There are no Class 400 flanges in NPS 1/2 through 3 1/2 (use Class 600).

<sup>\*</sup>All spiral-wound gaskets shall be furnished assembled into a centering ring.

<sup>\*</sup>Inner rings shall be furnished with all spiral-wound gaskets having PTFE filler and flexible Graphite filler material.

<sup>\*</sup>per ASME B16.20-2017.

# **Dimensions of Spiral Wound Gasket**



# per ASME B16.20

# for ANSI / ASME B16.5 Flanges

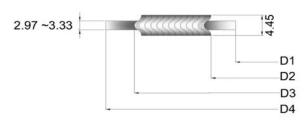
With Outer Ring ~ **ZW#6591** ~ **ZW#7591** 

ZW#8591

With Inner and Outer Ring ~ ZW#6596 ~ ZW#7596

~ ZW#8596

2.97 ~3.33 P4



The gasket thickness means the metal strip, and the filler will protrude beyond the metal strip.

Flange Nominal	t triiokire	600#					00#	eyona in	e metar		00#		2500#			
Size	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4
1/2"	14.2	19.1	31.8	54.1	_	_	_	_	14.2	19.1	31.8	63.5	14.2	19.1	31.8	69.9
3/4"	20.6	25.4	39.6	66.8	_	_	_	_	20.6	25.4	39.6	69.9	20.6	25.4	39.6	76.2
1"	26.9	31.8	47.8	73.2	_	_	_	_	26.9	31.8	47.8	79.5	26.9	31.8	47.8	85.9
1-1/4"	38.1	47.8	60.5	82.6	_	_	_	_	33.3	39.6	60.5	88.9	33.3	39.6	60.5	104.9
1-1/2"	44.5	54.1	69.9	95.3	_	_	_	_	41.4	47.8	69.9	98.6	41.4	47.8	69.9	117.6
2"	55.6	69.9	85.9	111.3	_	_	_	_	52.3	58.7	85.9	143.0	52.3	58.7	85.9	146.1
2-1/2"	66.5	82.6	98.6	130.3	_	_	_	_	63.5	69.9	98.6	165.1	63.5	69.9	98.6	168.4
3"	81.0	101.6	120.7	149.4	78.7	95.3	120.7	168.4	78.7	92.2	120.7	174.8	78.7	92.2	120.7	196.9
3-1/2"	91.4	104.8	133.4	161.9	_	_	_	_		_	_	_	_	_	_	_
4"	102.6	120.7	149.4	193.8	102.6	120.7	149.4	206.5	97.8	117.6	149.4	209.6	97.8	117.6	149.4	235.0
5"	128.3	147.6	177.8	241.3	128.3	147.6	177.8	247.7	124.5	143.0	177.8	254.0	124.5	143.0	177.8	279.4
6"	154.9	174.8	209.6	266.7	154.9	174.8	209.6	289.1	147.3	171.5	209.6	282.7	147.3	171.5	209.6	317.5
8"	205.7	225.6	263.7	320.8	196.9	222.3	257.3	358.9	196.9	215.9	257.3	352.6	196.9	215.9	257.3	387.4
10"	255.3	274.6	317.5	400.1	246.1	276.4	311.2	435.1	246.1	266.7	311.2	435.1	246.1	270.0	311.2	476.3
12"	307.3	327.2	374.7	457.2	292.1	323.9	368.3	498.6	292.1	323.9	368.3	520.7	292.1	317.5	368.3	549.4
14"	342.9	362.0	406.4	492.3	320.8	355.6	400.1	520.7	320.8	362.0	400.1	577.9	_	_	_	_
16"	389.9	412.8	463.6	565.2	374.7	412.8	457.2	574.8	368.3	406.4	457.2	641.4		_	_	_
18"	438.2	469.9	527.1	612.9	425.5	463.6	520.7	638.3	425.5	463.6	520.7	704.9		_	_	_
20"	489.0	520.7	577.9	682.8	482.6	520.7	571.5	698.5	476.3	514.4	571.5	755.7	_	_	_	_
24"	590.6	628.7	685.8	790.7	590.6	628.7	679.5	838.2	577.9	616.0	679.5	901.7	_	_	_	_

<sup>\*</sup>For all filler materials, inner rings shall be furnished in spiral-wound gaskets for NPS 24 and larger in Class 900, NPS 12 and larger in Class 1500, NPS 4 and larger in Class 2500.

<sup>\*</sup>There are no Class 900 flanges in NPS 1/2 through NPS 3 1/2 (use Class 1500); Class 1500 flanges in NPS 3 1/2 or Class 2500 flanges in NPS 3 1/2 or NPS 14 and large.

<sup>\*</sup>All spiral-wound gaskets shall be furnished assembled into a centering ring.

<sup>\*</sup>Inner rings shall be furnished with all spiral-wound gaskets having PTFE filler and flexible Graphite filler material.

<sup>\*</sup>per ASME B16.20-2017.



#### per ASME B16.20

#### for ANSI B16.47 Series B (API 605) Flanges

With Outer Ring ~ ZW#6591

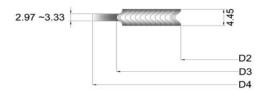
~ ZW#7591

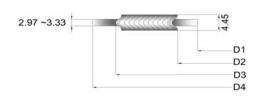
~ ZW#8591

With Inner and Outer Ring ~ ZW#6596

ZW#7596

ZW#8596





	The gasket thickness means the metal stri	<ul> <li>and the filler will</li> </ul>	protrude beyond the metal strip.
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Unit:	mm

Flange			60#		300#					10#			60	10#		900#				
Nominal Size	D1	D2	D3	D4																
26"	654.1	673.1	698.5	725.4	654.1	673.1	711.2	771.7	654.1	666.8	698.5	746.3	644.7	663.7	714.5	765.3	666.8	692.2	749.3	838.2
28"	704.9	723.9	749.3	776.2	704.9	723.9	762.0	825.5	701.8	714.5	749.3	800.1	685.8	704.9	755.7	819.2	717.6	743.0	800.1	901.7
30"	755.7	774.7	800.1	827.0	755.7	774.7	812.8	886.0	752.6	765.3	806.5	857.3	752.6	778.0	828.8	879.6	781.1	806.5	857.3	958.9
32"	806.5	825.5	850.9	881.1	806.5	825.5	863.6	939.8	800.1	812.8	860.6	911.4	793.8	831.9	882.7	933.5	838.2	863.6	914.4	1016.0
34"	857.3	876.3	908.1	935.0	857.3	876.3	914.4	993.9	850.9	866.9	911.4	962.2	850.9	889.0	939.8	997.0	895.4	920.8	971.6	1073.2
36"	908.1	927.1	958.9	987.6	908.1	927.1	965.2	1047.8	898.7	917.7	965.2	1022.4	901.7	939.8	990.6	1047.8	920.8	946.2	997.0	1124.0
38"	958.9	974.9	1009.7	1044.7	971.6	1009.7	1047.8	1098.6	952.5	971.6	1022.4	1073.2	952.5	990.6	1041.4	1104.9	1009.7	1035.1	1085.9	1200.2
40"	1009.7	1022.4	1063.8	1095.5	1022.4	1060.5	1098.6	1149.4	1000.3	1025.7	1076.5	1127.3	1009.7	1047.8	1098.6	1155.7	1060.5	1098.6	1149.4	1251.0
42"	1060.5	1079.5	1114.6	1146.3	1085.9	1111.3	1149.4	1200.2	1051.1	1076.5	1127.3	1178.1	1066.8	1104.9	1155.7	1219.2	1111.3	1149.4	1200.2	1301.8
44"	1111.3	1124.0	1165.4	1197.1	1124.0	1162.1	1200.2	1251.0	1104.9	1130.3	1181.1	1231.9	1111.3	1162.1	1212.9	1270.0	1155.7	1206.5	1257.3	1368.6
46"	1162.1	1181.1	1224.0	1255.8	1178.1	1216.2	1254.3	1317.8	1168.4	1193.8	1244.6	1289.1	1162.1	1212.9	1263.7	1327.2	1219.2	1270.0	1320.8	1435.1
48"	1212.9	1231.9	1270.0	1306.6	1231.9	1263.7	1311.4	1368.6	1206.5	1244.6	1295.4	1346.2	1219.2	1270.0	1320.8	1390.7	1270.0	1320.8	1371.6	1485.9
50"	1263.7	1282.7	1325.6	1357.4	1267.0	1317.8	1355.9	1419.4	1257.3	1295.4	1346.2	1403.4	1270.0	1320.8	1371.6	1447.8	-	-	-	-
52"	1314.5	1333.5	1376.4	1408.2	1317.8	1368.6	1406.7	1470.2	1308.1	1346.2	1397.0	1454.2	1320.8	1371.6	1422.4	1498.6	-	_	-	-
54"	1365.3	1384.3	1422.4	1463.8	1365.3	1403.4	1454.2	1530.4	1352.6	1403.4	1454.2	1517.7	1378.0	1428.8	1479.6	1555.8	-	-	-	-
56"	1422.4	1444.8	1478.0	1514.6	1428.8	1479.6	1524.0	1593.9	1403.4	1454.2	1505.0	1568.5	1428.8	1479.6	1530.4	1612.9	-	-	-	-
58"	1478.0	1500.1	1528.8	1579.6	1484.4	1535.2	1573.3	1655.8	1454.2	1505.0	1555.8	1619.3	1473.2	1536.7	1587.5	1663.7	-	-	-	-
60"	1535.2	1557.3	1586.0	1630.4	1557.3	1589.0	1630.4	1706.6	1517.7	1568.5	1619.3	1682.8	1530.4	1593.9	1644.7	1733.6	-	-	-	-

<sup>\*</sup>There are no Class 900 flanges in NPS 50 and larger.

<sup>\*</sup>For all filler materials, inner rings shall be furnished in spiral-wound gaskets for NPS 24 and larger in Class 900, NPS 12 and larger in Class 1500, NPS 4 and larger in Class 2500.

<sup>\*</sup>All spiral-wound gaskets shall be furnished assembled into a centering ring.

<sup>\*</sup>Inner rings shall be furnished with all spiral-wound gaskets having PTFE filler and flexible Graphite filler material.

<sup>\*</sup>per ASME B16.20-2017.



#### per ASME B16.20

#### for ANSI B16.47 Series A (MSS-SP44) Flagnes

With Outer Ring With Inner and Outer Ring ZW#6591 ZW#6596 ZW#7591 ZW#7596 ZW#8591 ZW#8596 2.97 ~3.33 2.97 ~3.33 D1 D2 D2 D3 D3 D4 D4

The gasket thickness means the metal strip, and the filler will protrude beyond the metal strip.

rne gask	gasket thickness means the metal strip, and the filler will protrude beyond the metal strip.  Unit: mm																			
Flange		15	60#			30	00#			40	00#			60	00#		900#			
Nominal Size	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4	D1	D2	D3	D4
22"	552.5	577.9	609.6	660.4	552.5	577.9	628.7	704.8	552.5	577.9	628.7	701.7	552.5	577.9	628.7	733.4		616.0	685.8	838.2
26"	654.1	673.1	704.9	774.7	654.1	685.8	736.6	835.2	660.4	685.8	736.6	831.9	647.7	685.8	736.6	866.9	660.4	685.8	736.6	882.7
28"	704.9	723.9	755.7	831.9	704.9	736.6	787.4	898.7	711.2	736.6	787.4	892.3	698.5	736.6	787.4	914.4	711.2	736.6	787.4	946.2
30"	755.7	774.7	806.5	882.7	755.7	793.8	844.6	952.5	755.7	793.8	844.6	946.2	755.7	793.8	844.6	971.6	768.4	793.8	844.6	1009.7
32"	806.5	825.5	860.6	939.8	806.5	850.9	901.7	1006.6	812.8	850.9	901.7	1003.3	812.8	850.9	901.7	1022.4	812.8	850.9	901.7	1073.2
34"	857.3	876.3	911.4	990.6	857.3	901.7	952.5	1057.4	863.6	901.7	952.5	1054.1	863.6	901.7	952.5	1073.2	863.6	901.7	952.5	1136.7
36"	908.1	927.1	968.5	1047.8	908.1	955.8	1006.6	1117.6	917.7	955.8	1006.6	1117.6	917.7	955.8	1006.6	1130.3	920.8	958.9	1009.7	1200.2
38"	958.9	977.9	1019.3	1111.3	952.5	977.9	1016.0	1054.1	952.5	971.6	1022.4	1073.2	952.5	990.6	1041.4	1104.9	1009.7	1035.1	1085.9	1200.2
40"	1009.7	1028.7	1070.1	1162.1	1003.3	1022.4	1070.1	1114.6	1000.3	1025.7	1076.5	1127.3	1009.7	1047.8	1098.6	1155.7	1060.5	1098.6	1149.4	1251.0
42"	1060.5	1079.5	1124.0	1219.2	1054.1	1073.2	1120.9	1165.4	1051.1	1076.5	1127.3	1178.1	1066.8	1104.9	1155.7	1219.2	1111.3	1149.4	1200.2	1301.8
44"	1111.3	1130.3	1178.1	1276.4	1104.9	1130.3	1181.1	1219.2	1104.9	1130.3	1181.1	1231.9	1111.3	1162.1	1212.9	1270.0	1155.7	1206.5	1257.3	1368.6
46"	1162.1	1181.1	1228.9	1327.2	1152.7	1178.1	1228.9	1273.3	1168.4	1193.8	1244.6	1289.1	1162.1	1212.9	1263.7	1327.2	1219.2	1270.0	1320.8	1435.1
48"	1212.9	1231.9	1279.7	1384.3	1209.8	1235.2	1286.0	1324.1	1206.5	1244.6	1295.4	1346.2	1219.2	1270.0	1320.8	1390.7	1270.0	1320.8	1371.6	1485.9
50"	1263.7	1282.7	1333.5	1435.1	1244.6	1295.4	1346.2	1378.0	1257.3	1295.4	1346.2	1403.4	1270.0	1320.8	1371.6	1447.8	-	-	_	_
52"	1314.5	1333.5	1384.3	1492.3	1320.8	1346.2	1397.0	1428.8	1308.1	1346.2	1397.0	1454.2	1320.8	1371.6	1422.4	1498.6	-	-	_	_
54"	1358.9	1384.3	1435.1	1549.4	1352.6	1403.4	1454.2	1492.3	1352.6	1403.4	1454.2	1517.7	1378.0	1428.8	1479.6	1555.8	-	-	-	_
56"	1409.7	1435.1	1485.9	1606.6	1403.4	1454.2	1505.0	1543.1	1403.4	1454.2	1505.0	1568.5	1428.8	1479.6	1530.4	1612.9	-	-	-	-
58"	1460.5	1485.9	1536.7	1663.7	1447.8	1511.3	1562.1	1593.9	1454.2	1505.0	1555.8	1619.3	1473.2	1536.7	1587.5	1663.7	-	_	_	-
60"	1511.3	1536.7	1587.5	1714.5	1524.0	1562.1	1612.9	1644.7	1517.7	1568.5	1619.3	1682.8	1530.4	1593.9	1644.7	1733.6	-	-	-	-

<sup>\*</sup>There are no Class 900 flanges in NPS 50 and larger.

<sup>\*</sup>For all filler materials , inner rings shall be furnished in spiral-wound gaskets for NPS 24 and larger in Class 900, NPS 12 and larger in Class 1500, NPS 4 and larger in Class 2500.

 $<sup>{}^{\</sup>star}\text{All}$  spiral-wound gaskets shall be furnished assembled into a centering ring.

<sup>\*</sup>Inner rings shall be furnished with all spiral-wound gaskets having PTFE filler and flexible Graphite filler material.

<sup>\*</sup>per ASME B16.20-2017.

<sup>\*22&</sup>quot; is non-standard and the size is for reference only.



The Kammprofile gasket consists of a precision serrated metallic core with additional soft sealing tapes bonded to each serrated face. It is particularly suitable for flanges, pressure vessels cover, heat exchangers and various valve connections in high temperature, pressure or fluctuating conditions. The equally separated concentric circles can minimize lateral flow of soft seal and ensures to provide exceptional gasket rigidity and blow out resistance. Size designed to meet EN12560-6 and B16.20 standards, available soft sealing materials are graphite, Gore ePTFE, Non-asbestos fiber and Mica...etc. The gasket can be re-used by just updating soft seal and is an alternative solution to enhance Spiral Wound and Metal Jacketed Gasket. Custom-made Kammprofile and Spiral Wound complex gasket is also available.

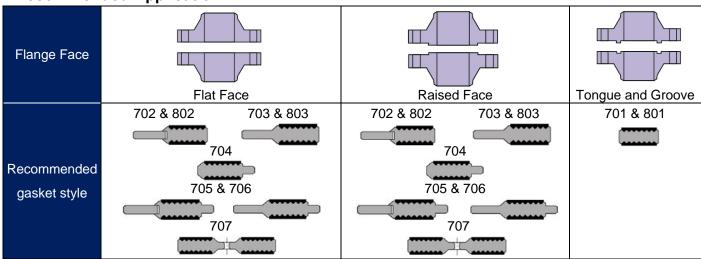


#### Style

Otylo								
Description	Profile	Style No.	Thickness	Core Materials		Facing	Materials	
Flat		ZW#700	1.5~3.2mm	CANDON STELL		Tempe	rature(°C)	Pressure
Basic		ZW#701		304SS 304LSS 316SS	Material	Min.	Max.	(bar)
With Loose O.R.		ZW#702		316LSS 316Ti 317LSS				
With Integral O.R.		ZW#703		321SS 347SS				
With Integral I.R.		ZW#704	3.2 mm	410SS 904LSS 5Cr-0.5Mo(F5)	Graphite	-200	450 (air)	400
With Loose O.R. & Integral I.R.		ZW#705	4.0 mm	MONEL 400 NICKEL 200 INCONEL 600 625		-200	600 (reducing	
With Integral I.R. & O.R.		ZW#706	4.5 mm	INCOLOY 800 825 TITANIUM	ePTFE	-200	atmosphere)	400
Double Kammprofile		ZW#707	5.0 mm	HASTELLOY B2/B3 HASTELLOY C276 HASTELLOY C22	Mica	-100	1000	20
Convex	******	ZW#801		ALUMINUM COPPER	Graphite	-100	750	100
Convex with Loose O.R.		ZW#802		BRONZE SILVER ZIRCONIUM	/Mia	-100	750	100
Convex with Integral O.R.		ZW#803		DUPLEX S31803/S32205 ALLOY 20 OTHERS				

XZW#703-316L/FG-316L had approved by API 6FB fire test

#### Recommended Application

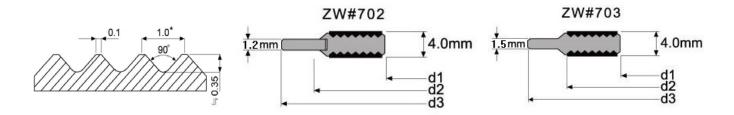


Style No.ZW#704, ZW#705 and ZW#706 with Integral I.R. only suit for special requirement under customer request.

# **Dimensions of Kammprofile Gasket**



# per ASME B16.20 for ANSI/ASME B16.5 Flanges



Standard Thickness: Metal core 2.97~3.33mm, Soft Layer 0.46~0.56mm.

\*The pitch of larger Kammprofile gaskets can also be produced according to customer requirements.

*The pitch of la	rger Kamimpio	ille gaskets ca	n also be prod	uceu accordinț	y to customer i	d3			Unit: mm
Nominal	d1	d2							
Size			150#	300#	400#	600#	900#	1500#	2500#
1/2"	23.1	33.3	47.8	54.1		54.1		63.5	69.9
3/4"	28.7	39.6	57.2	66.8	_	66.8	_	69.9	76.2
1"	36.6	47.5	66.8	73.2	_	73.2	_	79.5	85.9
1-1/4"	44.5	60.2	76.2	82.6	_	82.6	_	88.9	104.9
1-1/2"	52.3	69.9	85.9	95.3	_	95.3	_	98.6	117.6
2"	69.9	88.9	104.9	111.3	_	111.3	_	143.0	146.1
2-1/2"	82.6	101.6	124.0	130.3	_	130.3	_	165.1	168.4
3"	98.3	123.7	136.7	149.4	_	149.4	168.4	174.8	196.9
4"	123.7	153.9	174.8	181.1	177.8	193.8	206.5	209.6	235.0
5"	150.9	182.6	196.9	215.9	212.9	241.3	247.7	254.0	279.4
6"	177.8	212.6	222.3	251.0	247.7	266.7	289.1	282.7	317.5
8"	228.6	266.7	279.4	308.1	304.8	320.8	358.9	352.6	387.4
10"	282.7	320.8	339.9	362.0	358.9	400.1	435.1	435.1	476.3
12"	339.6	377.7	409.7	422.4	419.1	457.2	498.6	520.7	549.4
14"	371.6	409.7	450.9	485.9	482.6	492.3	520.7	577.9	_
16"	422.4	466.6	514.4	539.8	536.7	565.2	574.8	641.4	_
18"	479.3	530.1	549.4	596.9	593.9	612.9	638.3	704.9	_
20"	530.1	580.9	606.6	654.1	647.7	682.8	698.5	755.7	_
24"	631.7	682.5	717.6	774.7	768.4	790.7	838.2	901.7	_

<sup>\*</sup>The dimensions of the inner ring and other gasket types can be manufactured to different customer specifications.

<sup>\*</sup>There are no Class 400 flanges in NPS 1/2 through NPS 3 (use Class 600),

Class 900 flanges in NPS 1/2 through 2 1/2 (use Class 1500), or Class 2500 Flanges in NPS 14 and larger.

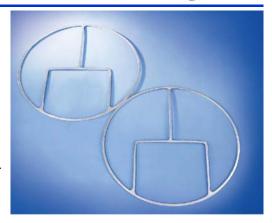
<sup>\*</sup>per ASME B16.20-2017.

# **Metal Jacketed Gasket**

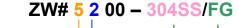


Metallic or non-metallic heat-resistant filler encapsulated in a very thin metallic shell forms metal jacketed Gaskets. The Filler material provides resilience while the metal jacket resists pressures, temperature and corrosion.

A wide range of size, profile, and materials are available to suit various specific application, especially for heat exchanger, pumps, valve cover, autoclaves, and manhole. Due to limited resilience and recovery properties, Metal Jacketed Gaskets require smooth flange surface finishes, high bolt loads, and flange flatness to seal effectively. Recently, this kind of gasket have been replaced by Kammprofile Gaskets.



#### Order Code



Layer Material									
5	0 110110								
6	6 Graphite								
Style									

Single Double

1 Corrugated							
	Filler						
FG	Graphite						
PTFE	PTFE						
NA	Non-Asbestos						

Ceramic Fiber

CE

	Jac	ket Metal				
Low Carbo	on Steel	Inconel 600/625				
304SS		Incoloy 800(H)/825				
304LSS		Titanium				
316SS		Hastelloy B2/B3				
316LSS		Hastelloy C276				
316TiSS		Hastelloy C22				
317LSS		Aluminum				
321SS		Copper				
347SS		Bronze				
410SS		Duplex S31803/S32205				
5Cr-0.5Mc	)	Alloy 20				
Monel 400	)	Others				
Nickel 200	)					

#### Style

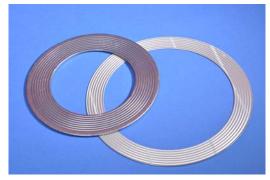
Style	Profile	Style No.
Single Jacket		ZW#5200 ZW#6200
Double Jacket		ZW#5800 ZW#6800
Corrugated Jacket		ZW#5100

Order example: ZW#5200-304/FG stands for Metal Single Jacketed Gasket that comprises of 304 stainless steel jacketed with Graphite filler.

# **Encapsulated Corrugated Gasket**

A metal core and non-metallic composite materials with special structure, pressed into concentric corrugation with both metal strength and elastic characteristics of the waveform. This unique construction, utilizing corrugated metal and compressible sealing elements, provides for excellent performance in thermal cycling applications. This configuration provides a rigid gasket that easily seals against flange seating surface imperfections.

Corrugated metal core having a multi-channel concentric sealing, the laver sealing material is not easy to blow out or creep relaxation. lower stress required can maintain long-term sealing performance. Meanwhile, the non-metallic layer can fit fill surface defects after compressed to form MMC, it is suitable for sealing heat exchangers, piping, valves, flanges joints...etc.

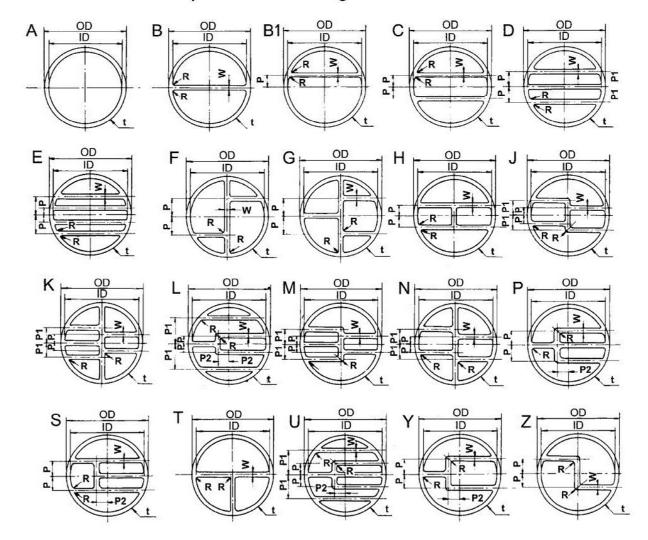


Style No.	Profile	Metal Material	Layer Materail	Temperature (°C)	Pressure (bar)
ZW#5000		304SS	Graphite	Graphite -200~450(air)/	
ZW#5010		316LSS	ePTFE	650(Reducing atmosphere) ePTFE -200~260	150

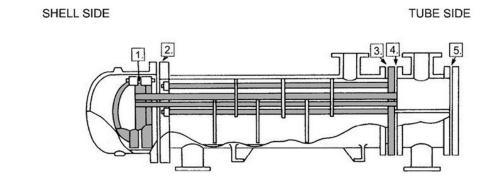
Other Metal materials are available.



# • Schedule of Standard Shapes for Heat Exchanger Gaskets



# Gasket location on Heat Exchanger



- 1. FLOATING HEAD.
- SHELL COVER.
   SHELL TO TUBESHEET.
- 4. TUBESHEET TO CHANNEL BOX.5. CHANNEL BOX COVER.

# **Metal Ring Joint Gasket**



Metal Ring Joint Gasket is a high integrity seal and predominantly used in high pressure / temperature oilfield applications and for petrochemical industry, such as valves, piping assemblies, and pressure vessels. Various materials and profiles are available for most-demanded design and operation conditions and conform to ASME B16.20 (general use) standards to fit ASME flanges. Steel Oval and Octagonal ring joints are in stock and can be interchangeable on the modern flat bottom groove. We could deliver in the short period.

Note: the hardness of metal ring joint gasket should lower 15~20 HB than the hardness of applied flange, as the material may harden to damage the flange and affect sealing properties, we DO not recommend to re-use the gasket.





Hollow metal O-ring is made by heat resistant and noncorrosive stainless steel pipe. It is available to have small holes in the inner diameter or outer diameter, when the pressure increasing, the self-sealing function will be work. The hollow O-ring with small holes is specially applied when the pressure over than 70kgf/cm², the pressure resistant will better than no holes O-ring. Upon customer's requirement, we also offer O-ring surface coating PTFE or silver.

# Style

Shape	Profile	Style No.
Oval		ZW#5500-OV
Octagonal		ZW#5500-OT
RX (High Pressure)		ZW#5500-RX
BX (High Pressure)		ZW#5500-BX
Delta		ZW#5500-DT
Lens		ZW#5500-LN
Hollow	0	ZW#5500-HL



# •Style No.

# ZW#5500-OV-AG-E

	Shape
OV	Oval
OT	Octagonal
RX	RX High Pressure
BX	BX High Pressure
DT	Delta
LN	Lens
HL	Hollow (No Holes)
HLI	Hollow (Internal Holes)
HLX	Hollow (External Holes)

Surface (Coating)					
Blank	Nil				
PF	PTFE				
AG	Silver				
MO	MOS2				
Z	Others				

Materials										
D	Soft Iron	М	Monel 400							
S	Low Carbon Steel	F5	5Cr-0.5Mo							
Е	304SS	F11	1.25Cr-0.5Mo							
L	304LSS	Ζ	Nickel 200							
G	316SS	Υ	Inconel 600/625							
Н	316LSS	Y1	Inconel X750							
0	310SS	W	Incoloy 800(H)/825							
Р	316Ti SS	T	Titanium							
J	321SS	X1	Hastelloy B2/B3							
K	347SS	X2	Hastelloy C276							
R	410SS	Х3	Hastelloy C22							
U	430SS	Α	Aluminum							
V	904L	С	Copper							

It is recommended the material and maximum hardness as below list in accordance with API 6A, and also offer other materials for example as 5Cr-0.5Mo, Monel, Inconel, Hastelloy, Duplex...etc.

# • Material Properties

	Mate	rial	Code	Max. H	lardness	Working Temperature(°C)		
	Category	Description	Code	Brinell BHN/HB	Rockwell B HRB	Min.	Max.	
		Low Carbon Steel	S	120	68	-40	540	
	Carbon steel	Soft Iron	D	90	56	-40	500	
	Carbon Steel	5Cr-0.5Mo	F5	130	72	-29	650	
		1.25Cr-0.5Mo	F11	130	72	-30	593	
		304SS	Е	160	83	-250	540	
General Grade		304LSS	L	160	83	-250	540	
Crado	Stainless steel	316SS	G	160	83	-200	815	
		316LSS	Н	160	83	-200	815	
		410SS	R	170	86	-40	850	
	Non-ferrous metal	Copper	С	81	41	-100	315	
	Non-lenous metal	Aluminum	Α	35	-	-200	425	
		321SS	J	160	83	-200	870	
	Stainless steel	347SS	K	160	83	-200	870	
	Stairliess steel	Inconel 600/625	Υ	150	78	-100	1095	
		Incoloy 800(H)/825	W	150	78	-100	1095	
Special Grade		Monel 400	М	160	83	-100	760	
Ciddo		Titanium	Т	160	83	-200	540	
	Non-ferrous metal	Nickel 200	N	120	68	-200	760	
		Hastelloy B2/B3	X1	230	98	-100	1095	
		Hastelloy C276/C22	X2/X3	210	96	-100	1095	

<sup>※</sup> It is recommended that the Ring Joint Gaskets to be of a lesser hardness than that of the mating flanges.

<sup>※</sup> Ring joint gaskets of materials listed shall have a hardness equal to or less than that shown as above.



	Flange Nominal Size / Pressure									
	ASMI	E-ANSI I	316.5		ASI	ME B16.4	7 A		API 6B	
150	300-600	900	1500	2500	150	300-600	900	2000	3000	5000
	1/2"									
	3/4"	1/2"	1/2"	1/2"						
	3/4	3/4"	3/4"	1/2						
1"										
4.4/411	1"	1"	1"	3/4"				1"	1"	1"
1-1/4"	1-1/4"	1-1/4"	1-1/4"	1"				1-1/4"	1-1/4"	1-1/4"
1-1/2"	, .	, .	1 1/1					1 1/1	1 1/1	, .
	1-1/2"	1-1/2"	1-1/2"					1-1/2"	1-1/2"	1-1/2"
2"				1-1/4"						
	2"			1-1/2"				2"		
		2"	2"						2"	2"
2-1/2"	2-1/2"			2"				2.1/0"		
	2-1/2"	2-1/2"	2-1/2"	2				2-1/2"	2-1/2"	2-1/2"
				2-1/2"						
3"										
	3" 3"	3"						3"	3"	
	J	3		3"				J	3	
3-1/2"										
	3-1/2"		3"							2"
4"			3							3"
	4"	4"						4"	4"	3-1/2"
			***	4"						411
5"			4"							4"
	5"	5"						5"	5"	
				5"						
6"			5"							5"
	6"	6"	J					6"	6"	3
			6"							6"
8"				6"						
8.	8"	8"						8"	8"	
			8"							8"
				8"						
10"	10"	10"						10"	10"	
	10	10	10"					10	10	10"
				10"						
12"	12"	12"				* 12"	* 12"	12"	12"	
	12	12	12"			12	12	12	12	
14"										
	4.48			12"		* 1 (!!		4.48	4.411	
	14"	14"				* 14"	* 14"	14"	14"	
			14"							
16"										
	16"	16"				* 16"	* 16"	16"	16"	
		10	16"				10		10	
18"										
	18"	10"				* 18"	* 18"	18"	10"	
		18"	18"				18"		18"	
			10							

			<b>5</b> : .			Unit : mm
			Dimension			
Ring No.	Р	Α	В	Н	С	R <sub>1</sub>
Tolerance	±0.18	±0.20	+1.3,-0.5	+1.3,-0.5	±0.20	±0.5
R11	34.14	6.35	11.2	9.7	4.32	1.5
R12	39.70	7.95	14.2	12.7	5.23	1.5
R13	42.88	7.95	14.2	12.7	5.23	1.5
R14	44.45	7.95	14.2	12.7	5.23	1.5
R15	47.63	7.95	14.2	12.7	5.23	1.5
R16	50.80	7.95	14.2	12.7	5.23	1.5
R17	57.15	7.95	14.2	12.7	5.23	1.5
R18	60.33	7.95	14.2	12.7	5.23	1.5
R19	65.10	7.95	14.2	12.7	5.23	1.5
R20 R21	68.28 72.24	7.95 11.13	14.2 17.5	12.7 16.0	5.23 7.75	1.5 1.5
R22	82.55	7.95	14.2	12.7	5.23	1.5
R23	82.55	11.13	17.5	16.0	7.75	1.5
R24	95.25	11.13	17.5	16.0	7.75	1.5
R25	101.60	7.95	14.2	12.7	5.23	1.5
R26	101.60	11.13	17.5	16.0	7.75	1.5
R27	107.95	11.13	17.5	16.0	7.75	1.5
R28	111.13	12.70	19.1	17.5	8.66	1.5
R29	114.30	7.95	14.2	12.7	5.23	1.5
R30	117.48	11.13	17.5	16.0	7.75	1.5
R31	123.83	11.13	17.5	16.0	7.75	1.5
R32	127.00	12.70	19.1	17.5	8.66	1.5
R33	131.78	7.95	14.2	12.7	5.23	1.5
R34	131.78	11.13	17.5	16.0	7.75	1.5
R35	136.53	11.13	17.5	16.0	7.75	1.5
R36	149.23	7.95	14.2	12.7	5.23	1.5
R37	149.23	11.13	17.5	16.0	7.75	1.5
R38	157.18	15.88	22.4	20.6	10.49	1.5
R39 R40	161.93	11.13 7.95	17.5 14.2	16.0 12.7	7.75 5.23	1.5 1.5
R40 R41	171.45 180.98	11.13	17.5	16.0	7.75	1.5
R42	190.50	19.05	25.4	23.9	12.32	1.5
R43	193.68	7.95	14.2	12.7	5.23	1.5
R44	193.68	11.13	17.5	16.0	7.75	1.5
R45	211.15	11.13	17.5	16.0	7.75	1.5
R46	211.15	12.70	19.1	17.5	8.66	1.5
R47	228.60	19.05	25.4	23.9	12.32	1.5
R48	247.65	7.95	14.2	12.7	5.23	1.5
R49	269.88	11.13	17.5	16.0	7.75	1.5
R50	269.88	15.88	22.4	20.6	10.49	1.5
R51	279.40	22.23	28.7	26.9	14.81	1.5
R52	304.80	7.95	14.2	12.7	5.23	1.5
R53	323.85	11.13	17.5	16.0	7.75	1.5
R54	323.85	15.88	22.4	20.6	10.49	1.5
R55	342.90	28.58	36.6	35.1	19.81	2.3
R56	381.00	7.95	14.2	12.7	5.23	1.5
R57	381.00	11.13	17.5	16.0	7.75	1.5
R58 R59	381.00	22.23 7.95	28.7 14.2	26.9	14.81 5.23	1.5
R60	396.88 406.40	7.95 31.75	39.6	12.7 38.1	22.33	1.5 2.3
R61	419.10	11.13	17.5	16.0	7.75	1.5
R62	419.10	15.88	22.4	20.6	10.49	1.5
R63	419.10	25.40	33.3	31.8	17.30	2.3
R64	454.03	7.95	14.2	12.7	5.23	1.5
R65	469.90	11.13	17.5	16.0	7.75	1.5
R66	469.90	15.88	22.4	20.6	10.49	1.5
R67	469.90	28.58	36.6	35.1	19.81	2.3
R68	517.53	7.95	14.2	12.7	5.23	1.5
R69	533.40	11.13	17.5	16.0	7.75	1.5
R70	533.40	19.05	25.4	23.9	12.32	1.5
R71	533.40	28.58	36.6	35.1	19.81	2.3

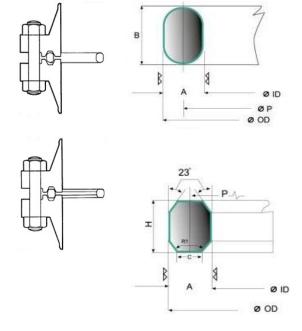


Unit: mm

			Flanç	ge Nom	inal Siz	ze / Pre	ssure							Dimension			
	ASME	-ANSI E	316.5		ASI	ME B16.4	7 A		API 6B		Ring No.	Р	Α	В	Н	С	R <sub>1</sub>
150	300-600	900	1500	2500	150	300-600	900	2000	3000	10000	Tolerance	±0.18	±0.20	+1.3,-0.5	+1.3,-0.5	±0.20	±0.5
20"											R72	558.80	7.95	14.2	12.7	5.23	1.5
	20"							20"			R73	584.20	12.70	19.1	17.5	8.66	1.5
		20"							20"		R74	584.20	19.05	25.4	23.9	12.32	1.5
			20"								R75	584.20	31.75	39.6	38.1	22.33	2.3
24"											R76	673.10	7.95	14.2	12.7	5.23	1.5
	24"										R77	692.15	15.88	22.4	20.6	10.49	1.5
		24"									R78	692.15	25.40	33.3	31.8	17.30	2.3
			24"								R79	692.15	34.93	44.5	41.4	24.82	2.3
					* 22"						R80	615.95	7.95		12.7	5.23	1.5
						* 22"					R81	635.00	14.30		19.1	9.58	1.5
										1'	R82	57.15	11.13		16.0	7.75	1.5
										1-1/2"	R84	63.50	11.13		16.0	7.75	1.5
										2"	R85	79.38	12.70		17.5	8.66	1.5
										2-1/2"	R86	90.50	15.88		20.6	10.49	1.5
										3"	R87	100.03	15.88		20.6	10.49	1.5
										4"	R88	123.83	19.05		23.9	12.32	1.5
										3-1/2"	R89	114.30	19.05		23.9	12.32	1.5
										5"	R90	155.58	22.23		26.9	14.81	1.5
										10"	R91	260.35	31.75		38.1	22.33	2.3
											R92	228.60	11.13	17.5	16.0	7.75	1.5
						26"					R93	749.30	19.05		23.9	12.32	1.5
						28"					R94	800.10	19.05		23.9	12.32	1.5
						30"					R95	857.25	19.05		23.9	12.32	1.5
						32"					R96	914.40	22.23		26.9	14.81	1.5
						34"					R97	965.20	22.23		26.9	14.81	1.5
						36"					R98	1022.35	22.23		26.9	14.81	1.5
								8"	8"		R99	234.95	11.13		16.0	7.75	1.5
							26"				R100	749.30	28.58		35.1	19.81	2.3
							28"				R101	800.10	31.75		38.1	22.33	2.3
							30"				R102	857.25	31.75		38.1	22.33	2.3
							32"				R103	914.40	31.75		38.1	22.33	2.3
							34"				R104	965.20	34.93		41.4	24.82	2.3
							36"				R105	1022.35	34.93		41.4	24.82	2.3

Note: \* End flanges to API 6D and API 600 use gaskets for equivalent pipe size under ASME B16.5 or ASME B16.47 Series A.

Tolerance	mm	inch
A , C (Width)	± 0.20	± 0.008
B , H (Height)	+1.3 / -0.5	+0.05/-0.020
P (Average pitch diameter of ring)	± 0.18	± 0.007
23 deg (Angle)	± 0 deg	30 min.
R1 (Radius in Ring)	± 0.5	± 0.02



<sup>\*</sup> Ring No. R30 is suitable for lapped flanges only.

<sup>\*</sup> Above specifications are in accordance with ASME B16.20, API std 6A and EN 12560-5  $\,^{\circ}$ 

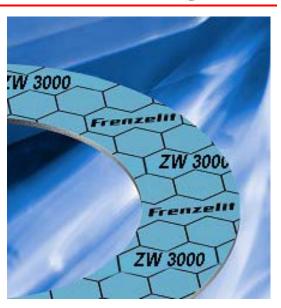


# novapress® 260 ZW 3000

Non-asbestos sheet gasket is a general purpose sheet material combination consists of high-quality aramid fibers bonded with nitrile-butadiene-rubber (NBR). It is optimized with special functional fillers, and a good alternative to compressed asbestos gasket and suitable for sealing off water, seawater, alkaline, hot oil, organic solvent, and all applications where low and average temperature and pressure conditions and where uncritical gaseous and liquid media have to be sealed off.

# Approval

- \* BS 7531 Grade Y
- \* DVGW (gas and water supply DIN 3535-6) DVGW W270 (drinking water)
- \* Elastomer Guideline ("KTW") / WARS (drinking water)



# Physical properties

- i iiyolodi pi opolilioo		,			
	Binders	NBR			
General data	Fiber	Aramid			
Scholal data	Anti-stick coating	Both side anti-stick coating			
	Colour	Blue			
	Temperature Range	-100 ~ 300°C			
Mode (typical value)	Maximum Pressure	Max. 90 Bar			
	Density	DIN 28090-2 [g/cm <sup>3</sup> ]	1.7		
	Tensile Strength Transverse	DIN 52910 [N/mm <sup>2</sup> ]	7.5		
Gasket Thickness	Residual stress 175°C 300°C	DIN 52913 [N/mm²] DIN 52913 [N/mm²]	27 22		
2.0mm	Compressibility	ASTM F36J [%]	9		
	Recovery	ASTM F36J [%]	45		
	Specific leakage rate	DIN 3535-6 [mg/(m·s)]	0.08		
	Fluid resistance	ASTM F146			
Product data: Thickness in mm 1.0/1.5/2.0/3.0/4.0	ASTM IRM903 Weight change Thickness increase	5h/150°C [%] [%]	10 4		
Dimensions in mm 1500x2000  Further dimensions and thickness	ASTM Fuel B Weight change Thickness increase	5h/23°C [%] [%]	11 9		
MOQ on request (Dimensions 1000x2000)	Leachable chloride content	QS-001-133 [ppm]	≤ 150		

Version: 04.08.2016





#### SF 2400

SF2400 is a general purpose sheet material reinforced with aramid fibers and bound with a high quality nitrile rubber (NBR).

It is excellent high performance and the replacement for normal Asbestos gaskets, and complies with the British Standard for non-asbestos sealing materials – BS 7531 Grade Y, and WRAS drinking water approval.

It is suitable for use in applications involving hot and cold water, steam, oils, fuels, gases, mild solvents, alkalis, and a wide range of general chemicals.

Minimum temperature -40°C, high temperature range 177~350°C (350~660°F), and maximum pressure is 100 bar. Application as public works, chemical plants, oil refineries, steel mills, power plants, shipyards, pipeline engineering, piping flanges used in the manufacturing machinery, heat exchangers for valves tanks, cover and seal the joint of pressure vessels, etc.



Sheet Standard:

Thickness(mm): 0.5/0.8/1.0/1.5/2.0/3.0/4.0/5.0

Width X Length(mm): 1500x1500,1500x2000, 1500x3000, 2000x6000 1500x1500 Also available with release coating on both sides (anti-stick)

#### Physical Properties

Density			g/cm³	1.84
Compressibility	ASTM F36J		%	7.7
Recovery	ASTM F36J		%	>50
Creep Relaxation	ASTM F38		%	20
Leakage	ASTM F37A		mL/hr	0.5
Tensile Strength	ASTM F152		Мра	>13
Residual Stress	BS 7531	40MPA,16hr, 300°C	Мра	>22
Gas Permeability	DIN3535 part 6		mL/min	<0.3
pH Range				3-11
	ASTM Oil#3	Thickness Incease	%	2
Immersion	ASTIVI OII#3	Weight Increase	%	7.4
Properties ASTM F 146	ASTM Fuel B	Thickness Incease	%	3.7
	ASTIVI FUELD	Weight Increase	%	10.2

The above test results are produced by 1.5 mm thick specimens.

Note: If required, we also offer the best service in all system products of Flexitallic<sup>®</sup>.





# novapress® basic ZW 8800

This Germany-made gasket has balanced raw material combination, consisting of high-grade Aramid fibers, special fillers and NBR rubber (Nitrile Butadiene Rubber) binder with A310 anti-stick coating. It demonstrates good resistance to media, standard permeability to gas, good stress relaxation, favorable cost-performance in a wide range of applications such as utility or sanitary applications (gas and water supply), chemical plant, steel works, ship building, oil refinery, power plant, pipeline construction, plant, machine building industry and food industry.



#### **APPROVAL**

- **DVGW**
- VP 401, W270
- **SVGW**
- KTW/ WARS
- EG 1935/2004 DNV GL
- BS 7531 Grade Y
- Ta-Luft

# Physical properties

# Deformation under temperature 2.0 mm 40 Change in thickness (%) 20 20 30 50 40° 60° 80° 100° 120° 140° 160° 180° 200° 220° 240° 260° Temperature (°C) at room temperature at 50 N/mm<sup>2</sup> pressure

	Binders	NBR			
	Fiber	Aramid			
General data	Anti-stick coating	anti-stick coating			
	Colour	Both sides orange			
	Sheet size and thickness tolerance	According DIN 28091-1			
	Temperature Range	-100 ~ 300°C			
	Maximum Pressure	Max. 85 Bar			
	Density	DIN 28090-2 [g/cm <sup>3</sup> ] 1.7			
	Tensile Strength	DIN 52910			
	Longitudinal	[N/mm <sup>2</sup> ] 14			
	Transverse	[N/mm²] 6			
Gasket Thickness	Residual stress 175°C	DIN 52913 [N/mm <sup>2</sup> ] 28			
2.0mm	300°C	[N/mm <sup>2</sup> ] 18			
	Compressibility	ASTM F36J [%] 6			
	Recovery	ASTM F36J [%] 55			
	Cold compressibility $\mathcal{E}_{KSW}$	DIN 28090-2 [%] 8			
Product data:	Cold recovery $\mathcal{E}_{KRW}$	DIN 28090-2 [%] 3			
Thickness in mm 0.3/0.5/0.75/1.0	Hot creep $\mathcal{E}_{\text{WSW/200}}$	DIN 28090-2 [%] 22			
1.5/2.0/3.0/4.0	Hot recovery $\mathcal{E}_{\text{WRW/200}}$	DIN 28090-2 [%] 2			
Dimensions in mm 1500x1000	Recovery R	DIN 28090-2 [mm] 0.05			
	Specific leakage rate	DIN 3535-6 $[mg/(m \cdot s)] \le 0.100$			
1500x1500, 1500x3000	Specific leakage rate λ 2,0	DIN 28090-2 [mg/(m·s)] 0.100			
	Fluid resistance	ASTM F146			
(Further dimensions and thickness	ASTM IRM903	5h/150°C			
are available on request.)	Weight change	[%] 7			
	Thickness increase	[%] 2			
	ASTM Fuel B	5h/23°C			
	Weight change	[%] 9			
	Thickness increase	[%] 5			
	Leachable chloride content	PV-0106S [ppm] ≤ 150			

Issue: 11.21

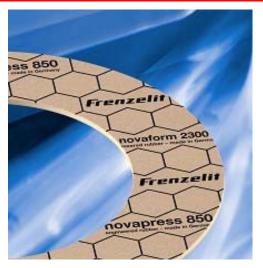




# Novapress® 850 (novaform® 2300)

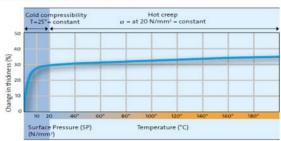
novapress<sup>®</sup> 850 is based on an ingenious raw material blend of high quality aramid fibers, special functional fillers and synthetic NBR. novapress<sup>®</sup> 850 has positive properties of both fiber gaskets and Rubber gaskets, it is soft and adaptable and provides the mechanical robustness.

novapress<sup>®</sup> 850 satisfies requirements that were previously considered unsolvable. Wide bolt spacing in easily deformed components with low bolt forces creates only partial, minimum surface pressure. novapress<sup>®</sup> 850 is superior to conventional elastomer gaskets in terms of chemical resistance, making it ideal for use in oils, fuels and refrigerants. Thanks to its excellent adaptability, novapress<sup>®</sup> 850 easily meets the demands in transmissions and perfectly compensates for the low surface pressure in these applications.

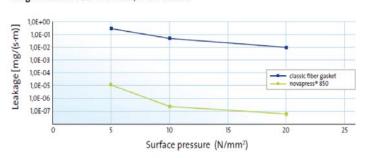


Every sheet has a unique batch number and is additionally equipped with new Gasket Code Technology – for full traceability.

Temp-Test at 20 MPa – sample thickness: 1.0 mm



Comparison of leakage properties novapress® 850 Ring dimension 92 x 49 x 1 mm, 10 bar helium



#### Material Data

	Approvals and tests	VDI 2200, DVGW, EG1935/2004, FDA, DNV GL, TA-Luft, KTW, HTB DIN 30653, W270, WRAS			
	Binder	NBR			
General information	Fiber	Aramid			
	Identification color/Printing	Light brown / Bla	ack honeycon	nb brand	
	Tolerance	DIN 28 091-1			
	Temperature Range	-100 ~ 130°C			
	Pressure	Max. 90 Bar			
	Density	DIN 28090-2	[g/cm3]	1.35	
	Residual stress 175°C	DIN 52913	[N/mm2]	26	
Physical properties	Compressibility	ASTM F36J	[%]	39	
Sample thickness 2.0mm	Recovery	ASTM F36J	[%]	60	
	Cold compressibility	DIN 28090-2	[%]	20	
	Cold recovery		[%]	12	
	ot creep [%] 3			30	
	Hot recovery		[%]	1	
	Specific leakage rate	DIN 3535-6	[mg/(m·s)]	0.001	
	Tensile Strength transverse	DIN 52910	[N/mm2]	5	
	Fluid resistance	ASTM F146			
	ASTM IRM903	5h/150°C			
	Weight change		[%]	8	
Product Data:	Thickness change		[%]	2	
Thickness(mm)	ASTM Fuel B	5h/23°C			
0.3/0.5/0.75/1.0/1.5/2.0/3.0/4.0	Weight change		[%]	12	
Dimensions(mm)	Thickness change		[%]	9	
1000x1500, 1500x1500, 3000x1500	Leachable chloride content	PV 01605	[ppm]	≤ 150	

21.02.2023 / Nr. 01607 / Version 9





# novatec® PREMIUM XP ZW 9500

Thanks to optimum composition of graphite and Kevlar®, this Germanymade gasket has offer completely new product qualities and outperforms all common high pressure gasket materials. Kevlar ® gives it its high tensile strength and high percentage of graphite but low percentage of binder provides remarkable resistance to media and temperature. It distinguishes itself by its excellent adaptability to flange irregularities. The standard A310 anti-stick coating on both sides facilitates the removal of the gasket during routine maintenance inspections.

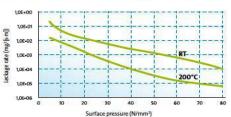
The combination of good media resistance at high temperatures, excellent stress relaxation, and very good adaptability guarantee universally applicable and maximum design safety. Novatec PREMIUM XP covers 80% of all industrial applications.

Kevlar® is a trademark registered by Dupont.

#### Approval

- \*DVGW (gas supply DIN 3535-6) DVGW VP 401 (higher thermal resistant DIN 30653)
- \*W270 / Elastomer-Guideline("KTW") / WRAS (Drinking Water)
- \*SVGW (gas and water industry in Switzerland)
- \*BAM Max. 100°C/130 bar (oxygen)
- \*EC 1935/2004 (Food Contact Material)
- \*DNV GL (DIN 86076)
- \*TA-Luft (VDI 2440)
- \*BS 7531 Grade X

#### Leakage rate under the influence of temperature



novatec<sup>®</sup> PREMIUM XP is designed for minimum leakage. The microporosity of the innovative gasket material decrease under the influence of temperature and surface pressure.

-Sample dimensions : 92 x 49 x 2 mm.

-Internal pressure: 25bar,

#### Physical properties

·	Binders	NBR
	Fiber	Graphite & Kevlar® Aramid
General date	Treatment	Anti-stick coating
	Colour	Royal blue
	Tolerances in thickness	According to DIN 28091-1
	Identification	DIN 28 091-2 FA-A1-O
	Temperature	Working 300°C Short Peak 450°C
	Pressure	Max. 100 bar
	Density	DIN 28 091-2 [g/cm <sup>3</sup> ] 1.74
	Tensile Strength	DIN 52 910
	longitudinal	[N/mm <sup>2</sup> ] 20
	transverse	[N/mm <sup>2</sup> ] 18
	Residual stress σ <sub>dE/16</sub>	DIN 52 913
0 1 1 1 1 1 1	170°C	[N/mm <sup>2</sup> ] 37
Gasket thickness	300°C	[N/mm <sup>2</sup> ] 30
2.0mm	Compressibility	ASTM F36 J [%] 6
	Recovery	ASTM F36 J [%] 60
	Cold compressibility ε κΕW	DIN 28 090-2 [%] 6
	Cold recovery ε KRW	DIN 28 090-2 [%] 3
	Hot creep ε <sub>WSW/200</sub>	DIN 28 090-2 [%] 8
Product data	Hot recovery ε <sub>WRW/200</sub>	DIN 28 090-2 [%] 2
●Dimensions in mm : 1500 x 3000	Specific leakage rate	DIN 3535-6 [Mg/s-m] ≤0.05
Thicknesses in mm: 0.5 / 0.8	Fluid resistance	ASTM F146
●Dimensions in mm : 1500 x 2000	IRM 903 Weight change	5h / 150°C [%] ≤8
Thicknesses in mm : 1.0 / 1.5 / 2.0 / 3.0	Thickness increase	[%]   ≤ 5
● Further dimensions and thicknesses are	Fuel B Weight change	5h / 23°C [%] ≤8
	Thickness increase	[%] ≤ 5
	Chloride content	PV01605 [ppm] ≤50

Note: If required, we also offer the best service in all systems products of Frenzelit.





# **Engineered graphite with expanded metal gasket**



# novaphit <sup>®</sup> SSTC XP ZW 6600 novaphit <sup>®</sup> MST

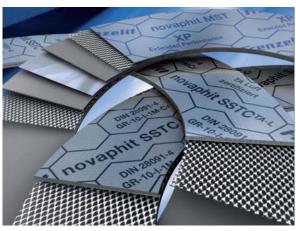
The material of novaphit® SSTC is high-grade expanded graphite insert a 0.4mm thick acid-resistant stainless steel plate 1.4404 (316L) and 3mm mesh expanded metal. The expanded graphite is pressed into a foil under high pressure without adding any bonding or reinforced fiber, it has excellent stress relaxation properties and further improves the recovery of graphite, which can make up for flange surface defects better than traditional metal-reinforced graphite gaskets.

novaphit® MST is characterized by a rational arrangement of stainless steel inserts, with 0.5 mm thick graphite foil alternating with stainless steel 1.4404, with an outer layer of expanded metal on each side. The open structure of the expanded metal makes the gasket more adaptable, and the two graphite layers on the outside can be used to compensate for flange unevenness.

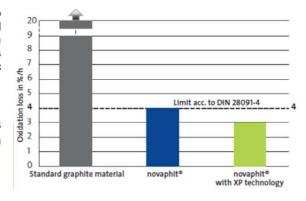
The purity of graphite is over 99%, the metal mesh is not easy to break, easy to install, and has good pressure resistance. It has good load capacity under high temperature (-200  $\sim 550^{\circ}\text{C})$  and high pressure (250 bar), and is also suitable for variable loads; it has good chemical resistance and is suitable for all organic and inorganic acids, bases and solvents.

# XP Technology eXtended Performance

- •Non-stick properties: fast gasket replacement tremendous petential for saving time, minimized risk of flange damage, long-term effectiveness and media stability.
- •Increase in oxidation resistance-better long term performance.



Mass loss due to oxidation acc. to DIN 28090-2, TGA at  $670 \, ^{\circ}\text{C/4} \, \text{h}$ 



#### Physical Properties

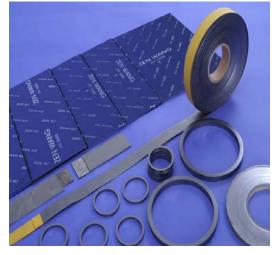
General Data Gasket thickness 2.0mm	Approval	novaphit <sup>®</sup> SSTC	novaphit ® MST			
Gasket tillekness 2.011111	XP Technology	XP Technology				
	DVGW			V	V	
	BAM (200°C@130 bar)			V	V	
	DIN EN ISO 10497 Firesafe			V	V	
	Ta-Luft / VP401			Option	V	
	DNV GL (DIN 86076)			V	V	
SSTC Product data:	Graphite purity	DIN 51903	[%]	>99	99.5	
Dimensions(mm) Thickness(mm)	Density	DIN 28090-2	[g/cm3]	1.35	1.20	
1000x1000 1.0/1.5/2.0/3.0 1000x2000	Residual stress 300°C	DIN 52913	[N/mm2]	≧45	≧45	
1500x2500 1.5/2.0/3.0	Compressibility	ASTM F36J	[%]	37	50	
	Recovery	ASTM F36J	[%]	15	10	
MST Product data:	Cold compressibility $\mathcal{E}_{KSW}$	DIN 28090-2	[%]	35	45	
Dimensions(mm) Thickness(mm) 1000x1000 1.0/1.5/2.0/3.0/4.0	Cold recovery $\mathcal{E}_{KRW}$	DIN 28090-2	[%]	4	4	
1500x2500	Hot creep & wsw/300	DIN 28090-2	[%]	2	3	
	Hot recovery $\mathcal{E}_{\text{WRW/300}}$	DIN 28090-2	[%]	2	3	
Further dimensions and	Specific leakage rate	DIN 3535-6	[mg/(s·m)]	0.07	≤0.01	
thicknesses are available on request.	Oxidation value (XP)	DIN 28090-2	[%]	≤3	≤3	
loquest.	Tensile strength transverse	DIN 52910	[N/mm2]	8	16	
	Chloride content (total)	DIN 28090-2	[ppm]	≤ 50	≤ 50	
	Leachable Chloride content	PV 01605	[ppm]	≤ 20	≤ 20	
Issue: 11.21	Total Fluoride content	DIN 51723	[ppm]	≤ 50	≤ 50	



# Flexible Graphite Sheet Gasket, Tape & Ring



The graphite tapes, gasket, molded ring, and laminated sheets are made from flake (exfoliated) graphite with high carbon content which is gone through chemical treatment, expanding under high temperature and then machine compressing. It has the characteristics of high temperature resistance, corrosion resistance and good elasticity, and is the basic material for making all kinds of reinforced graphite sheets. graphite ring tapes, packing ring and sealing gaskets. Working temperature –200 to 450°C (in air), up to 650°C (in reducing atmosphere), Service pressure is 150 bar maximum. The graphite gasket is mainly adopted in static sealing application and widely adopted in nuclear and petrochemical industry, such as level gauge, mold and flange joints; graphite tape is mainly used for thread, flange, the stem and the shaft seal packing and other occasions; graphite ring is applicable to compressors, pumps, valves, chemical equipment and instruments...etc. The applicable fluid including water, temperature, high pressure steam, heat exchange liquid, ammonia, hydrogen, organic solvents, hydrocarbons, cryogenic fluids. Certain categories are reinforced with flat or tang stainless steel / Nickel inserts which enhance mechanical properties of the gasket. It is extremely conformable to suit either worn or pitted flange.



#### Style

<u> </u>	
ZW 3600-P	Pure flexible graphite sheet gasket
ZW 3600-N	Flexible graphite reinforced flat Nickel foil
ZW 3600-F	Flexible graphite reinforced 0.05mm thick flat SS316 foil
ZW 3600-T	Flexible graphite reinforced 0.1mm thick tanged SS316
ZW 3700	Flexible graphite crinkling tapes (with / without adhesive)
	Flexible graphite flat tapes (without adhesive)
ZW 3800	Flexible graphite packing ring

Sheet size: 2000x1500, 1500x1500, 1000x1000

Thickness: 1.0, 1.5, 2.0, 3.0, 5.0

# Physical properties

Density	0.8 – 1.3 g/cm <sup>3</sup>
Carbon content	>99%
Ash content	<1%
Sulfur content	<1000 ppm
Chloride content	<50 ppm
Tensile strength	45 kg/cm²
Compressibility	>40%
Recovery	>10%
PH	0-14

#### Graphite Gasket/Ring with Metal Eyelet

Flexible graphite gasket reinforced flat SS316 or flexible graphite ring with thin metal foil eyelet are as per below profiles. The metal eyelet could improve the integral and complete the sealing performance, specially suit for contact pollute media and production. Metal eyelet could avoid any permeated leakage and erosion caused by pressure disproportionate, it could reach excellent gas sealing, and good for use to steam, chemical equipment and piping.





# Metal Reinforced Gasket (MRG)

#### ZW 3632

Metal core is high rigidity, corrosion-resistant metal plate, both sides compress and covered by graphite gasket reinforced 3D diamond mesh, no binder, with excellent heat resistance and chemical resistance, excellent surface fitness and easy to install.

Applies to poor surface roughness of the large flange surface (Ra 3.2 ~ 12.5), significantly improve thick graphite plate temperature creep and resilience inadequate shortcomings, allow lower surface pressure to get excellent sealing performance, and for the application of various types of pressure vessels, it can replace Metal Jacketed Gasket, Spiral Wound Gasket and Kammprofile Gasket.



The material and thickness of metal core are chosen by operating conditions and customer demand.

# Flexible Graphite with Metal Reinforced



# Flexitallic Flexicarb Graphite-RGS

Flexicarb RGS graphite sheets are made of high-purity expanded graphite sheets with a reinforced metal core. The middle metal sheet can be divided into sprint type and flat type according to different applications. Contains special inorganic antioxidants to enhance its antioxidant and anti-corrosion properties. Nuclear grade graphite can also be provided according to customer needs.

RGS-HP Multilayer Metal Reinforced Graphite Sheet A high-strength laminate with excellent load-bearing properties. The additional impregnation of the fused laminate reduces leakage in low assembly stress applications, improves handling and installation, and allows for easy disassembly. Excellent mechanical properties over a wide range of assembly stresses and operating temperatures. Load losses are very low even under extreme application conditions. Inherent burst resistance, excellent chemical resistance. Enhances long-term sealing performance in high temperature service. High-purity graphite reduces flange face gaps and stress.

# Physical properties

Product Code	RGS1 (NR)	RGS3 (ST)	RGS4 (SR)	RGS-HP	
Material	Graphite foil reinforced with 13µm nickel foil core	Graphite foil reinforced with 0.1mm thick tanged 316SS core	Graphite foil reinforced with a 0.05mm thick flat 316SS core	Graphite foil reinforced with multi layer 005mm Flat 316SS	
Max. working pressure		100 bar		250 bar	
Working temperature	370°C max. (Thermal oxidizing media) 1000°C max. (Inert or reducing media)	370°C r (Thermal oxidiz 700°C r (Inert or reduc	zing media) Nax.	-250~550°C (Temp. exceeding 450°C, please consult Flexitallic)	
Graphite content		98 %		≥99%	
Density	1.0 g/cm <sup>3</sup>	1.35 g/cm <sup>3</sup>	1.2 g/cm <sup>3</sup>	1.1 g/cm <sup>3</sup>	
Compressibility ASTM F36A	45%	45%	40%	35%	
Recovery ASTM F36A	10%	10%	20%	20%	
Retention Stress BS 7531	39 Mpa	38 Mpa	32 Mpa	-	
Tensile Strength ASTM F152	7 Mpa	17 Mpa	20 Mpa	-	
Oxidization rate EN 14772 670°C		>10%			
Total Chloride		< 50 ppm		<b>≦25 ppm</b>	
Total Fluoride		< 50 ppm		< 50 ppm	
Total Sulphur		≤900 ppm		≦300 ppm	
Recommended Applications	Especially suitable for steam and general applications and most chemicals (except strongly oxidizing media). The nickel plate makes the gasket highly stable and easy to process and cut	For high sealing stress and high blowout resistance. Can be used to seal various media (except strongly oxidizing media) under moderate temperature and pressure combinations. BAM oxygen API 6FB fire	Can be used to seal various media (except strongly oxidizing media) under moderate temperature and pressure combinations	Suitable for high pressure and high temperature. Non-standard connections, heat exchangers, containers, sight glasses, valve covers, etc. Medium and high pressure steam services	









Sheet specifications:

Thickness (mm):  $0.4 \sim 3.0$  (RGS 1) Thickness (mm):  $1.0 \sim 3.0$  (RGS 3)

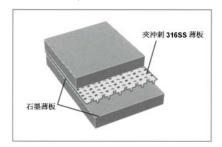
Thickness (mm): 0.75 ~ 3.0

(RGS 4)

Thickness (mm): 1.5, 2.0, 3.0

(RGS-HP)

Width x length (mm): 1000x1000, 1500x1500



RGS3 tanged metal reinforced cross-section

Note: 1. The above test results were produced by 1.5mm thick specimens.

2. If required, we also offer the best service in all systems products of Flexitallic.



# Thermiculite® Gasket – High Temperature



In 1998, Flexitallic set new standards for sealing technology with the introduction of Thermiculite<sup>®</sup> Critical Service Series gasket material, it is exclusive to Flexitallic, this revolutionary material, comprised of chemical and thermally exfoliated vermiculite, simulated structure of exfoliated graphite, with one notable exception – it maintains integrity through a wide range of high temperatures.

This innovative and versatile material is available in Coreless Sheet, a filler for SWG, and a facing for Kammprofile. It is suitable for replacing aramid fiber, glass fiber, carbon fiber, PTFE and Graphite, and in a wider array of applications.

Since its inception, Thermiculite® gasket material has proven itself as an effective long-term sealing solution in thousands of the most demanding industrial sealing applications, with the combination of Thermiculite® Critical Service (800 Series) and Thermiculite® Performance (700 Series), a single, proven material can be used for virtually all of your sealing requirements. That's why we call Thermiculite® The Total Static Sealing Solution.

#### **Total Freedom From Oxidation**

Conventional graphite gaskets are susceptible to attack by oxidizing agents. This occurs from oxygen flowing within the media, or simply from oxygen present in the atmosphere surrounding the flange. The rate at which graphite oxidizes depends on the application temperature and the concentration of oxygen present. But when it does happen – the end result is seal failure. The unique composition of Thermiculite® gasket material ensures that seals maintain their integrity at maximum service temperature far exceeding that of graphite.

#### **Characteristics**

- Total freedom from oxidation
- 800 series chemical compatibility exceeds graphite
- 800 series contains sulfate and chloride <50ppm each, never corrode the flange
- Genuine opportunity for gasket standardization and inventory consolidation

o or remine opposite	or tarrity for governor a					
Style No.	Thermiculite <sup>®</sup> 715	Thermiculite <sup>®</sup> 815	Thermiculite <sup>®</sup> 835	Thermiculite <sup>®</sup> 845		
Product Type	Coreless Sheet	Tanged Sheet	Spiral Wound Filler	Kammprofile Facing		
Temperature Range	-40~450°C	-200~1000°C	-200~1000°C			
Pressure Range	140 Bar	200 Bar	ASME B16.5 2500LB			
Typical Use	General Environment Replaced Asbestos, Non-Asbestos, PTFE	High Temperature Environment Nominal and non-standard pipe sizes Critical seal and problem application Replaced graphite The total static sealing solution				
Standard Size (mm)	0.8~3T 1500x1500 1500x3000	0.8~4T 1000x1000, 1500x1500	000x1000, 0.5T			
Approval	BS 7531 Grade X	API 607	API 6FB			

<sup>\*</sup>The above test results of 715 and 815 produced by 1.5mm thick specimens.

Thermiculite 894 packing is made by over-knitting strips of Thermiculite foil with a fine (0.09mm diameter) Inconel 600 wire and then braiding a number of those Thermiculite Inconel strips to produce a square section sealing material available in continuous coil form. Thermiclute 894 is intended for high temperature and/or aggressive media applications where a flexible gasket/packing is required. Such applications include but not limited to oven doorseals, very large flanges and in the manufacture of nitric acid and ammonium nitrate fertilizers. It can be also be used in conventional high temperature valve stem sealing systems for on-off or isolation valves. Alternatively, as the header rings either side of a conventional valve stem sealing stack it can provide an oxidation barrier for the standard graphite components. The maximum temperature up to 1050°C.

Square section available in coils: 5~19mm,

Standard Length: 8000mm

Other size and length are also can be custom made on request





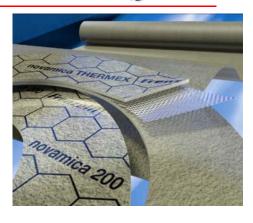


# novamica® - Phlogopite Mica Gaskets



novamica<sup>®</sup> is a gasket material made from optimized phlogopite mica with outstanding temperature resistance, chemical resistance, electrical insulation and processing properties. Sealing of aggressive/corrosive media at high temperature. Mica facing materials for Kammprofile seals or filler for spiral wound gaskets. The phlogopite mica used in novamica<sup>®</sup> products resists temperature up to 1000°C. novamica<sup>®</sup> materials guarantee continuously high sealing tightness after initial temperature exposure in the respective application.

Physical F	r	novamica	novamica®			
Filysical F	THERMEX			200		
Ва	se		ı	High qua	lity Phlo	gopite
Bind	lers			Silic	one resi	n
Metal	insert			1.4404		-
Thickness		[mm]	1.5	2	3	2
Density	DIN28090-2	[g/cm]	1.85	1.8	1.75	1.8
Residual stress 300°C	DIN52913	[N/mm]	37	32	25	32
Compressibility	ASTM F 36 J	[%]	18	20	22	20
Recovery	ASTM F 36 J	[%]	42	40	38	35
Cold compressibility	DIN 28090-2	[%]	15	15	15	12
Cold recovery	DIN 28090-2	[%]	5	5	5	3
Hot creep	DIN 28090-2	[%]	10	10	10	10
Hot recovery	DIN 28090-2	[%]	2	2	2	2
Specific leakage rate	DIN 28090-2	[mg/m/s]	3/ 0.8	3/ 0.8	3/ 0.8	
Tensile strength (trans.)	DIN 52910	[N/mm]	30	25	20	25
Dielectric Strength 23°C	IEC 243	[kV/mm]	17.5	17.5	17.5	19
Electrical conductivity	[s/cm]	1.0 • 10			1.0 • 10	
Thermal conductivity(perpend	Thermal conductivity(perpendicular) 23°C			0.09	0.07	



THERMEX combination consisting of high quality phlogopite mica, an effective binder system and expanded metal insert made from acid-proof stainless steel 316L, DIN 1.4404 (0.4mm) 3mm mesh makes it possible to produce premium solutions for a wide range of high-temperature applications.

Sheet Standard(mm):1200x1000 novamica® THERMEX thickness: 1.0/1.5/2.0/3.0/4.0/5.0 novamica® 200 thickness: 0.5/0.8/1.0/1.5/2.0/3.0/4.0/5.0

# **Biosoluble Mineral Fibres/Ceramic Fibre Gasket**

# isoplan® GREENLINE

isoplan<sup>®</sup> GREENLINE products are based on special, biosoluble mineral fibres and/or biosoluble high-temperature Alkaline Earth Silicate (AES) wools. In combination with appropriate filling and bonding agents, they guarantee resistance to consistently high temperatures and comply with REACH and do not contain any SVHC-listed fibres, isoplan GREENLINE products are an excellent alternative to products that are based on ceramic fibres. isoplan<sup>®</sup> 1100 made by special high-performance biodegradable, mineral and ceramic fibres. the extremely flexible material combination means that thin isoplan can be adapted to existing geometries dry, and in moistened state even at thickness of up to 10mm. The coordinated raw material blend and the defined process technology lead to extremely low thermal conductivity, with very good, consistent heat insulation properties, isoplan<sup>®</sup> materials are also suitable for acoustic soundproofing and used as gaskets for inert gases up to an internal pressure level of 500 mbar.



			isoplan <sup>®</sup> 750 GREENLINE	isoplan <sup>®</sup> 1000 GREENLINE	isoplan <sup>®</sup> 1100 GREENLINE	isoplan <sup>®</sup> 1100	
Recommended a	application temp	erature	300~500°C	750°C	1000°C	1100°C	
Maximum app	olication temper	ature	1050°C	850°C	1050°C	1150°C	1100°C
Peak tempe	erature (short-tir	ne)	1100°C	900°C	1100°C	1200°C	
Density	DIN 28 090-2	[g/cm]	1.01	0.93	0.94	0.91	0.95
Tensile strength lo	ong DIN 52 910	[N/mm]	8.5	7.5	8	8.5	≧4.0
Tensile strength tr	rans IN 52 910	[N/mm]	4.1	3.4	3.7	3.5	≥2.0
Compressibility	ASTM F 36K	[%]	10	7	8	8.5	≦25
Recovery	ASTM F 36K	[%]	50	58	61	52.5	≧30
Ignition Loss	DIN 52 911	[%]	16	16	16	17	17
Thermal conductiv	vity 400°C	[w/(m-K)]	0.14	0.13	0.13	0.11	0.11

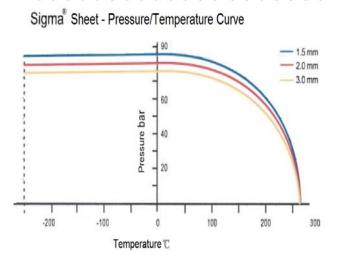


# **Filled PTFE Sheet Gasket**



# Flexitallic® SIGMA®

Flexitallic® SIGMA® adopts a bidirectional fluorinated polymer structure with excellent dimensional stability, greatly improving the creep tendency and stress relaxation of PTFE. It also has the excellent chemical resistance (pH 0~14) and good cleanliness of PTFE, and can be widely used. It is suitable for use in acids, alkalis and corrosive fluids other than hydrofluoric acid, and is extremely suitable for use in the food, pharmaceutical and electronic industries, and is suitable for vacuum to 8.5MPa pressure ranges. SIGMA® gaskets are softer and more conformable than ordinary pure PTFE, with lower adhesion stress, so they can be applied to flanges with glass, plastic, and ceramic linings; and the required sealing stress is lower than that of pure Teflon, which is suitable for slender or affected flanges. The sealing performance can still be achieved even with damaged flange surfaces or under low load conditions.



#### Physical properties

Product	SIGMA <sup>®</sup> 500	SIGMA <sup>®</sup> 511	SIGMA <sup>®</sup> 533	SIGMA <sup>®</sup> 600
Outlook	MA SO STOMA NO DA SO	III SIGMA IN A SIGMA IN SIGMA IN SIGMA IN A	MA 33 SOMA 33 SOMA	SOMA SOMA
Color	Blue	Fawn	Off-white	White
Filler	Hollow glass microspheres	Silica	Barium sulfate	None
Max. Pressure (bar)		85	j	
Service Temperature (°C)		-250 ~	260	
Density ASTM F1315 (g/cm3)	1.40	2.2	2.9	0.75
Compressibility ASTM F36 (%)	35	7	8	68
Recovery ASTM F36 (%)	44	44	43	5
Tensile Strength ASTM F152 (Mpa)	14	15	15	6.7
Residual Stress (175°C) DIN52913 (Mpa)	30	30	28	34
Creep Relaxation ASTM F38 (%)	31	35	33	<50
Liquid Leakage ASTM F37 (mL/hr)	0.65	4	3	1.2
Gas Leakage DIN3754 (mL/min.)	<0.1	<0.01	<0.01	0.01
Approval	DVGW, WRAS, Ta-Luft, EG1935/2004, FDA	BAM, WRAS, Ta-Luft EG1935/2004, FDA	Ta-Luft, FDA	WRAS, Ta-Luft, FDA
Application	Low bolt loads Improved flexibility, Suitable for use in alkali, acid and chlorine service, Glass lined, plastic and ceramic flange	Strong acids (except hydrofluoric), Suitable for oxygen & peroxide,	Strong alkalis, Aqueous hydrofluoric acid <49%. Used in food, medicine, and pollution-free environment. Not suited for sealing molten alkali or fluorine gas	Universal, minimized inventory, High compressibility for ultra-low bolt loads, wide range of chemical media acids, alkalis, halogens and hydrocarbons, For contamination sensitive, Plastic and glass lined equipment

The above test results are produced by 1.5 mm thick specimens.



# PTFE Gasket & PTFE Envelope Gasket



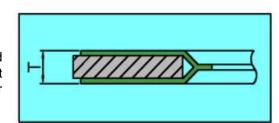
#### ZW 7500 Virgin/Pure PTFE sheet gasket

ZW#7500 pure Teflon plate-shaped gasket material can be applied to many chemicals, especially for toxic, strong acid-base and corrosive coal (except alkali metals strong for and high-temperature fluorine compounds). Virgin PTFE Sheet ZW#7500 is a universal gasket produced from 100% virgin PTFE. Thanks to the excellent in versatile chemical resistance, very low friction, inherent clean and wide working temperature range -100 ~ +150°C. ZW7500 has been widely adapted in oil refinery, chemical processing, pharmaceutical, and foodstuff industry. Service pressure is from 10 bar.



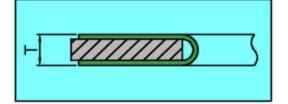
#### ZW 7530 Virgin PTFE Envelope V-shape gasket

V-shape gasket enveloping is machined from virgin PTFE and inserted with Non-Asbestos or rubber filler. It is one of the most popular gaskets and well suited to general application except for corrosive media or thicker filler.



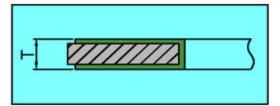
#### ZW 7531 Virgin PTFE Envelope U-shape gasket

U-shape gasket enveloping is lathe cut from virgin PTFE and inserted with Non-Asbestos or rubber filler. It is mainly shaped into large diameter and used in toxic chemical environment.

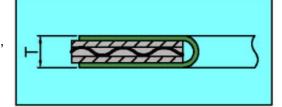


#### ZW 7535 Virgin PTFE Envelope 以-shape gasket

LI-shape gasket enveloping is machine cut from virgin PTFE and inserted with Non-Asbestos or rubber filler. It is mainly shaped into large diameter with thicker filler and used in toxic chemical environment.

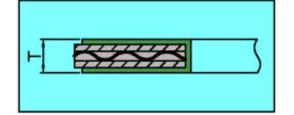


ZW 7531 and ZW 7535 PTFE envelop gasket filler material also available for metal corrugated reinforced (normally 304SS/316LSS), when the PTFE envelope three layers filler or more than three, the multi layers with good compressibility, and metal corrugated provide memory and resilience, this gasket requires lower stress to seal, and suit for Glass lined and FRP piping seal.



Maximum service pressure is limit to 40 bar.

We also offer special metal material for middle corrugated gasket.



# **Expanded PTFE Sheet Gasket**



# **GORE® GR (Sheet Gasketing)**

GORE® GR sheet gasketing has been developed for a secure flange connection offering an enduring seal for all pipeline and apparatus flange connections made of steel. It consists of pure, high quality expanded PTFE (ePTFE) with multidirectional oriented fibril structure that ensures an almost unlimited chemical resistance of the seal.

GORE® GR sheet gasketing is distinguished by its minimum loss of gasket stress (high PQR value according to EN 13555). This is particularly beneficial when gasketing material is subjected to the stress of temperature cycling, high temperatures and external forces, which can lead to leakage and/or blow-out.

The high strength of the material results in increased pressure and blow-out resistance. The higher rigidity of the material simplifies installation of the gasket. GORE® GR sheet gasketing offers a long-lasting seal on an extremely wide range of steel flange geometries.

The temperature range of GORE® GR is -269°C(-452°F) to +315°C (600°F), resistant to all media in range pH 0-14 (except molten or dissolved alkali metals and elemental fluorine, particularly at elevated temperature and pressure). Not subject to aging and physiologically harmless within the material's temperature range, UV-resistant and can be stored indefinitely. Low dielectric constant, insulation resistance, low friction coefficient ( $\mu$  = 0.02). The maximum applicable pressure as well as the maximum safe operating temperature depend mainly on the equipment. Standard pressures range from full vacuum to 210 bar (3,000 psig).

#### **Application**

- Steel Flange and complex flange shapes
- Old, rough, and damaged flange
- High Aggressive and dangerous media
- Facing material of Kammprofile gasket for high temperature and high pressure

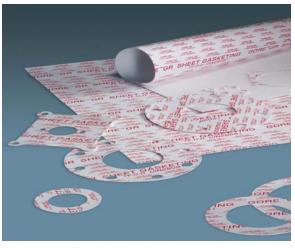
# **Approval**

- Oxygen Service (BAM)
- Chlorine Service
- TA Luft
- Marine & Offshore Applications (ABS)

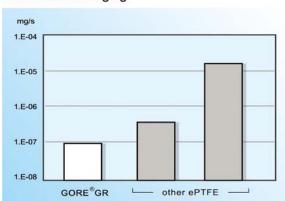
Sheet Size: 60"X60"

Sheet Thickness(mm): 0.5, 1.0, 1.6, 3.2, 6.4

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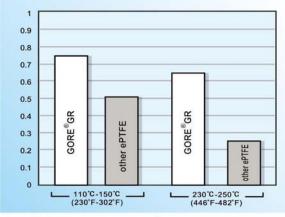


Leak Rate after Aging



Legend:ARLA, 3mm(1/8") sheet thickness Initial Gasket Stress: 34.5 MPa(5000 psi) Initial Pressure:55bar(800 psi) Aging Conditions:96 hours at 315°C(600°F)

#### Ratio of Gasket Stress Retained



Legend:EN13555 Relaxation Ratio, Por 3.2mm(1/8")sheet thickness

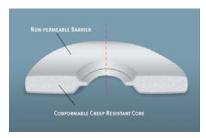


# **Universal Expanded PTFE Sheet Gasket**



# GORE® Universal Pipe Gasket (Style 800)

GORE<sup>®</sup> Universal Pipe Gaskets are used to seal all types of flanges in chemical-process piping. Style 800 gaskets are designed to meet the needs of various piping materials. They are ideal for standardizing gasket material across steel, glass-lined steel, and Fiberglass reinforced plastic (FRP) systems – any application in which a non-metallic gasket can be used.



Unaffected by even the most aggressive chemicals, Style 800 gaskets combine all the properties of expanded PTFE with exceptional seal ability. Engineered to deliver superior

bolt load retention, it exhibits exceptional creep resistance for reliable sealing of steel piping flanges. And due to it's unique design, they provide the lowest stress-to-seal for application in the most fragile plastic and glass-lined flanges. The exceptional performance in three important areas: conforming to irregular surfaces, helping to protect flanges, and seal reliability. With over 30 years of manufacturing and technical experience, depend on Gore™ gaskets when you need the highest level of confidence.

# Widely applications

Temperature Range from -269°C (-452°F) to +315°C (+600°F), resistance to all media in the 0-14 pH range (except molten alkali metals and element fluorine), particularly at elevated temperatures and pressures. Operating Pressure from Vacuum to 3,000 psig (200 bar). Not subject to aging and can be stored indefinitely.

#### **Available Size**

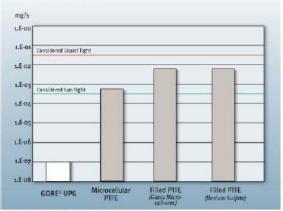
DN10~DN600, 1/2"~24" PN6~PN40, Class 150~300 Thickness 1.5mm, 3.0mm, 6.0mm

Metallic flanges and FRP flanges are suit for 3.0mm thick gasket Glass-lined flanges are suit for 6.0mm thick gasket

All 6.0mm thick (DN spec.) gasket with smaller inner diameter, the size different with standard EN 1514-1 and ASME B16.21.



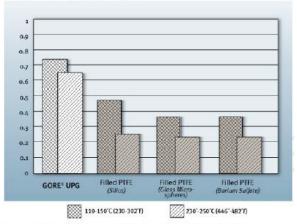
#### Leak Rate after Aging



Legend: ARLA, 3.2mm (1/8") sheet thickness Initial Gasket Stress: 43.5 MPa (5000 psi) Initial Pressure: 55 bar (800 psi) Aging Conditions: 96 hours at 315°C (600°F)

Note: Third party testing validates 100,000 times less emission for  $GORE^{\otimes}$  GR sheet gasketing.

#### Ratio of Gasket Stress Retained



Legend: EN13555 Relaxation Ratio, Pqr 3.2mm (1/8") sheet thickness

Note: If required, we also offer the best service in Gasket system products of GORE®.

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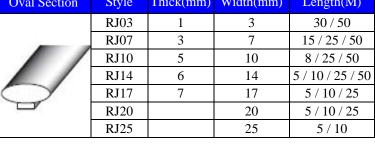


#### GORE® Joint Sealant

GORE® Joint Seal is the first form-in-place gasket to reliably seal large, complex or damaged flanges. GORE interface sealant is made of 100% expanded PTFE. When compressed, it can form a thin and high-strength sealing film. Due to its high resistance to creep and cold flow, it has long durability. This reduces downtime due to leaks and minimizes resulting production losses. Just peel off the adhesive and stick it on the flange surface, then overlap the head and tail of the selected bolt to achieve sealing. It can be applied to various standard and non-standard flange surfaces, and the material preparation is simple and easy. There is no need to prepare gaskets of different sizes for flange surfaces of different sizes, making the sealing work easy and easy.

Approval: EN13555, BAM, Ta Luft, DVGW

Oval Section	Style	Thick(mm)	Width(mm)	Length(M)
	RJ03	1	3	30 / 50
_	RJ07	3	7	15 / 25 / 50
	RJ10	5	10	8 / 25 / 50
	RJ14	6	14	5 / 10 / 25 / 50
	RJ17	7	17	5 / 10 / 25
	RJ20		20	5 / 10 / 25
	RJ25		25	5 / 10





GORE® Gasket Tapes are made from Gore's patented expanded PTFE technology and are supplied by the roll. GORE® Tape Gaskets are also available with full-width adhesive backing for easy installation. It is suitable for applications where the entire flange plane needs to be covered by a sealing gasket, such as to avoid crack corrosion due to sealing gaps or the accumulation of impurities.

Rectangular section	Style	Thick(mm)	Width(mm)	Length(M)
	FJ05100	0.5	100	30
	FJ1025		25	
	FJ1050	1.0	50	15
	FJ1100		100	
	FJ1525	1.5	25	10
	FJ1550	1.5	50	10
	FJ3010		10	7
	FJ3015	3.0	15	/
	FJ3030	3.0	30	5 / 15
	FJ3050		50	5







Chemical resistance to all media pH 0-14, except molten alkali metals and elemental fluorine. Typical use: -60°C to 150°C (-76°F to 300°F); industrial full vacuum to 10 bar (145 psi). Maximum use: -269°C to 315°C (-452°F to 600°F); full vacuum to 210 bar (3000 psi). It is harmless to the body. The material is non-contaminating and nonaging. It is perfectly suited for cryogenic applications, is UV resistant, and can be stored for a long time. For applications above 150°C or 10 bar, please contact Gore first.

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# **GORE**<sup>®</sup> Gasket Tape Series 500 for large steel flanges

The latest technology for sealing large diameter steel flange equipment and large steel pipes (replaces Series 300). Made with the latest patented technology, it greatly enhances the creep resistance of the product and improves the operational reliability of large steel flange sealing applications, especially in various heat exchangers with temperatures ranging from -269 to +315°C. of use. It is highly compressible, has high sealing performance, has excellent creep resistance, and has multi-directional tensile properties. It can withstand almost all chemical and corrosive substance treatments, making it an ideal choice for sealing large-diameter flanges.



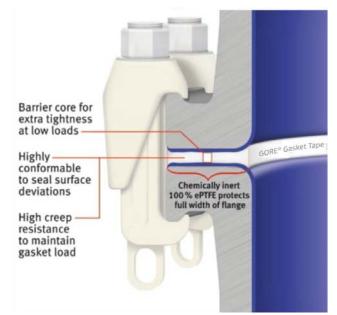


#### Product Size

Thickness	Width	Length
1/8" (3mm)	3/8"(10mm)	25 ft.(7.7M)
1/4" (6mm)	1/2"(15mm)	50 ft.(15.3M)
	3/4"(20mm)	100 ft.(30.5M)
	1"(25mm)	5M
	1-1/4"(30mm)	10M
		20M

# GORE® Gasket Tape Series 1000 for glass-lined steel equipment

Series 1000 is popular among leading glass-lined companies Endorsed by De Dietrich. This product uses unique Barrier Core technology and is a field-formed gasket suitable for glass-lined equipment or large special metal flanges. It is convenient, quick to install, easy to replace and replaceable. The on-site molding feature avoids unnecessary waste, making it more economical to use. Barrier Core technology can cause the pressing force acting on the gasket to produce a "local stress concentration" effect, improving the tightness. The chemical inertness prevents it from encountering sealing problems related to corrosive media or external environments. Its flexible texture can be completely sealed on the surface of irregular flanges such as glass-lined flanges, and it can also maintain dimensional stability and high sealing reliability. Series 1000 adhesive-backed Tape has been confirmed to replace traditional pure PTFE enveloped gaskets.



#### **Operating range**

The maximum applicable pressure and temperature depend mainly on the equipment and installation.

Typical use: -60°C to 230°C (-76°F to 445°F); industrial full vacuum to 40 bar (580 psi).

Maximum use: -269°C to 315°C (-452°F to 600°F); full vacuum to 210 bar (3000 psi) for flanges up to DN 2000/ASME 80"

● Product size

Thickness Width Length

6mm (1/4") 40 mm (1-1/2") 5M (16")
9mm (3/8") 55 mm (2") 10M (32")
65 mm (2-1/2") 15M (49")

Chemical resistance to all media pH 0-14, except molten alkali metals and element fluorine. The material is pollution-free, non-aging, and has good performance at low temperatures.

Note: If required, we also offer the best service in Gasket system products of GORE®. GORE® is registered trademarks of W.L. Gore & Associates, Inc.



#### 仁 望 Zen Wang

#### Expanded PTFE GR Gasket with corrugated metal reinforcement

# GORE® GR with corrugated reinforced for high thermal cycling

GORE® Dynacore® gasket is designed to provide superior sealing performance and blowout resistance in thermal and pressure cycling applications. The unique corrugated metal insert (316LSS in standard) provides memory and resilience. With its spring-like memory, this gasket required lower stress to seal, ensuring high lightness in demanding application.

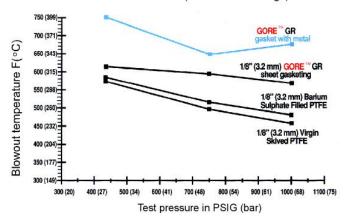
#### Profile Section



Under compression, the gaskets ensure high tightness during wide stress variations that occur under extreme temperature and pressure cycling consitions. GORE® Dynacore® gaskets exhibit the same superior creep resistance as all GORE® GR sheet gaskets.



Blowout resistance (ANSI 3" x 150 Flange)



#### Gland Packing

### **GORE®** GFO® Packing Fiber

Braided compression packing made from 100% GFO® fiber provide consistently high performing general service packing for wide application and use. Unlike other PTFE/graphite sealants, only those made with GFO® fiber, with its 20+ year history of trouble-free performance, deliver an unmatched level of assurance and confidence.

#### **Key Benefits**

- Minimum downtime from re-packing pumps or resurfacing shafts
- Saves maintenance expense
- Reduce inventory/consolidate packing needs
- Confidence that it will work every time

#### **Technical Data**

- Temperature Range: -400°F to +550°F (-240°C to +288°C)
- Chemical Resistance: Chemical inert, with few exceptions, over the entire 0-14 pH range
- Stability: Able to withstand shaft speeds to 4,300 feet per minute (21.8 m/s)

Note: If required, we also offer the best service in Gasket systems products of GORE®



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#### 100% Expanded PTFE ZW# 600

Expanded Soft PTFE fiber sealing gasket is made from 100 % PTFE through special process. It is made up of countless homogeneous fine soft multidirectional fiber. It has high tensile strength, low creep, high and low temperature resistant, corrosive resistant no asbestos no additive, nontoxic, comply with FDA requirements, aging resistant. After compression fiber tangles mutually, become more closer, airtight, watertight high-performance of anti leakage, in severe corrosive environment and heat, it can still maintain excellent sealing. The filling of superior compliance used for crude of damaged flange surfaces. It is used as sealing material for various kinds of flanges, and suitable for



used as sealing material for various kinds of flanges, and suitable for Chemical, Food, Pharmacy, Semiconductor, Aerospace, Petrochemical, Paper, Ship and Medical Industrials.

Property Test	Standard	Unit	Result
Gravity Density	DIN 28091-3	g/cm3	0.83
Sealability	ASTM F37B 4bar Nitrogen	ml/hr	0.02
Creep Deformation	ASTM F38 212°F / 73°F	%	13 / 8
Compressibility	ASTM F36	%	38~46
Recovery	ASTM F36	%	>50
Tensile Strength	ASTM F152	N/mm2	14
pH-Range		/	0~14

The above test results were produced by 1.5mm thickness specimens.

#### **ZEALON JOINT SEALANT**

ZEALON Joint Sealant, a unique ePTFE gasket tape, is the ideal choice for Sealing large diameter flanges. Made from 100% multi-directionally expanded PTFE, the entire gasket owns high conformability compressibility, good creep and relaxation, chemically inertness (pH 0~14), and very high tensile strength. As a result, the user will resolve and sealing problems associated with aggressive





media or outside environment. The service temperature range from -200 to 260°C and maximum pressure can be up to 200 bar. This unique joint sealant performs well and reliable in sealing imperfect flanges like glass-lined flange surfaces.

Easy and quick installation enables end users to gain initial benefits as urgent maintenance or unexpected outage can be greatly reduced.

Product	Wid	lth	Thickness	Length
code	inch	mm	mm	M
ZW# 7003	1/8"	3	2.0	30
ZW# 7005	3/16"	5	3.0	25
ZW# 7006	1/4"	6	3.0	20
ZW# 7010	3/8"	10	4.0	10
ZW# 7013	1/2"	13	5.0	5
ZW# 7016	5/8"	16	5.0	5
ZW# 7020	3/4"	20	7.0	5
ZW# 7025	1"	25	12.0	5
ZW# 7030	1-1/4"	30	3.0	5
ZW# 7035	1-1/4"	30	5.0	5
ZW# 7050	2"	50	3.0	5
ZW# 7055	2"	50	5.0	5

#### High-temperature & Fireproof Braided Fabrics, Tape, Rope

Various fireproof braided fabrics in form of cloth, fiber, tape and rope can be supplier in stock. Certain standard material like glass fiber, and ceramic fiber can meet versatile applications. They are suitable for making duckwork expansion joint, moulds thermal barrier cover, fire & smoke barrier (curtain), fireproof clothes, fireproof blankets, non-flammable apron and gloves, oven door seal and gasket in high temperature application.



Product code	Product name	Max. Temp. ℃
ZW# 910	Glass Fiber Fabric	593
ZW# 915	Silica Fabric	1000
ZW# 920	Ceramic Fiber Fabric	1260
ZW# 940	Glass Fiber Braided Tape	593
ZW# 950	Ceramic Fiber Braided Tape	1260
ZW# 970	Glass Fiber Braided Rope	593
ZW# 980	Ceramic Fiber Braided Rope	1260
ZW# 988	Silica Rope	1000
ZW# 992	Carbon Fiber Blanket	1000



		Temperature(°C) Max.		Max.		
Product Code	Product Name	Min.	Max.	pressure (bar)	Picture	
ZW# 200	Ramie With PTFE Dipped Braided Packing	-50	130	100		
ZW# 210	Pure PTFE Braided Packing	-200	280	150		
ZW# 220	PTFE With Lubricants Braided Packing	-200	280	150		
ZW# 230	PTFE & Aramid Fiber in Corners Braided Packing	-100	280	200		
ZW# 240	PTFE Filament Braided Packing	-200	280	250	The same	
ZW# 250	PTFE With Graphite Braided Packing	-200	280	200		
ZW# 260	PTFE With Graphite & Aramid Fiber In Corners Braided Packing	-100	280	250	HITTEN .	
ZW# 270	Aramid Fiber With PTFE Dipped Braided Packing	-100	280	250		
ZW# 280	Carbonized Fiber With PTFE Dipped Braided Packing	-50	260	200		
ZW# 300	Flexible Graphite Braided Packing	-250	600	250		
ZW# 310	Flexible Graphite With Fiberglass & Inconel Wire Reinforced Braided Packing	-250	600	250		
ZW# 320	Flexible Graphite With Inconel Wire Mesh Reinforced Braided Packing	-250	600	500		
ZW# 330	Flexible Graphite With Inconel Wire Reinforced Braided Packing	-250	600	300		
ZW# 340	Flexible Graphite & Carbon Fiber In Corners Braided Packing	-250	600	400		
ZW# 350	Carbon Fiber with Graphite Impregnated Braided Packing	-200	600	300		

#### **Insulating Gasket Kits**



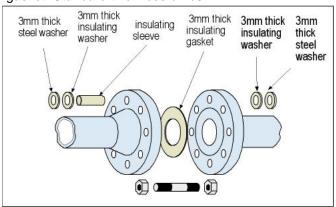
The insulation kits are composed of an insulating gasket, one sleeve for each bolt, one insulating washers and carbon steel washer for each nut. The insulation kits are used on two pipeline flanges made of different materials to prevent corrosion and provide complete conductive insulation protection. Suitable for offshore insulation, seawater environments, hydrocarbon, chemical insulation, refineries and pipelines.



#### **ZW# 1200 - RF (APS TYPE F)**

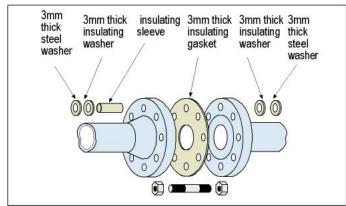
ZW 1200-RF gaskets are made to fit the raised face portion of the flange only. As there are no bolt holes in the gasket, the inside diameter of the bolt hole circle is slightly smaller than the outside diameter of the gasket, assuring an exact, automatic positioning of the gasket.

Available in the same materials as the ZW 1200-FF gasket. Standard thickness of 1/8".



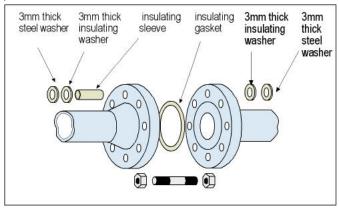
#### **ZW# 1200 - FF (APS TYPE E)**

ZW 1200-FF is a full faced gasket with the same outside diameter as the flange and precision cut bolt holes. This design facilitates proper alignment of the gasket during installation and foreign material is prevented from shorting the flange insulation. ZW 1200-FF gaskets are available in Neoprene/NBR coated plain face Phenolic, as well as a variety of high temperature materials. Standard thickness of 1/8".



#### **ZW# 1200 - RTJ (APS TYPE D)**

ZW 1200 - RTJ is specifically designed to fit into the ring groove of ring type joint flanges. They are manufactured of a medium weave, fabric-reinforced Phenolic material and are sized to ANSI specifications available in basic oval shape. Also available are BX gaskets with pressure ratings to 15,000 psi.





Note: Whole lines products of APS are available under requested.

# **Insulating Gasket Kits**



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•	ınsı	ulatin	ıg	Gasket	water	ıaı

Name	Grade	Water Absorption %	Tensile Strength PSI	Compression Strength PSI	Flexural Strength PSI	Dielectric Strength VPM	Max. Continuous Operating Temperature
Canvas Based Phenolic	CE	2.0	11,000	34,000	17,500	550	-59 ~ 125°C
Phenolic &Paper Laminate	XP	1.5	18,000	45,000	29,000	600	-51 ~ 130°C
Neoprene/NBR faced Phenolic & Paper Laminate	XPN	1.5	18,000	45,000	29,000	600	-54 ~ 115°C
Glass Fiber Reinforced Epoxy	FR4/G10	0.1	51,000	66,000	65,000	800	-54 ~ 115°C -129 ~ 150°C <mark>*</mark>
Glass Fiber Reinforced Epoxy	FR5/G11	0.08	43,000	58,000	58,000	550	-129 ~ 205°C
Glass Fiber Reinforced Silicon	G7	0.19	25,000	40,000	18,500	350	-59 ~ 220°C
Glass Fiber	G3	2.0	42,000	76,000	55,000	375	-59 ~ 175°C

#### Insulating Sleeve & Washer Material

Name	Grade	Water Absorption%	Dielectric Strength Volts/mil	Max. Continuous Operating Temperature
Mycarta Phenolic	LE	1.5	600	-51 ~ 130°C
Glass Fiber Reinforced Epoxy	FR4/G10	0.1	800	-51 ~ 115°C -129 ~ 150°C <mark>*</mark>
Polyester Film	Mylar®	0.8	4,000	-70 ~ 149°C
Meta-aramid Fiber	Nomex®	-	500	-54 ~ 232°C

#### One-piece integral Insulating Sleeve & Washer Material

Name	Grade	Water Absorption%	Dielectric Strength volts/mil	Max. Continuous Operating Temperature
Mineral and Mineral/Glass Fiber Reinforced Nylon Resins	Minlon <sup>®</sup>	0.22	1,200	-75 ~ 121°C

Mylar®, Nomex® and Minlon® are registered trademarks of E.I. du Pont de Nemours and Company.



#### • Special Materials for High Temperature

- GASKETS: NEMA grades G3, G7, G10 and G11, Durabla<sup>®</sup>, Durlon<sup>®</sup> SLEEVES: Nomex<sup>®</sup>, NEMA grade G7, G10, Durabla<sup>®</sup>, Durlon<sup>®</sup> WASHERS: NEMA grade G7, G10, Durabla<sup>®</sup>, Durlon<sup>®</sup>

Other high temperature materials are available upon request. It is recommended that the factory be contacted to discuss technical data on the above referenced products.

NEMA: the National Electrical Manufacturers Association of U.S.A. Durlon is registered trademarks of Gasket Resources Incorporated, Durlon 8500 Green are aramid and inorganic fibers with NBR resist temp. 700°F (371°C).



Electrically

Isolated

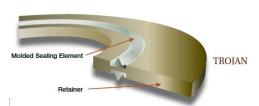
Retainer

The Standard

Trojan Sealing

Flastome Sealing

Gasket

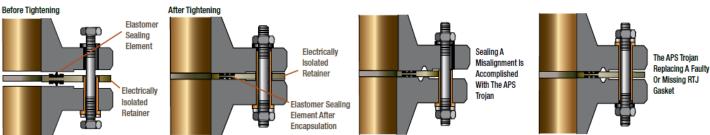


#### THE APS TROJAN

Trojan gaskets are state-of-the-art in near zero leakage static sealing. The elastomer sealing element is encapsulated in the electrically isolated retainer. The encapsulation of the sealing element permits only micro-exposure of the seal to hostile environs of fire, chemical and corrosive fluids.

Element Because of the controlled confinement of the elastomer sealing ring within the retainer allows the availability of a 92% to 94% filled volume groove. A consistent controlled pressure seal can always be obtained without tremendous bolt loads. Reduced loads allow for reduced flange thickness with smaller circles and smaller bolt holes.

The cross section of APS's Trojan Sealing Gasket (A) shows the elastomer sealing element as it appears before compression between flanges. This compression causes the seal to effectively fill the void of the groove and encapsulate, permitting only micro exposure of the actual seal to hostile elements either from within or without.



Sealing Element Material				
Name	Min. Operating Temperature	Max. Continuous Operating Temperature		
Nitrile (NBR)	-60°F (-51°C)	240°F (115°C)		
Viton (FKM)	-75°F (-60°C)	400°F (205°C)		
EPDM	-40°F (-40°C)	250°F (121°C)		
Teflon (PTFE)	-425°F (-253°C)	450°F (232°C)		

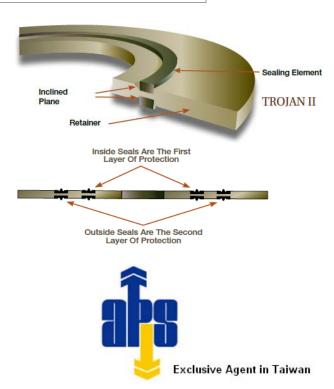
#### THE APS TROJAN II / DUPLEX SEAL TROJAN

Four seals on the new Duplex-Seal Trojan further ensures the integrity of the sealing capability of an already proven reliable gasket. For areas where absolute zero leakage is a must, the Duplex-Seal Trojan works twice as hard.

- Advantages
- · Can be utilized with mismatched flanges
- Can be utilized with misaligned flanges
  Can be used in place of RTJ rings
- Little initial torque required
- No re-torquing required
- Sealing ring cannot be left out
- Reusable
- Limited area of seal exposed (long fire life)
- Compensates for pressure fluctuations.

compression changes, vibrations, temperature, etc.

- Greatly reduces human error during installation
- Large selection of materials available
- Three to four times the dielectric strength necessary
- Low installation and maintenance costs
- · Gaskets through 144"



#### 仁望 Zen Wang

INTEGRA SSA® CATHODIC ISOLATION GASKETS

#### APS INTEGRA SSA®

The Integra SSAR Cathodic Isolation Gasket is manufactured from proprietary G-FORCE 2000®, a special glass epoxy material with an impressively high compression strength. Inserted in the gasket is a glass reinforced, spring energized PTFE seal to assist in maintaining a high pressure, chemically resistant seal within the flange. Incorporated within the PTFE seal, a 316 stainless steel coil spring provides additional compression with minimal cold flow. These characteristics allow constant pressure to be applied with low cold flow characteristics ultimately providing an outstanding seal and cathodically isolating the flange for superior reliability. It can be installed in flanges from ANSI 150# to ANSI 2500# up to an API 10,000# flange.

Integra SSAR gaskets have excellent electrical properties while at elevated temperatures. During mechanical operations, Integra SSAR gaskets can operate at 374 °F. Integra SSAR gaskets are manufactured to accommodate RTJ, full and raised face flanges. All kit components include either G-10 or Mylar sleeves and G-10 isolating washers when Integra SSAR gaskets are installed. These gaskets are constructed from an

extremely high compressive strength material formulated for high temperatures. Integra SSAR gaskets are manufactured in 1/4 inch thick material.

Material		Moisture Absorption		Tensile Strength	Compressive Strength	Max. Operating Temperature
G-Force 2000	111 M Scale	0.1%	80,000psi	61,000psi	91,000psi	204°C(400°F)

Material Tested: 0.25" thickness

#### **APS INTEGRA Z®**

The Integra Z  $^{\odot}$  gasket kit is comprised of EC-5000 material for gaskets and washers, developed and used by NASA for absolute zero operating temperature -273°C / -459 °F~140°C / 284 °F. Sleeves are available in G-10 or optional Nomex materials. Metal backup washers are available in stainless steel.

#### Typical Properties

Material	Compressive Strength	Dielectric Water Strength Absorption		Flexural Strength	Tensile Strength	Shear Strength	
EC-5000	65,000psi	670VPM	0.1%	75,000/65,000psi	45,000/38,000psi	22,000 lb.	



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#### **APS INTEGRA SSAXT**

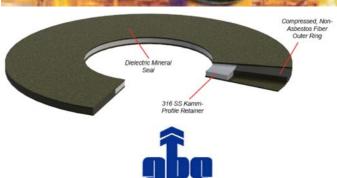
The Integra SSAXT flange isolation gasket kit was developed to meet the needs of our customers for a high temperature,

cathodic protection gasket in severe service applications. The SSAXT combines the reliability of a Kamm-profile retainer with the temperature capabilities of a highly dielectric mineral seal. This gasket is suitable for use in all services up to and including ANSI 2500# and API 10,000# classes. Isolation Kits are available which include high temperature washers and sleeves. Max. Operating Temperature 800°F (427°C).

Temperature 800°F (427°C). It designed to withstand operating temperatures which exceed the limits of epoxy/phenolic resin gaskets. They are also made from materials which electrically isolate and cathodically protect flanges and flange components. The engineered mica seals are effective at sealing across a wide range of chemicals, hydrocarbons, and gaseous mixtures, as well as maintaining sealing at elevated temperatures.

Gasket	Mica Seal: Max.1292°F(700°C), Thickness 0.125"(3.2mm), Dielectric Strength 635VPM, Tensile Strength 2,900psi, Outer retainer max. temp.925°F(496°C).
Sleeves	Filamic Mica, Max.1200°F(650°C), Dielectric Strength 305VPM.
Washers	Mica Sheet Max. Temp. 1022°F(550°C), Dielectric Strength 631VPM, Water Absorption 0.65%, Compressive Strength 57,500psi





#### 仁望 Zen Wang

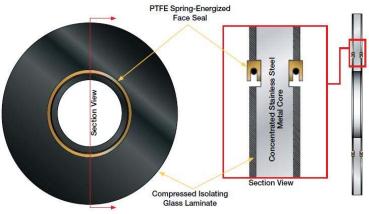
#### APS INTEGRA II SSA®

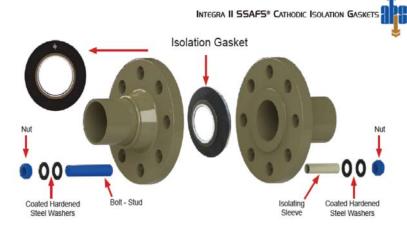
The APS Integra II SSA (severe service application Stainless/Steel) Gasket is an exceptionally expendable gasket used for both isolating and general sealing purposes in severe service applications. This gasket has been developed as an inimitable and effective seal for sealing flanges in which the opportunity for leakage must be held at zero allowance and exclusively designed for severe isolating service in harsh environmental applications especially where hydrocarbons are a factor. The Integra II SSA Gasket consists of a PTFE spring-energized face seal, seated in a highly compressed isolating glass laminate affixed to a concentrated stainless steel metal core. Because of its all-composite exclusive construction and its exceptional pressure-activated sealing properties, the gasket requires far less bolt stress to seal than most standard isolating gaskets in the industry. The Integra II SSA Gasket's inner diameter is machined to match the exact flange bore dimension specified by the customer to eradicate the possibility of turbulent flow and inner flange face corrosion. This gasket is engineered to be reusable with a replaceable sealing element. The Integra II SSA Gasket is suitable in all services up to and including ANSI 2500# and API 10,000# classes. All Integra II gaskets are manufactured in 1/4" thickness for all diameters.

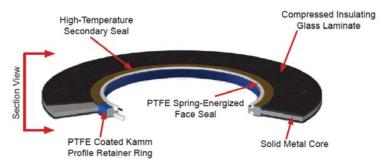
#### **APS INTEGRA II SSAFS®**

The new SSAFS<sup>®</sup> gasket combines the proven dependability of a PTFE pressure energized spring seal as the primary seal. The core of the gasket is 316 stainless steel, with permanently bonded insulating glass laminated adhered to both faces. Zero-free leaks for high sulfur content crude oil for H2S gas fugitive emissions, proven through multiple applications. Exceptionally dependable for insulating and sealing purposes for severe service and fire safe applications. pass API Standard 6FB test. Highly suitable for all severe service applications up to and including ANSI 2500# and API 10,000# classes.

#### INTEGRA II SSA® CATHODIC ISOLATION GASKETS







Isolating between flanges of dissimilar metals to prevent galvanic corrosion, Wellhead isolation from interconnected flow lines, Mating mismatched dissimilar flanges, Eliminate turbulence and flow-induced erosion between ring-joint (RTJ) flagnes, Protect against corrosion on uncoated or scarred flange faces, to seal between flanges subjected to vibration/cavitations, Eliminate corrosion from forming in the cavities between RTJ flanges where intense modes of hostile chemicals may be present.

Retainer Material	Compressive	Dielectric	Max. Continuous	Water	r Flexural Tensile Bond		Bond	Shear
Retainer Waterial	Strength	Strength	Operating Temp.	<b>Absorption</b>	Strength	Strength	Strength	Strength
G10 SSA S/S	66,000PSI	800 VPM	302°F(150°C)	0.05%	65,000PSI	51,000PSI	2,600 lb.	22,000 lb.
G11 SSA S/S	58,000PSI	550 VPM	400°F(205°C)	0.08%	58,000PSI	43,000PSI	2,200 lb.	21,200 lb.

Retainer Material	PTFE (Spring-Energized), Temp250°F~+450°F, designed for multiple applications.
	Viton, Temp75°F~+400°F, designed for general oil and gas applications.
Sleeve Material	G-10, max. Temp. 302°F
Sleeve Material	Mylar, max. Temp. 300°F
Washers	Coated Hardened Steel Washers





#### **CLOTH**

APS PTFE cloth safety shields are manufactured from single and multi layered clear cloth for ease of visibility, or from a colored cloth with a leak indicating patch. Weep holes located behind the sensitive pH indicating patch allow the indicator to immediately signal a leak and will change color to red in the presence of an acid, or green if an alkali. The pH patch is also replaceable which allows reuse of the shield. APS safety shields are UV stabilized and resistant to sun, rain and fumes and may be used indoors or outdoors. Our cloth shields are quickly and easily installed by one person without any tools by means of a hook and loop fastener and drawstrings.







PTFE Premium Spray Shield Style TP



Clear PTFE Spray Shield Style TC



PTFE Super Shield Style TW

- PTFE coated glass cloth
- PTFE or Nomex<sup>®</sup> thread and drawstring
- Maximum operating temperature 450°F
- Fire and tear resistant. Broad spectrum of chemical resistance.

Style TS	Style T	Style TP	Style TC	Style TW
PTFE Single Ply	PTFE Standard	PTFE Premium	Clear PTFE	PTFE Super
Similar in design to standard PTFE shield, Single-layered, economical construction for less severe applications.	The most popular and best selling shield. 3-ply multilayered reinforced construction.	High PTFE content for severe applications. Outlasts all other brands on market. 3-ply multilayered construction. Laboratory test proven.	Similar in design to standard PTFE. 100% clear PTFE strip in center of shield allows to visual inspection.	White and solid PTFE construction (expanded PTFE cloth. PTFE or Nomex® cord, thread and reinforcement. Suitable for applications where coated glass is not acceptable. Reinforced construction through multi-layered design.

Nomex<sup>®</sup> is registered trademark of E.I. du Pont de Nemours and Company.

Safety spray shields shall be used to inhibit and detect chemical sprayout due to failures of flanged connections. They shall be installed on all un-insulated process lines conveying acid, caustic, and other identified chemicals.

Shields shall enclose all flanges, all of expansion joint and connecting flanges, all valves and connecting flanges, and cover bonnet on gate and globe valves. APS spray shields available for all ANSI, DIN, PN, BS, JIS and KS flange sizes.

The shields shall be manufactured of chemical resistant cloth or metal. The cloth shields shall be sewn with chemical resistant thread, and have chemical resistant drawcords and hook and loop attachments for closure. Solid cloth shields shall be pH indicator tape for leak indication or transparent shields shall provide visual inspection.

Material of construction shall be chosen by customer using the APS safety spray shields and chemical resistant chart guide or by manufacture's recommendations.

Note: Whole lines products of APS are available under requested.





#### ADDITIONAL CLOTH











Polypropylene Spray Shield Style P

Polyethylene Spray Shield Style PE

Polyvinyl Chloride (PVC) Spray Shield Style V

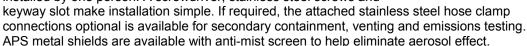
Clear PVC Spray Shield Style VC

Clear PTFE Spray Shield with Drain Style TCD

Style P	Style PE	Style V	Style VC	Style TCD
Polypropylene	Polyethylene	Polyvinyl Chloride(PVC)	Clear PVC	Optional Drain
100% black polypropylene cloth, thread, and drawstring. Polypropylene stiffener lines the interior for adds protection. Maximum operating temperature 200°F.	Manufactured from transparent, reinforced polyethylene. Reinforced thread and drawstring. Maximum operating temperature 170°F.	Manufactured from yellow, reinforced polyvinyl chloride (other colors available). Reinforced thread and drawstring. Maximum operating temperature 170°F.	Similar in design to standard PVC shields. Clear vinyl strip in center allows for visual inspection.	Available on clear PTFE shield, 100% PTFE drain nipple attached to bottom of shield. Used for secondary containment, venting, and emissions testing.

#### **METAL**

The metal material shield manufactured from 22 to 24 gauge (0.6 to 0.76mm) sheet metal used in high temperature, high pressure or when conditions are unfavorable for cloth shields. The slotted overlapped edges prevent lateral spray-outs, and spacer rods raise shield off flange to dissipate pressure. The metal shields shall be attached by keyway slot and screw. In addition, shield can be easily installed by one person. A screwdriver, stainless steel screws and





Stainless Steel	Galvanized Steel	Optional Drain
Recommended for corrosive and hazardous environments. Available in 304 and 316 grade stainless steel. Maximum operating temperature 2,000°F. Maximum operating pressure 3,500 psi.		Available in 304 and 316 grade stainless steel. Stainless steel nipple attached in bottom of shield. Used for secondary containment, venting and emissions testing.

Splash Arrestor® specifically designed to capture sprayouts from faulty flanges carrying dangerous liquids, the Splash Arrestor® gets the job done right the first time.

#### Advantage

- Produced entirely with stainless steel
- Easy & accurate installation by one person
- No maintenance required
- Reusable many times over the life of the installation
- Available for most ANSI & API flanges
- Lightweight

Note: Whole lines products of APS are available under requested.





Safety Spray Shields are made of high strength expanded PTFE, and PTFE drawstring. A sensitive pH indicating patch on the exterior surface allows the earliest warning of initial leak while its color changes to red in the presence of an acid or to green if an alkali. The pH patch (replaceable leak indicating patch) is replaceable which reuse of the shield is possible. Besides, 100% PTFE center clear strip is also available and easy for visual inspecting the leak level is serious or not. It is kind of effective proactive maintenance to prevent and diagnose any abnormal spray of spattering of high concentration or corrosive chemicals. It is necessary for labor safety to protect from the environment hazardous factor.



TYPE	ZW#600-S (Standard)
	244#000-3 (Standard)





ZW#600-SC (Clear)

ZW#610 (Hydrogen Clear)

Standard

Made by 100% High Strength expanded PTFE; 100% PTFE drawstring and thread; Enclosed drawstring stopper;

high molecule patch pocket; replaceable pH patch.

0-14)clear high molecule foil for patent high sensitive Hydrogen gas center strip;

Anti Corrosion (pH 0-14) clear Specially adopt anti corrosion (pH Adopt anti corrosion clear visual strip plus detecting patch.

# Characteristics

- 1. 100%PTFE drawstring and thread, high performance.
- 2. pH indicating patch on out of shield help for visual inspection.
- 3. Clear high molecule patch pocket could protect pH indicating patch easy to visual and to avoid damage.
- 4. Replace pH indicating patch design for long term using.
- 5. Especially suitable for strong acid and alkali piping flange around the walking way of the plant.

- 1. 100%PTFE drawstring and thread, high performance.
- 2. Anti corrosion (pH 0-14) clear high molecule foil to direct visual inside of shields, it is good for inspecting the leak direction when leakage and to avoid the media spraying out to hurt worker's body during disassemble.
- 3. Especially suitable for dangerous chemicals, high pressure steam piping flange around the walking way of the plant.

- 1. 100%PTFE drawstring and thread, high performance.
- 2. Micro Hydrogen gas leakage though Anti corrosion (pH 0-14) clear visual strip plus hydrogen detecting patch become visible, it reduced the detection costs, suitable for outdoor and flame-proof area, it is easy for Risk-based Inspection (RBI) system and daily routing-inspection for a wide-area determination of hydrogen presence prior to any combustion or local temperature rise.
- Excellent Sensitive Hydrogen gas detecting, and patent concentrate accumulating indicator design, high identification.
- Replaceable Hydrogen detecting patch. Hydrogen gas detecting patch shall be replaced in regular period after installation to maintain the high sensitive and prove the best warning function. The period time depends on the environment.

pH indicating patch shall be replaced per 10 months after delivery to maintain the properties and ensure the best warning function.

- Warranty excluding the replaceable patch.
- Every Shield with exclusive code and Warranty.
- Exclusive code filed the produce date, warranty period, maintenance and inspection experience for tracking the material and records.
- Warranty one year after delivery to ensure the excellent protect and detecting function and avoid possible potential failure and recommend take apart the shields to do the fully function inspection and necessary maintenance every 18 months or maintenance period (within 2 years).

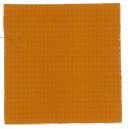
# Maintenance & Warranty

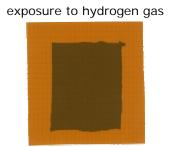


The ZW #610 hydrogen leak detection element uses Nitto DX-2106H tape, which quickly changes color from amber to black (depending on the percentage of hydrogen). As an additional safety measure to detect gas leaks. Because it makes it easier to detect intermittent leaks, inspection time can be shortened. Detects hydrogen leaks with hydrogen concentrations as low as 1%.

DX-2106H will not return to its original color once exposed to hydrogen gas. It is as easy to apply as regular pressure sensitive adhesive tape. Can be used in most indoor or outdoor environments.

Not exposed to hydrogen gas





ZW safety shields made by 100% PTFE, and with excellent performance for anti corrosion, UV stabilized, temperature resistance, waterproof, smoke prevention, anti-oxidation properties, and suitable for high concentration acid, alkali, hazardous chemical and high-pressure steam piping flange. PTFE material is much better to compare with legacy PP, PE or PVC material and meet most industry requirement. It can be used in room or outside, and easy to install by one-man in short time without tools. The shields meet most of international industrial standard such as ANSI, DIN, PN, BS, JIS, CNS or non-standard flange, and also available upon customer request.

#### • Material properties comparison of PTFE vs PE, PP, PVC

	The condition of the confidence of the confidenc								
	$\odot$ Excellent , $\triangle Good$ , X Inferior	PTFE	(HD)PE	(LD)PE	PP	PVC			
1	Chemical Resistance (pH 0~14)	0	$\triangle$	$\triangle$	$\triangle$	Х			
	Maximum Temperature Resistance °C	300	115	115	130	95			
2	Maximum Working Temperature °C (pH indicating patch)	230	80	80	105	80			
	Maximum Working Temperature °C (Hydrogen gas detecting patch)	90	80	80	90	80			
3	Working Pressure (psi)	1650	350	350	1100	435			
4	Tensile Strength (psi) , ASTM D638	4600	4600	2000	2850	400			
5	UV Stabilized , ASTM G154 Cycle 1	0	Х	Х	Х	Х			
6	Water Absorption (non-absorbency)	0	©	©	©	<b>(</b>			
7	Air Permeability	0	Х	Х	Х	Х			
8	Incombustibility (compare to plastic material)	0	Х	Х	Х	Х			
9	Dielectric Strength (V/mil ) , ASTM D149	1390	460	450	500	554			
10	Reuse possibility	0	Х	©	Х	Х			



#### Easy Installation

Enclosed Velcro and drawstring stopper, it is easy to install by one-man.

#### Applications

For strong acid and alkali piping flange, valve and other joints, For hazardous chemicals, high-pressure steam piping flange, valve and other joints

For hydrogen gas piping flange, valve and other joints.

#### **Rubber Sheet Gasket**



Rubber sheet gasket is the most basic and suitable for a wide range of general sealing application, it is the polymer vulcanization, adding fillers, pigments and additives to form a synthetic rubber, with a very soft compressibility and excellent recovery, only required low tightening torque in low temperature and low pressure and the occasion to play an effective sealing effect, when removed from the flange will not split. Suitable for installing on uneven flange surfaces to achieve the effect of modification, has so far never reduced its volume. Rubber is very expansion and impermeability, the resistance to the formation of gas and fluid through the very effective seal.



#### **Sheet Standard:**

Thickness(mm): 1.0/1.5/2.0/3.0/5.0/6.0

Width(mm): 1000/1200/1500 Length(mm): 10,000~30,000 Other dimensions requested by customer

#### Material

				Temperaure	Rango	
Product Code	Material Code	Material	Hardness ±5	remperaure (°C) Min.	Max.	Application
ZW#2100	NR	Natural Rubber	40	- 50	90	Excellent physical properties such as extremely high resilience, tear strength and abrasion resistance. Suitable for inorganic salt, Ammonia, Light Acids or Alkalis.
ZW#2200	CR	Neoprene <sup>®</sup> Chloroprene Rubber	65	- 20	90	Good aging, ozone and weathering resistance. Resistance to chemicals, oils. Flame retardant.
ZW#2300	NBR	Nitrile Butadiene Rubber	65	- 20	90	Excellent resistance to mineral and vegetable oils, solvents and fuels. Good abrasion resistance.
ZW#2400	IIR	Butyl Isobutylene Isoprene Rubber	65	- 30	120	Excellent resistance to acid and alkali, excellent weathering properties and ozone resistance. Very goods electrical resistance, low permeability to air.
ZW#2500	FKM	Viton <sup>®</sup> Fluorocarbon Rubber	70	- 30	120	Excellent resistance to a wide range of chemicals, excellent resistance to heat and oil combinations found in engines and compressors.
ZW#2600	EPDM	Ethylene Propylene Diene Monomer	60	- 20	90	Good for steam, hot water, diluted acids and lyes, alcohols, ketones, ester, silicone grease, brake fluids, polyglycol-water mistures.
ZW#2700	SBR	Styrene Butadiene Rubber	60	- 30	90	Good tear resistance, good abrasion resistance. Suitable for water, alcohols, ketones, grease, diluted acid, synthetic brake fluids.
ZW#2800	SI	Silicone Rubber	50	- 55	150	Wide temperature range - excellent properties for both hot and cold temperature extremes. Excellent resistance to weathering properties, excellent resistance to ozone and oxygen.

Remark: We also offer other rubber material and fabric reinforcement.

#### PTFE Coated Rubber Gasket



#### **ZW 2960**

It is improved from full face rubber gasket, surface with molded virgin PTFE coating which covered inner diameter to inside bolt circle on both sides with one to two concentric convex sealing rings. PTFE coating increase the maximum corrosion resistance possibility to suit for universal corrosive chemicals. Normal rubber material is EPDM, the EPDM giving elastic recovery and low seating stress advantages (only one third of traditional PTFE enveloped Gasket), and a long sealing life. It meets ASME B16.5 \ JIS \ DIN flange standard, standard size 1/2" up to 24", continue service temperature range -30°C ~+150°C, maximum pressure 20 Bar. It can be used for application such as plastic piping and metal lining or glass lining piping.



Remark: Custom size depends on requirement is available.

#### PTFE Encapsulated O-Ring

#### ZW 2970

Teflon® (PFA or FEP material) encapsulated elastomer (Viton® or Silicone) core to perform the excellent chemical corrosive resistance and higher temperature resistance. It is novel type and suitable for the special requirement when other single elastic material can't meet. O-Ring installation will result variation depends on the pressure rating, it is specially suit for low pressure environment, and itself elasticity will be formed the sealing property. The properties are corrosion resistance, smooth, no stick, low absorption, low ovality and no swelling.



Outer Material		Inner Material		Temperature Range °C	Max. Pressure	
FEP	- Transparent	VITON <sup>®</sup>	Black	-200 ~ 205		
PFA		VITON®	Diack	-200 ~ 260	50 Dor	
FEP		SILICONE	Dod	-200 ~ 205	50 Bar	
PFA		SILICONE	Red	-200 ~ 260		

Remark: Custom size depends on requirement is available. We also offer various rubber materials O-ring.



#### FIREFLY (TBA) ZW 2900

Oil-proof paper jointing sheet is made of cellulose as the base material and impregnated with plasticized gel. It is economical and practical, and has good oil resistance and fuel resistance. Mainly used in the automobile and motorcycle industries, such as engine carburetors, fuel pumps, front panels, oil pumps, oil filters, side covers, timing outer covers, temperature regulators and water pumps; input shafts and upper covers of gear boxes And clutch; axle cover and half shaft of rear axle. It can also be used in industries with low temperature and chemical resistance requirements.



• Physical properties

- i ilyotosii proportioo				
Max. Temperature		120°C (250°F)		
Color		Brown		
Compression (70 kg / cm <sup>2</sup>	번 1000psi) ASTM F36	25 - 40%		
Recovery ASTM F36		40 % min.		
Tensile Strength ASTM F1	52	13.79 MN/m² min.		
Fluid Resistance Propertie	s after 22 hours at 21~30°C (70~85	refer to ASTM F146		
ASTM IRM 903 Oil	Change in weight	15% max.		
ASTIVITRIVI 903 OII	Change in thickness	5 % max.		
A CTM Final D	Change in weight	15 % max.		
ASTM Fuel B	Change in thickness	5 % max.		
Distilled Water	Change in weight	90% max.		
Diotinoa Wator	Change in thickness	30% max.		

Sheet Size: Thickness 0.15~6.40mm, Width 1000mm, Length 100/50/25 Meter

#### • Fluid Resistance Chart

Acetone	2	Dibutyl Pathalate	1	Linseed Oil	1
Acids Inorganic	3	Ether	2	Lubricating Oil	1
Alcohols Methyl/Ethyl/Amyl	1	Ethyl Acetate	1	Methyl Ethyl Ketone	1
Alkalis	3	Ethylene Glycol	1	Nitrobenzene	1
Ammonia	3	Formaldehyde	1	Phenol	1
Aniline	1	Freon 12 and 22	3	Propane	1
Benzene	1	Fuel Oil	1	Propylene Glycol	1
Butane	1	Gasoline	1	Sodium Silicate	1
Butyl Acetate	1	Glycerine	1	Steam	3
Carbolic Acid	1	Greases	1	Toluol	1
Carbon Dioxide	1	Hydrogen	1	Tricholroethylene	1
Carbon Tetrachlorid	1	Hydrogen Peroxide	2	Vegetable Oils	1
Chlorinated Solvents	1	Hydrogen Sulphide	1	Water/Sea Water	2
Cresol	2	Inks	1	White Spirit	1
Detergents	1	Kerosene	1	Xylol	1

Note: 1 - Good Resistance, 2 - Medium Resistance, 3 - Not Resistant.



#### ZW 2950

Cork rubber gasket is composed of cork particles of different sizes and various rubbers. It is a material with high compressibility, good elasticity and strong recovery power.

Its oil and fuel resistance properties can be used in the automotive industry and general industry.



• Physical properties

Service Temperature		-30 ℃ ~ 110 ℃		
Color		Black Brown		
Density ASTM F1315		560 ~ 760 kg/m³		
Hardness (Shore A) ASTM D2240		55 ~ 70		
Compressibility (400 psi) ASTM F36		30 ~ 55%		
Compression Set (Method A, 22hr at 70°C) A	STM D395	55% Max.		
Recovery (400 psi) ASMT F36		75% Min.		
Tensile Strength ASTM F152		0.96 MPa Min.		
ASTM F147 Oil No.1				
(70 hr at 100°C, 212°F)	Change in Volume	-10% ~ 10%		
ASTM F146 Fuel A	Olassa is Val	00/ 450/		
(22 hr at RT)	Change in Volume	0% ~ 15%		
ASTM F146 IRM 903	Change in Thisler	20/ 450/		
(70 hr at 100°C, 212°F)	Change in Thickness	-2% ~ 15%		

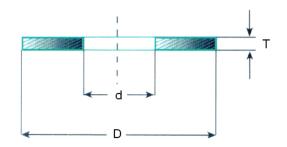
Non-Standard Sheet Size: 1.0mmX1350mmX66M , 4.0mmX1220mmX16M

5.0mmX1245mmX13M , 6.0mmX1270mmX11M (MOQ is required for Non-Standard Sheet Size)



per ASME B16.21

for ANSI / ASME B16.5 Flange



Unit: mm

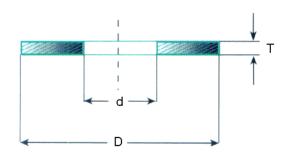
Flange	RF											
Nominal	ID	150#	300#	400#	600#	900#	1500#					
Size	d		1		D							
1/2"	21	48	54	54	54	64	64					
3/4"	27	57	67	67	67	70	70					
1"	33	67	73	73	73	79	79					
1-1/4"	42	76	83	83	83	89	89					
1-1/2"	48	86	95	95	95	98	98					
2"	60	105	111	111	111	143	143					
2-1/2"	73	124	130	130	130	165	165					
3"	89	137	149	149	149	168	175					
3-1/2"	102	162	165	162	162	_	_					
4"	114	175	181	178	194	206	210					
5"	141	197	216	213	241	248	254					
6"	168	222	251	248	267	289	283					
8"	219	279	308	305	321	359	352					
10"	273	340	362	359	400	435	435					
12"	324	410	422	419	457	498	521					
14"	356	451	486	483	492	521	578					
16"	406	514	540	537	565	575	641					
18"	457	549	597	594	613	638	705					
20"	508	606	654	648	683	699	756					
22"	559	660	705	702	733							
24"	610	718	775	768	791	838	902					

%Above 150~900# size as per ASME B16.21-2021



per ASME B16.21

for ANSI / ASME B16.47 Seires A (MSS-SP44) & Series B (API 605) flange

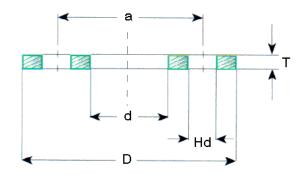


Flange		SEF	RIES B (	API 605	) RF		SERIES A (MSS-SP44) RF							
Nominal	ID	75#	150#	300#	400#	600#	ID	150#	300#	400#	600#	900#		
Size	d			D			d			D				
26"	660	708	725	772	746	765	660	775	835	832	867	879		
28"	711	759	776	826	800	819	711	832	899	892	914	943		
30"	762	810	827	886	857	879	762	883	953	946	972	1007		
32"	813	860	881	940	911	933	813	940	1006	1003	1022	1070		
34"	864	911	935	994	962	997	864	991	1057	1054	1073	1134		
36"	914	973	987	1048	1022	1048	914	1048	1118	1118	1130	1197		
38"	965	1024	1045	1099	_	_	965	1111	1054	1073	1105	1197		
40"	1016	1075	1095	1149	_	_	1016	1162	1114	1127	1156	1248		
42"	1067	1126	1146	1200	_	_	1067	1219	1165	1178	1219	1299		
44"	1118	1181	1197	1251	_	_	1118	1276	1219	1232	1270	1365		
46"	1168	1232	1256	1318	_	_	1168	1327	1273	1289	1327	1432		
48"	1219	1283	1307	1368	_	_	1219	1384	1324	1346	1391	1483		
50"	1270	1334	1357	1419	_	_	1270	1435	1378	1403	1448	_		
52"	1321	1387	1408	1470	_	_	1321	1492	1429	1454	1499	_		
54"	1372	1438	1464	1530	_	_	1372	1549	1492	1518	1556	_		
56"	1422	1495	1514	1594	_	_	1422	1607	1543	1568	1613	_		
58"	1473	1546	1580	1656	_	_	1473	1664	1594	1619	1664	_		
60"	1524	1597	1630	1705	_	_	1524	1715	1645	1683	1721	_		

<sup>%</sup>Above 75~600# size as per ASME B16.21-2021



per ASME for ANSI / ASME B16.5 Flange



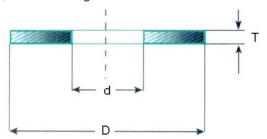
FF FF												
Flange			150 #					300 #				
Nominal Size	Dα	O D	BCD a	Hole Dia. Hd	Holes	ID d	O D	BCD a	Hole Dia. Hd	Holes		
1/2"	21	89	60.3	16	4	21	95	66.7	16	4		
3/4"	27	98	69.9	16	4	27	117	82.6	19	4		
1"	33	108	79.4	16	4	33	124	88.9	19	4		
1-1/4"	42	117	88.9	16	4	42	133	98.4	19	4		
1-1/2"	48	127	98.4	16	4	48	156	114.3	22	4		
2"	60	152	120.7	19	4	60	165	127.0	19	8		
2-1/2"	73	178	139.7	19	4	73	191	149.2	22	8		
3"	89	191	152.4	19	4	89	210	168.3	22	8		
3-1/2"	102	216	177.8	19	8	102	229	184.2	22	8		
4"	114	229	190.5	19	8	114	254	200.0	22	8		
5"	141	254	215.9	22	8	141	279	235.0	22	8		
6"	168	279	241.3	22	8	168	318	269.9	22	12		
8"	219	343	298.5	22	8	219	381	330.2	25	12		
10"	273	406	362.0	25	12	273	445	387.4	29	16		
12"	324	483	431.8	25	12	324	521	450.9	32	16		
14"	356	533	476.3	29	12	356	584	514.4	32	20		
16"	406	597	539.8	29	16	406	648	571.5	35	20		
18"	457	635	577.9	32	16	457	711	628.7	35	24		
20"	508	699	635.0	32	20	508	774	685.8	35	24		
22"	559	750	692.2	35	20							
24"	610	813	749.3	35	20	610	914	812.8	42	24		

<sup>%</sup>Above size as per ASME B16.21-2021



per JIS B 2404 : 2018

for JIS B 2220, B 2239, B 2240, B 2241 Flange

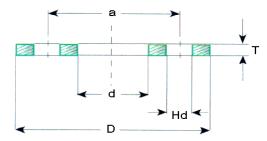


	RF										
Flange Norminal	ID	2 K	5 K	10 K	16 K	20 K	30 K				
Size	d			1	)						
10	18	_	45	53	53	53	59				
15	22		50	58	58	58	64				
20	28		55	63	63	63	69				
25	35		65	74	74	74	79				
32	43		78	84	84	84	89				
40	49		83	89	89	89	100				
50	61	_	93	104	104	104	114				
65	84	_	118	124	124	124	140				
80	90		129	134	140	140	150				
90	102	_	139	144	150	150	163				
100	115	_	149	159	165	165	173				
125	141	_	184	190	203	203	208				
150	167	_	214	220	238	238	251				
175	192	_	240	245	_	_	_				
200	218	_	260	270	283	283	296				
225	244	_	285	290	_	_	_				
250	270	_	325	333	356	356	360				
300	321	_	370	378	406	406	420				
350	359	_	413	423	450	450	465				
400	410		473	486	510	510	524				
450	460	535	533	541	575	575	_				
500	513	585	583	596	630	630	_				
550	564	643	641	650	684	684	_				
600	615	693	691	700	734	734	_				
650	667	748	746	750	_	_	_				
700	718	798	796	810	_	_	_				
750	770	856	850	870	_	_	_				
800	820	906	900	920							
850	872	956	950	970	_	_	_				
900	923	1006	1000	1020	_	_	_				
1000	1025	1106	1100	1124	_	_	_				
1100	1130	1216	1210	1234	_	_	_				
1200	1230	1326	1320	1344	_	_	_				
1350	1385	1481	1475	1498	_	_	_				
1500	1540	1636	1630	1658							



per JIS B 2404 : 2018

for JIS B 2220, B 2239, B 2240, B 2241 Flange



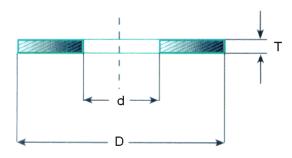
																Un	nit : mm
Flange Nominal	ID								F	F							
Size	טו			2K				5 K				10 K				16 K	
DN	ID	OD	BCD	Hd	Holes	OD	BCD	Hd	Holes	OD	BCD	Hd	Holes	OD	BCD	Hd	Holes
DIN	d	D	а	φ	110163	D	а	φ	110163	D	а	φ	110163	D	а	φ	Tioles
10	18		_		_	55	75	12	4	65	90	15	4	65	90	15	4
15	22	-			_	60	80	12	4	70	95	15	4	70	95	15	4
20	28		_	_	_	65	85	12	4	75	100	15	4	75	100	15	4
25	35	—	_	_	_	75	95	12	4	90	125	19	4	90	125	19	4
32	43				_	90	115	15	4	100	135	19	4	100	135	19	4
40	49		_		_	95	120	15	4	105	140	19	4	105	140	19	4
50	61		_		_	105	130	15	4	120	155	19	4	120	155	19	8
65	84		_		_	130	155	15	4	140	175	19	4	140	175	19	8
80	90	—	_		_	145	180	19	4	150	185	19	8	160	200	23	8
90	102	_	_			155	190	19	4	160	195	19	8	170	210	23	8
100	115	_	_			165	200	19	8	175	210	19	8	185	225	23	8
125	141	_	_	_	_	200	235	19	8	210	250	23	8	225	270	25	8
150	167	_	_	_		230	265	19	8	240	280	23	8	260	305	25	12
175	192		_	_	_	260	300	23	8	265	305	23	12	_	_	_	_
200	218		_	_	_	280	320	23	8	290	330	23	12	305	350	25	12
225	244		_	_	_	305	345	23	12	310	350	23	12	-	-	_	
250	270		_	_	_	345	385	23	12	355	400	25	12	380	430	27	12
300	321	-	_	_	_	390	430	23	12	400	445	25	16	430	480	27	16
350	359		_	_	_	435	480	25	12	445	490	25	16	480	540	33	16
400	410		_	_	_	495	540	25	16	510	560	27	16	540	605	33	16
450	460	555	605	23	16	555	605	25	16	565	620	27	20	605	675	33	20
500	513	605	655	23	20	605	655	25	20	620	675	27	20	660	730	33	20
550	564	665	720	25	20	665	720	27	20	680	745	33	20	720	795	39	20
600	615	715	770	25	20	715	770	27	20	730	795	33	24	770	845	39	24
650	667	770	825	25	24	770	825	27	24	780	845	33	24	_	_	_	_
700	718	820	875	25	24	820	875	27	24	840	905	33	24	_	_		
750	770	880	945	27	24	880	945	33	24	900	970	33	24	_	_	_	_
800	820	930	995	27	24	930	995	33	24	950	1020	33	28	_	_	_	_
850	872	980	1045	27	24	980	1045	33	24	1000	1070	33	28	_	_	_	_
900	923	1030	1095	27	24	1030	1095	33	24	1050	1120	33	28	_	_		_
1000	1025	1130	1195	27	28	1130	1195	33	28	1160	1235	39	28	_	_	_	_
1100	1130	1240	1305	27	28	1240	1305	33	28	1270	1345	39	28	_	_	_	_
1200	1230	1350	1420	27	32	1350	1420	33	32	1380	1465	39	32		_	_	
1350	1385	1505	1575	27	32	1505	1575	33	32	1540	1630	45	36	_	_		_
1500	1540	1660	1730	27	36	1660	1730	33	36	1700	1795	45	40		_	_	

**※**Above 5~16K size as per JIS B 2404-2018



per EN 1514-1

for EN 1092-1, EN 1092-2 Flange



								Unit : mn							
Flange					RF						SR			TG	
Nominal Size				Raised	Face Fla	anges				Spi	got and Re	cess	Ton	gue and Gr	oove
		PN2.5	PN6	PN10	PN16	PN25	PN40		PN63		PN10-25	PN40		PN10-25	PN40
DN	d							d	D	d	D	D	d	D	D
10	18	39	39	46	46	46	46	18	56	18	34	34	24	34	34
15	22	44	44	51	51	51	51	21	61	22	39	39	29	39	39
20	27	54	54	61	61	61	61	25	72	27	50	50	36	50	50
25	34	64	64	71	71	71	71	30	82	34	57	57	43	57	57
32	43	76	76	82	82	82	82	41	88	43	65	65	51	65	65
40	49	86	86	92	92	92	92	47	103	49	75	75	61	75	75
50	61	96	96	107	107	107	107	59	113	61	87	87	73	87	87
60*	72		106	117	117	117	117	68	123						
65	77	116	116	127	127	127	127	73	138	77	109	109	95	109	109
80	89	132	132	142	142	142	142	86	148	89	120	120	106	120	120
100	115	152	152	162	162	168	168	110	174	115	149	149	129	149	149
125	141	182	182	192	192	194	194	135	210	141	175	175	155	175	175
150	169	207	207	218	218	224	224	163	247	169	203	203	183	203	203
175								185	277						
200	220	262	262	273	273	284	290	210	309	220	259	259	239	259	259
250	273	317	317	328	329	340	352	264	364	273	312	312	292	312	312
300	324	373	373	378	384	400	417	314	424	324	363	363	343	363	363
350	356	423	423	438	444	457	474	360	486	356	421	421	395	421	421
400	407	473	473	489	495	514	546	415	543	407	473	473	447	473	473
450	458	528	528	539	555	564	571			458	523	523	497	523	523
500	508	578	578	594	617	624	628			508	575	575	549	575	575
600	610	679	679	695	734	731	747			610	675	675	649	675	675
700	712	784	784	810	804	833				712	777	0.0	751	777	0.0
800	813	890	890	917	911	942				813	882		856	882	
900	915	990	990	1017	1011	1042				915	987		961	987	
1000	1016	1090	1090	1124	1128	1154				1016	1092		1062	1092	
1100	1120			1231	1228	1254								100=	
1200	1220	1290	1307	1341	1342	1364									
1400	1420	1490	1524	1548	1542	1578									
1500*	1520			1658	1654	1688									
1600	1620	1700	1724	1772	1764	1798									
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													
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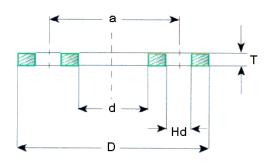
<sup>\*</sup>DN60/1500 relates to case iron flanges only.

<sup>\*</sup>Gaskets for use with pipes and fittings complying with EN 545, EN 598 and EN 969 will apply only in the range PN 10 to PN 40.



per EN 1514-1

for EN 1092-1, EN 1092-2 flange



																				Uı	nit : mm
Flange Nominal Size	ID											F									
			PN 2	2.5 / 6			PN	l 10			PN	l 16			PN	25			PI	V 40	
DN	d	OD D	BCD a	Hd Φ	Holes	OD D	BCD a	Hd ø	Holes												
10	18	50	75	11	4	60	90	14	4	60	90	14	4	60	90	14	4	60	90	14	4
15	22	55	80	11	4	65	95	14	4	65	95	14	4	65	95	14	4	65	95	14	4
20	27	65	90	11	4	75	105	14	4	75	105	14	4	75	105	14	4	75	105	14	4
25	34	75	100	11	4	85	115	14	4	85	115	14	4	85	115	14	4	85	115	14	4
32	43	90	120	14	4	100	140	18	4	100	140	18	4	100	140	18	4	100	140	18	4
40	49	100	130	14	4	110	150	18	4	110	150	18	4	110	150	18	4	110	150	18	4
50	61	110	140	14	4	125	165	18	4	125	165	18	4	125	165	18	4	125	165	18	4
60*	72	120	150	14	4	135	175	18	8	135	175	18	8	135	175	18	8	135	175	18	8
65*	77	130	160	14	4	145	185	18	8*	145	185	18	8*	145	185	18	8*	145	185	18	8*
80	89	150	190	18	4	160	200	18	8	160	200	18	8	160	200	18	8	160	200	18	8
100	115	170	210	18	4	180	220	18	8	180	220	18	8	190	235	22	8	190	235	22	8
125	141	200	240	18	8	210	250	18	8	210	250	18	8	220	270	26	8	220	270	26	8
150	169	225	265	18	8	240	285	22	8	240	285	22	8	250	300	26	8	250	300	26	8
200	220	280	320	18	8	295	340	22	8	295	340	22	12	310	360	26	12	320	375	30	12
250	273	335	375	18	12	350	395	22	12	355	405	26	12	370	425	30	12	385	450	33	12
300	324	395	440	22	12	400	445	22	12	410	460	26	12	430	485	30	16	450	515	33	16
350	356	445	490	22	12	460	505	22	16	470	520	26	16	490	555	33	16	510	580	36	16
400	407	495	540	22	16	515	565	26	16	525	580	30	16	550	620	36	16	585	660	39	16
450	458	550	595	22	16	565	615	26	20	585	640	30	20	600	670	36	20	610	685	39	20
500	508	600	645	22	20	620	670	26	20	650	715	33	20	660	730	36	20	670	755	42	20
600	610	705	755	26	20	725	780	30	20	770	840	36	20	770	845	39	20	795	890	48	20
700	712					840	895	30	24	840	910	36	24	875	960	42	24				
800	813					950	1015	33	24	950	1025	39	24	990	1085	48	24				
900	915					1050	1115	33	28	1050	1125	39	28	1090	1185	48	28				
1000	1016					1160	1230	36	28	1170	1255	42	28	1210	1320	56	28				
1100	1120					1270	1340	39	32	1270	1355	42	32	1310	1420	56	32				
1200	1220					1380	1455	39	32	1390	1485	48	32	1420	1530	56	32				
1400	1420					1590	1675	42	36	1590	1685	48	36	1640	1755	62	36				$\perp$
1500*	1520					1700	1785	42	36	1710	1820	56	36	1750	1865	62	36				
1600	1620					1820	1915	48	40	1820	1930	56	40	1860	1975	62	40				$\perp$
1800	1820					2020	2115	48	44	2020	2130	56	44	2070	2195	70	44				
2000	2020					2230	2325	48	48	2230	2345	62	48	2300	2425	70	48				

<sup>\*</sup>DN60/1500 relates to case iron flanges only.

\*DN65 PN10/40 gasket is used also for flanges having 4 bolt holes.

\*Gaskets for use with pipes and fittings complying with EN 545, EN 598 and EN 969 will apply only in the range PN 10 to PN 40.

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- Oil-proof Paper Jointing Gasket
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