

# Composite Sealing Washers

aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



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The data for operating pressure, operating temperature, and surface speed stated in the columns represent maximum values and are interrelated. Under extreme working conditions it is recommended not to use all maximum values simultaneously.

For special requirements (pressure, temperature, speed, etc.) please contact our consultancy service, so that suitable materials and/or designs can be recommended.

## Compatibility of seals and operating media / cleaning agents

Due to the great diversity of operational parameters affecting fluidic devices and their impact on seals, it is absolutely imperative that manufacturers of these devices approve seals for functional and operational suitability under field conditions.

Furthermore, in view of the consistent increase of newly available media used as hydraulic oils, lubricants, and cleaning agents, special attention is invited to the aspect of compatibility with sealing elastomers currently in use.

Additives contained in base media in order to enhance certain functional characteristics may affect compatibility characteristics of sealing materials.

For this reason, it is imperative that any product equipped with our seals be tested for compatibility with operational media or cleaning agents approved or specified by you either at your plant or by means of field tests prior to any field use.

We kindly ask you to comply with this notice since, as a manufacturer of seals, we are not in a position, as a matter of principle, to perform simulations of any and all conditions present in the final application nor of knowing the composition of the operational media and cleaning agents used.

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# Composite sealing washers – Introduction

## Introduction

### Reliable sealing of screw connections

Parker's composite sealing washers perform two major functions. Firstly, they provide reliable sealing against various media (oils, coolants and gases) in technical components used in automotive and mechanical engineering, for example. Secondly, they consistently assure ideal compression conditions between the bolt and flange and thus prevent the destruction of the seal.

These versatile composite parts allow reliable sealing concepts to be achieved in a wide range of applications such as in air conditioning systems or gas regulators and fuel pumps. This makes composite sealing washers the preferred solution to quickly eliminate leakage problems on screw connections.

### What are composite sealing washers?

Parker composite sealing washers consist of a metallic carrier and a vulcanised elastomer sealing lip. Depending on the requirements profile, various metals and elastomers can be combined with each other.

The requirements profile determines the type of composite sealing washer to be used. The WO series, for example, is designed for sealing below the screw head whereas the WT series is particularly well suited for sealing in the threaded area.

### What are the advantages of composite sealing washers?

- A single component provides the groove and seal
- Since the composite sealing washer is visible from the outside the presence of the seal can be visually checked
- After installation the sealing lip is protected against external influences and internal, mechanical overloading
- The self-centring option eliminates the need for readjustment
- No seal groove is required in the flanges
- Composite sealing washers deliver reliable and long service

### How do composite sealing washers work?

The metallic carrier of the composite sealing washer prevents compression of the elastomer element beyond its elastic limit. As a result, the initial axial pressure acting on the seal is limited within the direct line of force and the sealing effect occurs in the indirect line of force. Since the metal carrier limits the sealing element on the inner diameter the elastomer seal is pushed forwards and pressed against the screw shaft and the other areas. This provides effective, reliable sealing for vacuum and high-pressure applications.

### Where are composite sealing washers used?

Composite sealing washers are increasingly used in a wide range of applications and markets such as automotive engineering, air conditioning technology, energy, oil and gas (EOG) and general industrials. They are exclusively used for static sealing. The effectiveness of elastomer sealing elements can far exceed the sealing effect of copper washers. Customers can choose between various elastomers and metals which can be combined with each other with respect to their media resistance, for example. Composite sealing washers allow quick and easy fitting and can be customised to suit specific requirements.

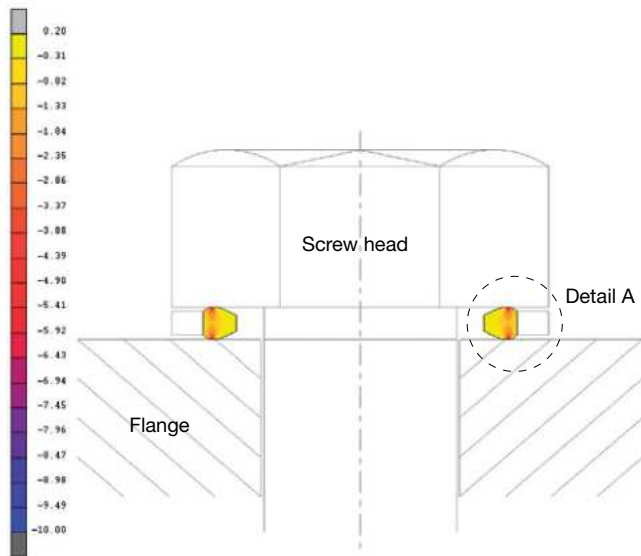
### Application conditions

The plane surfaces to be sealed must be free of scratches and coarse machining marks. The recommended maximum surface roughness is less than  $R_{\max}$  15  $\mu\text{m}$ , the recommended average peak-to-valley height below  $R_z$  6.3  $\mu\text{m}$ . Parker composite sealing washers are suitable depending on the dimensions for applications up to an operating pressure of approx. 200 MPa (2000 bar). Depending on the elastomer material used, operating temperatures between  $-50$  and  $+200$   $^{\circ}\text{C}$  are possible. The bursting pressure depends on the seal geometry, dimensions and material selection.

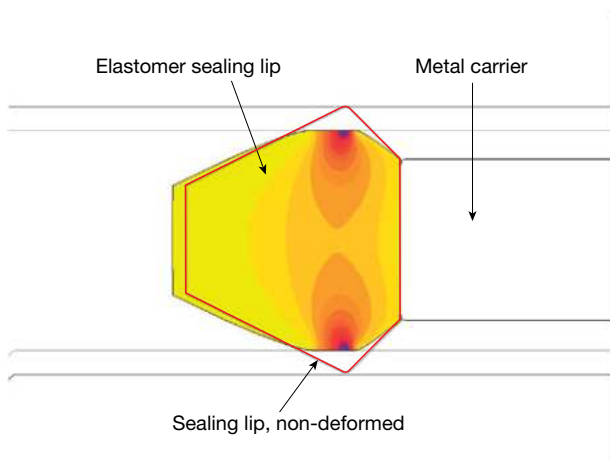
## Finite Element Analysis

If desired by the customer, we subject composite sealing washers to a Finite Element Analysis, which allows us to assess the required compression forces, deformations or material stress in the elastomer profile before manufacturing the product.

The image shows a screw connection with a composite sealing washer. Displayed in detail is the stress distribution in the deformed sealing lip: the darker the colour the heavier the deformation. The red line shows the contour of the sealing lip in the non-deformed state.



*Schematic drawing of a screw connection*



*Detail A: composite sealing washer*

# Composite sealing washers – Introduction

## Design principle and types

Parker composite sealing washers consist of an elastomer sealing element which is chemically or mechanically bonded to a metallic carrier (washer). The metallic carrier prevents compression of the elastomer seal beyond its elastic limit and thus its destruction. It provides the groove for the elastomer part and transfers the torque through the primary force closure.

### WX composite sealing washer



Parker WX series composite sealing washers have been designed to replace copper washers in high-pressure systems. The WX composite sealing washer is a time-tested and low-cost solution for screw head and flange sealing areas. The elastomer sealing lip is chemically bonded to the metal carrier.

### WZ composite sealing washer



Parker WZ series composite sealing washers are a further development of the WZ series. They have an additional self-centring function on the inner diameter, which retains the seal in a concentric position during assembly.

### WU diamond-shaped composite sealing washer



Parker WU series composite sealing washers are a further development of the WX/WZ series, with optimised seal compression behaviour compared to WX.

### WO composite sealing washer



Parker WO series composite sealing washers are designed for radial sealing below the screw head in the area of the smooth (non-threaded) screw shaft. This provides three functionally relevant sealing areas. The elastomer sealing lip is chemically and mechanically connected to the metal carrier. The WO series is self-centring.



## WT composite sealing washer



Parker WT series composite sealing washers are designed for direct sealing on the thread. The lips seal the leakage path of the threads. The sealing washers have a self-centring function. The elastomer sealing lip is chemically and mechanically connected to the metal carrier.

Additional designs are available for special fastening applications. Please contact our consultancy service who will adapt the material and design to suit your specific application.

# Materials and selection aids

## Elastomers

### Acryl nitrile butadien rubber (NBR)

NBR exhibits good resistance to petrol and mineral oils, possesses high abrasion resistance and can be used at operating temperatures between -30 and +100 °C. NBR is the most commonly used polymer in the sealing industry.

### Hydrogenated acryl nitrile butadien rubber (HNBR)

HNBR has a similar properties profile as NBR materials but better ozone resistance and suitability for temperatures of up to +150 °C. HNBR exhibits good resistance to oils and greases plus good wear resistance. HNBR is frequently used with central hydraulics fluids.

### Fluoroelastomers (FKM)

FKM materials possess outstanding temperature and chemical resistance as well as exhibiting outstanding ozone, weather and age resistance. They may be used at temperatures from -20 up to +200 °C (and higher for short-term exposure).

### Ethylen propylene dien momomers (EPDM)

EPDM materials offer good ozone and weather resistance but are not resistant to mineral oil products. They are well suited for use with phosphate ester based hydraulic fluids, glycol based brake fluids and hot water as well as steam. EPDM are frequently used in conjunction with foodstuffs and in pneumatics.

## Carrier materials

### Structural steel, e.g. 1.0330 (DC01)

Structural steel possesses sufficient tensile strength for composite sealing washers. This version corresponds to the standard one and is heavy-build passivated for corrosion protection.

### Stainless steel, e.g. 1.4401

High-grade version using stainless steels which do not exhibit corrosion even in case of damage to the surface. Very good chemical resistance to various media.

### Quenched and tempered steel, e.g. 1.0503 (C45)

This steel exhibits high strength, tenacity and tensile strength. Quenched and tempered steel withstands even extreme loads and sudden shocks. Corrosion protection is also achieved through heavy-build passivation.

### Aluminium, e.g. 3.2315 (EN AW-6082 T6, AlSi1MgMn)

This aluminium alloy has relatively high strength and tenacity even at low temperatures plus good sea water and weather resistance.

Hydraulic pressure fluid		Elastomer base			
		NBR (-30 to 100 °C)	HNBR (-20 to 150 °C)	FKM (-20 to 200 °C)	EPDM (-50 to 150 °C)
mineral oil	H, HL, HLP, HVLP	+	+	+	-
polyalphaolefins	PAO	+	+	+	-
synthetic hydrocarbons	HEPR	+	+	+	-
polyalkylene glycol	HEPG	+ <sup>1)</sup>	+ <sup>1)</sup>	+ <sup>3)/-4)</sup>	+ <sup>2)</sup>
triglycerides	HETG	+	+	+	-
synthetic ester	HEES	+ <sup>1)</sup>	+ <sup>1)</sup>	+	-
brake fluid	DOT-3 / -4	-	-	- <sup>1)</sup>	+
water-in-oil emulsion	HFAE, HFAS, HFB	+	+	+	-
water glycol mixture	HFC	+	+	+ <sup>1)</sup>	- <sup>1)</sup>
organophosphate	HFD	-	-	+	- <sup>1)</sup>

<sup>1)</sup> With limitations, testing required

<sup>2)</sup> Absolutely mineral oil-free

<sup>3)</sup> Peroxidically crosslinked materials

<sup>4)</sup> Bisphenolically crosslinked materials



## Corrosion and corrosion protection

Corrosion is the “reaction of a metallic material with its environment that causes a measurable change of the material and may lead to an impairment of the function of a metallic component or an entire system” (DIN 50900-1).

Corrosion cannot be prevented. However, a suitable coating can significantly reduce the extent of corrosion. The designer specifies suitable corrosion protection measures.

The most important corrosion protection measures for composite sealing washers are described in DIN 50979. In this case, the corrosion protection consists of a metallic coating, additional passivation and optional topcoat.

## Metallic coatings

### Zinc coating

Zinc coating is a standard process that has been in industrial use for many years. Zinc coatings offer good corrosion protection against parent material corrosion (red rust) for a minimum of 96 hours (incl. passivation).

### Zinc-nickel coating

Zinc-nickel coatings exhibit clearly better corrosion behaviour compared to coatings using only zinc. The addition of 12 to 15 % nickel can significantly increase corrosion resistance against red rust to a minimum of 600 hours (incl. passivation) in salt spray mist. Many components withstand this exposure by more than 1,000 hours without corroding. Therefore, zinc-nickel has been established as the standard in the automotive industry.

## Passivation / chromating

### Transparent (thin-layer) passivation

Transparent passivation offers good corrosion protection without the use of prohibited chromium (VI).

### Iridescent (heavy-layer) passivation

Iridescent passivation offers very good corrosion protection. Instead of chromium (VI) this process uses harmless chromium (III).

### Yellow chromate conversion coating (no longer available)

This technique became widely used due to its outstanding corrosion protection and economy. However, the coating contains hazardous chromium (VI) and has been prohibited in the automotive industry since the publication of the EU End-of-Life Vehicles Directive (Directive 2000/E53/EC) and the restrictions of hazardous substances in electrical and electronic equipment (Directive 2002/95/EC). Therefore, it is no longer available for composite sealing washers.

### Topcoat

Topcoat enhance corrosion resistance. They consist of organic and / or inorganic chemical compounds, with coating thickness up to 2 µm.

## Testing of the surface protection

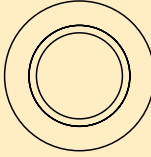
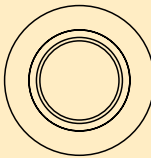
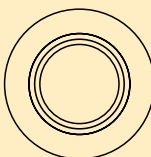
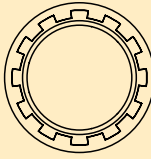
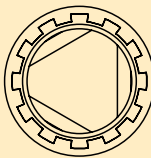
The salt spray test is a testing procedure standardized according to DIN EN ISO 9227 to determine the corrosion protection of coatings.

A saline solution (PH-value 6.5 to 7.2) is sprayed inside a chamber (min. volume 400 litres) at 35 °C or 50 °C chamber temperature. The NaCl solution can be mixed with acetic acid and copper chloride to intensify the effective mechanisms during the process that induces the corrosion.

The fine salt fog deposits on the samples and causes the surface to corrode. The quality of the coating is determined by the duration for which the samples withstand this medium without forming white rust (destruction of the chromium coating) or even red rust (basic metal corrosion). The samples are visually evaluated.



# Composite sealing washers: technical data and dimensions

Top view	Profile reference	Page
Composite sealing washers		
	WX	14
	WZ	17
	WU	20
	WO	22
	WT	25





The Parker WX composite sealing washer consists of a metal washer with a rectangular cross-section and an elastomer sealing lip with a trapezoidal cross-section that is vulcanised to the inside.

The seal has been designed for use in high-pressure applications and can far exceed the sealing effect of copper washers or similar metal seals.

## Range of application

Static sealing of flanges or screw heads.

Operating temperature

NBR	-30 °C to +100 °C
HNBR	-20 °C to +150 °C
FKM	-20 °C to +200 °C
EPDM	-50 °C to +150 °C

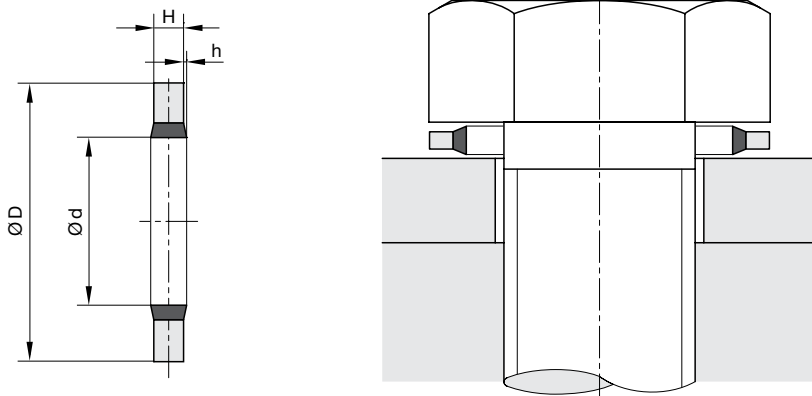
## Compounds

Materialcode	Metal compound	Coating	Elastomer	Hardness
Z5170	steel (1.0330)	zinc	NBR	85 Shore A
Z5171	steel (1.0330)	zinc	HNBR	80 Shore A
Z5172	steel (1.0330)	zinc	FKM	80 Shore A
Z5173	steel (1.0330)	zinc	EPDM	80 Shore A
Z5419	steel (1.0330)	zinc nickel	NBR	85 Shore A
Z5420	steel (1.0330)	zinc nickel	HNBR	80 Shore A
Z5421	steel (1.0330)	zinc nickel	FKM	80 Shore A
Z5422	steel (1.0330)	zinc nickel	EPDM	80 Shore A
Z5399	stainless steel (1.4401)	-	NBR	85 Shore A
Z5400	stainless steel (1.4401)	-	HNBR	80 Shore A
Z5401	stainless steel (1.4401)	-	FKM	80 Shore A
Z5402	stainless steel (1.4401)	-	EPDM	80 Shore A

Other materials on request.

For special media such as HFO 1234yf, CO<sub>2</sub> and natural gas elastomer materials with special approvals are available.

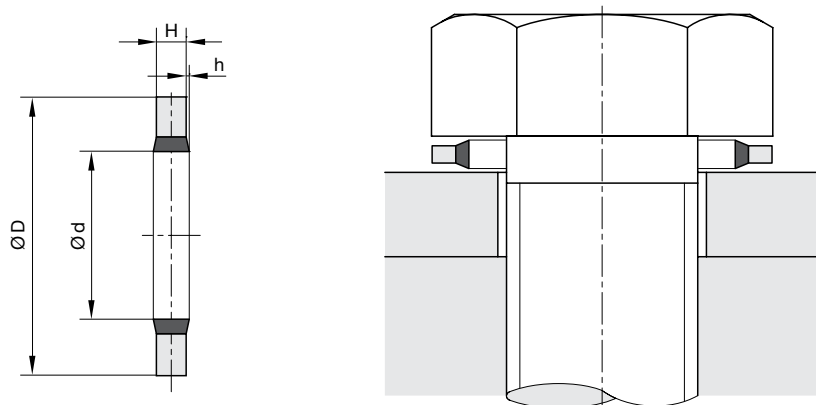
In case of special operating conditions please contact our consultancy service for a selection of the material and design best suiting your particular application requirements.



## Metric dimensions

Thread	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> bar	Order code
M 5	NBR	10	5.7	1	0.3	1500	WX 0510 Z5170
M 5	FKM	10	5.7	1	0.3	1500	WX 0510 Z5172
M 6	NBR	10	6.7	1	0.3	1130	WX 0610 Z5170
M 6	FKM	10	6.7	1	0.3	1130	WX 0610 Z5172
M 8	NBR	13	8.7	1	0.3	1330	WX 0813 Z5170
M 8	FKM	13	8.7	1	0.3	1330	WX 0813 Z5172
M 10	NBR	16	10.7	1.5	0.4	1350	WX 1016 Z5419
M 10	FKM	16	10.7	1.5	0.4	1350	WX 1016 Z5421
M 12	NBR	18	12.7	1.5	0.4	1250	WX 1218 Z5419
M 12	FKM	18	12.7	1.5	0.4	1250	WX 1218 Z5421
M 14	NBR	22	14.7	1.5	0.4	1510	WX 1422 Z5419
M 14	FKM	22	14.7	1.5	0.4	1510	WX 1422 Z5421
M 16	NBR	24	16.7	1.5	0.4	1400	WX 1624 Z5419
M 16	FKM	24	16.7	1.5	0.4	1400	WX 1624 Z5421
M 18	NBR	26	18.7	1.5	0.4	1275	WX 1826 Z5419
M 18	FKM	26	18.7	1.5	0.4	1275	WX 1826 Z5421
M 20	NBR	28	20.7	1.5	0.4	1150	WX 2028 Z5419
M 20	FKM	28	20.7	1.5	0.4	1150	WX 2028 Z5421
M 24	NBR	32	24.7	2	0.4	1050	WX 2432 Z5419
M 24	FKM	32	24.7	2	0.4	1050	WX 2432 Z5421
M 26	NBR	35	26.7	2	0.4	1050	WX 2635 Z5170
M 26	FKM	35	26.7	2	0.4	1050	WX 2635 Z5172
M 30	NBR	39	31	2	0.4	860	WX 3039 Z5170
M 30	FKM	39	31	2	0.4	860	WX 3039 Z5172

Further sizes on request.



## Imperial dimensions

BSP	Bolt	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
1/8	3/8	NBR	15.88	10.37	2.03	0.25	1500	WX 0316 Z5170
1/8	3/8	FKM	15.88	10.37	2.03	0.25	1500	WX 0316 Z5172
1/4	1/2	NBR	20.57	13.74	2.03	0.25	1550	WX 0621 Z5170
1/4	1/2	FKM	20.57	13.74	2.03	0.25	1550	WX 0621 Z5172
3/8	-	NBR	23.8	17.28	2.03	0.25	1260	WX 1024 Z5170
3/8	-	FKM	23.8	17.28	2.03	0.25	1260	WX 1024 Z5172
1/2	13/16	NBR	28.58	21.54	2.5	0.25	1150	WX 1329 Z5170
1/2	13/16	FKM	28.58	21.54	2.5	0.25	1150	WX 1329 Z5172
5/8	7/8	NBR	31.75	23.49	2.5	0.25	1250	WX 1623 Z5170
5/8	7/8	FKM	31.75	23.49	2.5	0.25	1250	WX 1623 Z5172
3/4	1	NBR	34.93	27.05	2.5	0.25	1060	WX 1935 Z5170
3/4	1	FKM	34.93	27.05	2.5	0.25	1060	WX 1935 Z5172
7/8	1 3/16	NBR	38.1	30.81	2.5	0.25	900	WX 2238 Z5170
7/8	1 3/16	FKM	38.1	30.81	2.5	0.25	900	WX 2238 Z5172
1	1 5/16	NBR	42.8	33.89	2.5	0.25	810	WX 2543 Z5170
1	1 5/16	FKM	42.8	33.89	2.5	0.25	810	WX 2543 Z5172
1 1/4	1 5/8	NBR	52.38	42.93	2.5	0.25	690	WX 3252 Z5170
1 1/4	1 5/8	FKM	52.38	42.93	2.5	0.25	690	WX 3252 Z5172
1 1/2	1 7/8	NBR	58.6	48.44	2.5	0.25	690	WX 3859 Z5170
1 1/2	1 7/8	FKM	58.6	48.44	2.5	0.25	690	WX 3859 Z5172
1 3/4	2 1/8	NBR	69.85	54.89	3.38	0.25	950	WX 4470 Z5170
1 3/4	2 1/8	FKM	69.85	54.89	3.38	0.25	950	WX 4470 Z5172
2	-	NBR	73.03	60.58	2.5	0.25	700	WX 5173 Z5170
2	-	FKM	73.03	60.58	2.5	0.25	700	WX 5173 Z5172
2 1/2	-	NBR	90.17	76.08	3.38	0.25	680	WX 6490 Z5170
2 1/2	-	FKM	90.17	76.08	3.38	0.25	680	WX 6490 Z5172

Further sizes on request.



The Parker WZ composite sealing washer consists of a metal washer with a rectangular cross-section and an elastomer sealing lip with a trapezoidal cross-section that is vulcanised to the inside. It is a further development of the WX series and has an additional self-centring function.

The seal has been designed for use in high-pressure applications and can far exceed the sealing effect of copper washers or similar metal seals.

## Range of application

Static sealing of flanges or screw heads.

### Operating temperature

NBR	-30 °C to +100 °C
HNBR	-20 °C to +150 °C
FKM	-20 °C to +200 °C
EPDM	-50 °C to +150 °C

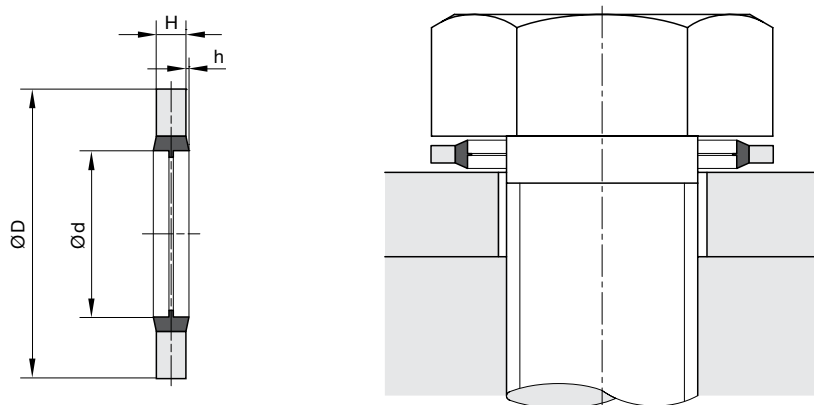
## Compounds

Materialcode	Metal compound	Coating	Elastomer	Hardness
Z5170	steel (1.0330)	zinc	NBR	85 Shore A
Z5171	steel (1.0330)	zinc	HNBR	80 Shore A
Z5172	steel (1.0330)	zinc	FKM	80 Shore A
Z5173	steel (1.0330)	zinc	EPDM	80 Shore A
Z5419	steel (1.0330)	zinc nickel	NBR	85 Shore A
Z5420	steel (1.0330)	zinc nickel	HNBR	80 Shore A
Z5421	steel (1.0330)	zinc nickel	FKM	80 Shore A
Z5422	steel (1.0330)	zinc nickel	EPDM	80 Shore A
Z5399	stainless steel (1.4401) -		NBR	85 Shore A
Z5400	stainless steel (1.4401) -		HNBR	80 Shore A
Z5401	stainless steel (1.4401) -		FKM	80 Shore A
Z5402	stainless steel (1.4401) -		EPDM	80 Shore A

Other materials on request.

For special media such as HFO 1234yf, CO<sub>2</sub> and natural gas elastomer materials with special approvals are available.

In case of special operating conditions please contact our consultancy service for a selection of the material and design best suiting your particular application requirements.

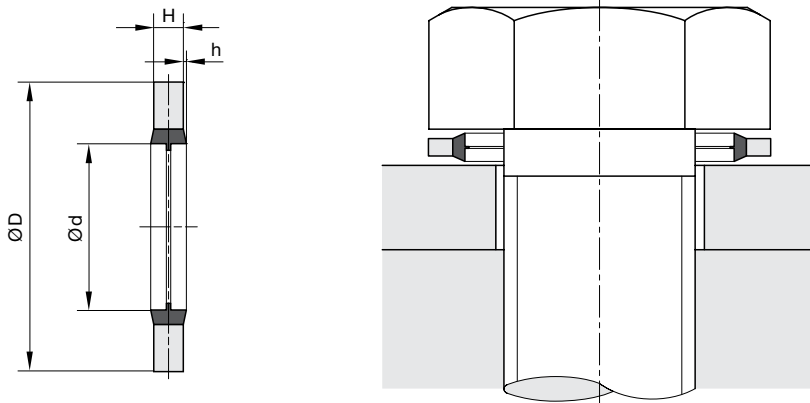


## Metric dimensions

Thread	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
M 4	NBR	7	4.5	1	0.3	1250	WZ 0407 Z5170
M 4	FKM	7	4.5	1	0.3	1250	WZ 0407 Z5172
M 5	NBR	10	5.7	1	0.3	1500	WZ 0510 Z5170
M 5	FKM	10	5.7	1	0.3	1500	WZ 0510 Z5172
M 6	NBR	10	6.7	1	0.3	1130	WZ 0610 Z5170
M 6	FKM	10	6.7	1	0.3	1130	WZ 0610 Z5172
M 8	NBR	13	8.7	1	0.3	1330	WZ 0813 Z5170
M 8	FKM	13	8.7	1	0.3	1330	WZ 0813 Z5172
M 10	NBR	16	10.7	1.5	0.4	1350	WZ 1016 Z5419
M 10	FKM	16	10.7	1.5	0.4	1350	WZ 1016 Z5421
M 12	NBR	18	12.7	1.5	0.4	1250	WZ 1218 Z5419
M 12	FKM	18	12.7	1.5	0.4	1250	WZ 1218 Z5421
M 14	NBR	22	14.7	1.5	0.4	1510	WZ 1422 Z5419
M 14	FKM	22	14.7	1.5	0.4	1510	WZ 1422 Z5421
M 16	NBR	24	16.7	1.5	0.4	1400	WZ 1624 Z5419
M 16	FKM	24	16.7	1.5	0.4	1400	WZ 1624 Z5421
M 18	NBR	26	18.7	1.5	0.4	1275	WZ 1826 Z5419
M 18	FKM	26	18.7	1.5	0.4	1275	WZ 1826 Z5421
M 20	NBR	28	20.7	1.5	0.4	1150	WZ 2028 Z5419
M 20	FKM	28	20.7	1.5	0.4	1150	WZ 2028 Z5421
M 24	NBR	32	24.7	2	0.4	1050	WZ 2432 Z5419
M 24	FKM	32	24.7	2	0.4	1050	WZ 2432 Z5421
M 26	NBR	35	26.7	2	0.4	1050	WZ 2635 Z5170
M 26	FKM	35	26.7	2	0.4	1050	WZ 2635 Z5172
M 30	NBR	39	31	2	0.4	860	WZ 3039 Z5170
M 30	FKM	39	31	2	0.4	860	WZ 3039 Z5172

Further sizes on request.





## Imperial dimensions

BSP	Bolt	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
1/8	3/8	NBR	15.88	10.37	2.03	0.25	1500	WZ 0316 Z5170
1/8	3/8	FKM	15.88	10.37	2.03	0.25	1500	WZ 0316 Z5172
1/4	1/2	NBR	20.57	13.74	2.03	0.25	1550	WZ 0621 Z5170
1/4	1/2	FKM	20.57	13.74	2.03	0.25	1550	WZ 0621 Z5172
3/8	-	NBR	23.8	17.28	2.03	0.25	1260	WZ 1024 Z5170
3/8	-	FKM	23.8	17.28	2.03	0.25	1260	WZ 1024 Z5172
1/2	13/16	NBR	28.58	21.54	2.5	0.25	1150	WZ 1329 Z5170
1/2	13/16	FKM	28.58	21.54	2.5	0.25	1150	WZ 1329 Z5172
5/8	7/8	NBR	31.75	23.49	2.5	0.25	1250	WZ 1623 Z5170
5/8	7/8	FKM	31.75	23.49	2.5	0.25	1250	WZ 1623 Z5172
3/4	1	NBR	34.93	27.05	2.5	0.25	1060	WZ 1935 Z5170
3/4	1	FKM	34.93	27.05	2.5	0.25	1060	WZ 1935 Z5172
7/8	1 3/16	NBR	38.1	30.81	2.5	0.25	900	WZ 2238 Z5170
7/8	1 3/16	FKM	38.1	30.81	2.5	0.25	900	WZ 2238 Z5172
1	1 5/16	NBR	42.8	33.89	2.5	0.25	810	WZ 2543 Z5170
1	1 5/16	FKM	42.8	33.89	2.5	0.25	810	WZ 2543 Z5172
1 1/4	1 5/8	NBR	52.38	42.93	2.5	0.25	690	WZ 3252 Z5170
1 1/4	1 5/8	FKM	52.38	42.93	2.5	0.25	690	WZ 3252 Z5172
1 1/2	1 7/8	NBR	58.6	48.44	2.5	0.25	690	WZ 3859 Z5170
1 1/2	1 7/8	FKM	58.6	48.44	2.5	0.25	690	WZ 3859 Z5172
1 3/4	2 1/8	NBR	69.85	54.89	3.38	0.25	950	WZ 4470 Z5170
1 3/4	2 1/8	FKM	69.85	54.89	3.38	0.25	950	WZ 4470 Z5172
2	-	NBR	73.03	60.58	2.5	0.25	700	WZ 5173 Z5170
2	-	FKM	73.03	60.58	2.5	0.25	700	WZ 5173 Z5172
2 1/2	-	NBR	90.17	76.08	3.38	0.25	680	WZ 6490 Z5170
2 1/2	-	FKM	90.17	76.08	3.38	0.25	680	WZ 6490 Z5172

Further sizes on request.



The Parker WU composite sealing washer consists of a metal washer with a rectangular cross-section and an elastomer sealing lip with a diamond-shaped cross-section that is vulcanised to the inside. It is a further development of the WX series, with optimized compression distribution.

The seal has been designed for use in high-pressure applications and can far exceed the sealing effect of copper washers or similar metal seals.

## Range of application

Static sealing of flanges or screw heads.

Operating temperature

NBR	-30 °C to +100 °C
HNBR	-20 °C to +150 °C
FKM	-20 °C to +200 °C
EPDM	-50 °C to +150 °C

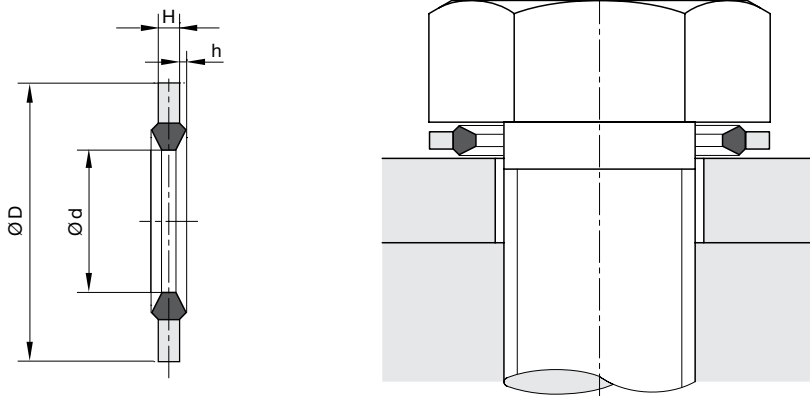
## Compounds

Materialcode	Metal compound	Coating	Elastomer	Hardness
Z5419	steel (1.0330)	zinc nickel	NBR	85 Shore A
Z5420	steel (1.0330)	zinc nickel	HNBR	80 Shore A
Z5421	steel (1.0330)	zinc nickel	FKM	80 Shore A
Z5422	steel (1.0330)	zinc nickel	EPDM	80 Shore A
Z5399	stainless steel (1.4401) -	-	NBR	85 Shore A
Z5400	stainless steel (1.4401) -	-	HNBR	80 Shore A
Z5401	stainless steel (1.4401) -	-	FKM	80 Shore A
Z5402	stainless steel (1.4401) -	-	EPDM	80 Shore A

Other materials on request.

For special media such as HFO 1234yf, CO<sub>2</sub> and natural gas elastomer materials with special approvals are available.

In case of special operating conditions please contact our consultancy service for a selection of the material and design best suiting your particular application requirements.



## Metric dimensions

Thread	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
M 6	NBR	10	6	1	0.4	1130	WU 0610 Z5419
M 6	FKM	10	6	1	0.4	1130	WU 0610 Z5421
M 8	NBR	14	8	1	0.4	1200	WU 0814 Z5419
M 8	FKM	14	8	1	0.4	1200	WU 0814 Z5421
M 10	NBR	17	10	1.5	0.5	1250	WU 1017 Z5419
M 10	FKM	17	10	1.5	0.5	1250	WU 1017 Z5421
M 12	NBR	19	12	1.5	0.5	1250	WU 1219 Z5419
M 12	FKM	19	12	1.5	0.5	1250	WU 1219 Z5421
M 14	NBR	22	14	1.5	0.5	1100	WU 1422 Z5419
M 14	FKM	22	14	1.5	0.5	1100	WU 1422 Z5421
M 16	NBR	24	16	1.5	0.5	1050	WU 1624 Z5419
M 16	FKM	24	16	1.5	0.5	1050	WU 1624 Z5421
M 18	NBR	27	18	2	0.5	1100	WU 1827 Z5419
M 18	FKM	27	18	2	0.5	1100	WU 1827 Z5421
M 20	NBR	30	20	2	0.5	1050	WU 2030 Z5419
M 20	FKM	30	20	2	0.5	1050	WU 2030 Z5421
M 24	NBR	36	24	2	0.5	1130	WU 2436 Z5419
M 24	FKM	36	24	2	0.5	1130	WU 2436 Z5421
M 26	NBR	35	26	2	0.5	850	WU 2635 Z5419
M 26	FKM	35	26	2	0.5	850	WU 2635 Z5421

Further sizes on request.



The Parker WO composite sealing washer consists of a metal washer and a circular elastomer sealing lip with an additional mechanical connection to the inside edge of the supporting washer. The coin and spline achieve a positive connection of the elastomer with the supporting washer and the phenomenon of sheared sealing lips which is frequently encountered with composite sealing washers is prevented.

WO composite sealing washers are very robust in assembly and are suitable for sealing requirements below the screw head in the area of the smooth (non-threaded) screw shaft.

## Range of application

Static sealing of flanges or screw heads.

Operating temperature

NBR	-30 °C to +100 °C
FKM	-20 °C to +200 °C
EPDM	-50 °C to +150 °C

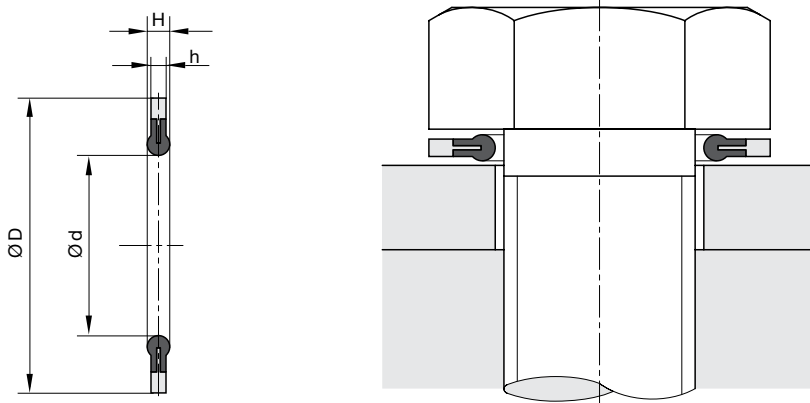
## Compounds

Materialcode	Metal compound	Coating	Elastomer	Hardness
Z5413	steel (1.0402 / 1.0528)	zinc	NBR	60 Shore A
Z5414	steel (1.0402 / 1.0528)	zinc	FKM	75 Shore A
Z5415	steel (1.0402 / 1.0528)	zinc	EPDM	80 Shore A

Other materials on request.

For special media such as HFO 1234yf, CO<sub>2</sub> and natural gas elastomer materials with special approvals are available.

In case of special operating conditions please contact our consultancy service for a selection of the material and design best suiting your particular application requirements.

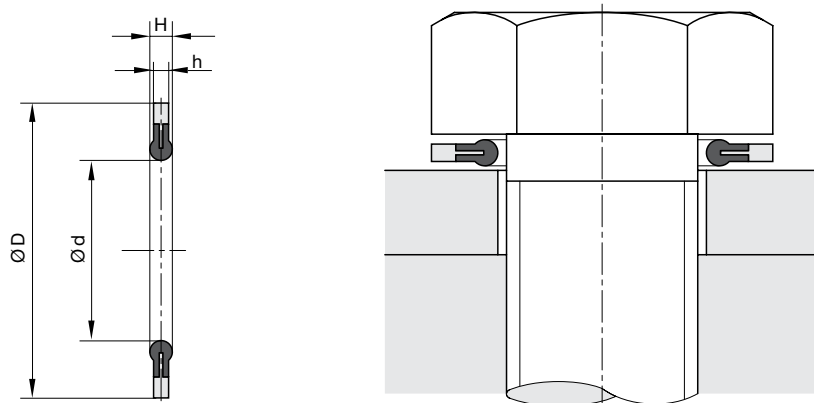


## Metric dimensions

Thread	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
M 5	NBR	9.78	4.83	1.32	1.02	1050	WO 0510 Z5413
M 5	FKM	9.78	4.83	1.32	1.02	1050	WO 0510 Z5414
M 6	NBR	11.25	5.79	1.68	1.27	885	WO 0611 Z5413
M 6	FKM	11.25	5.79	1.68	1.27	885	WO 0611 Z5414
M 8	NBR	13.49	7.77	1.68	1.27	545	WO 0813 Z5413
M 8	FKM	13.49	7.77	1.68	1.27	545	WO 0813 Z5414
M 10	NBR	15.32	9.73	1.68	1.27	495	WO 1015 Z5413
M 10	FKM	15.32	9.73	1.68	1.27	495	WO 1015 Z5414
M 12	NBR	19.3	11.71	1.68	1.27	490	WO 1219 Z5413
M 12	FKM	19.3	11.71	1.68	1.27	490	WO 1219 Z5414
M 14	NBR	22.35	13.67	1.68	1.27	550	WO 1422 Z5413
M 14	FKM	22.35	13.67	1.68	1.27	550	WO 1422 Z5414
M 16	NBR	27.1	15.67	1.68	1.27	860	WO 1627 Z5413
M 16	FKM	27.1	15.67	1.68	1.27	860	WO 1627 Z5414
M 20	NBR	33.38	19.66	2.44	1.63	790	WO 2033 Z5413
M 20	FKM	33.38	19.66	2.44	1.63	790	WO 2033 Z5414
M 22	NBR	31.5	21.62	1.68	1.27	300	WO 2232 Z5413
M 22	FKM	31.5	21.62	1.68	1.27	300	WO 2232 Z5414

Further sizes on request.

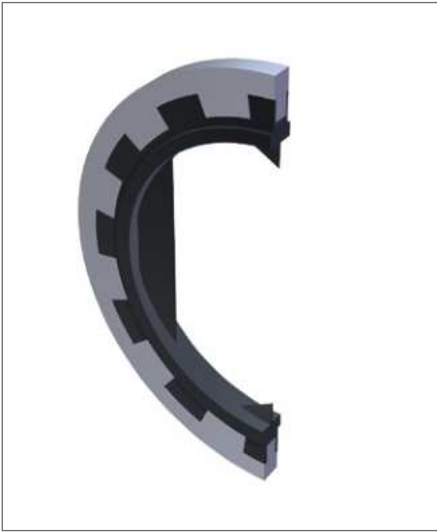




## Imperial dimensions

Thread (inch)	Elastomer	D (mm)	d (mm)	H (mm)	h (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
#6	NBR	9.78	3.3	1.27	1.02	1350	WO 0610 Z5413
#6	FKM	9.78	3.3	1.27	1.02	1350	WO 0610 Z5414
#8	NBR	9.78	3.96	1.27	1.02	1000	WO 0810 Z5413
#8	FKM	9.78	3.96	1.27	1.02	1000	WO 0810 Z5414
#10	NBR	11.25	4.57	1.83	1.27	790	WO 1011 Z5413
#10	FKM	11.25	4.57	1.83	1.27	790	WO 1011 Z5414
1/4	NBR	12.83	6.1	1.83	1.27	655	WO 0013 Z5413
1/4	FKM	12.83	6.1	1.83	1.27	655	WO 0013 Z5414
5/16	NBR	15.32	7.65	1.83	1.27	460	WO 0015 Z5413
5/16	FKM	15.32	7.65	1.83	1.27	460	WO 0015 Z5414
3/8	NBR	16.92	9.25	1.83	1.27	440	WO 0017 Z5413
3/8	FKM	16.92	9.25	1.83	1.27	440	WO 0017 Z5414
7/16	NBR	19.3	10.85	1.83	1.27	465	WO 0019 Z5413
7/16	FKM	19.3	10.85	1.83	1.27	465	WO 0019 Z5414
1/2	NBR	22.35	12.45	1.83	1.27	545	WO 0122 Z5413
1/2	FKM	22.35	12.45	1.83	1.27	545	WO 0122 Z5414
9/16	NBR	27.1	14.02	1.83	1.27	855	WO 0127 Z5413
9/16	FKM	27.1	14.02	1.83	1.27	855	WO 0127 Z5414
5/8	NBR	30.3	15.62	1.83	1.27	970	WO 0130 Z5413
5/8	FKM	30.3	15.62	1.83	1.27	970	WO 0130 Z5414
3/4	NBR	33.58	18.8	2.44	1.63	730	WO 0134 Z5413
3/4	FKM	33.58	18.8	2.44	1.63	730	WO 0134 Z5414
7/8	NBR	38.35	21.95	2.44	1.63	780	WO 0138 Z5413
7/8	FKM	38.35	21.95	2.44	1.63	780	WO 0138 Z5414
1	NBR	44.7	25.1	2.44	1.63	910	WO 0145 Z5413
1	FKM	44.7	25.1	2.44	1.63	910	WO 0145 Z5414

Further sizes on request.



The Parker WT composite sealing washer consists of a metal washer and a rectangular elastomer sealing lip with an additional mechanical connection to the inside edge of the supporting washer. The coin and spline achieve a positive connection of the elastomer with the supporting washer and the phenomenon of sheared sealing lips which is frequently encountered with composite sealing washers is prevented.

WT composite sealing washers ensure reliable sealing of screws in the threaded area. Assembly is self-centring and directionally independent.

## Range of application

Static sealing of screw threads.

Operating temperature

NBR	-30 °C to +100 °C
FKM	-20 °C to +200 °C
EPDM	-50 °C to +150 °C

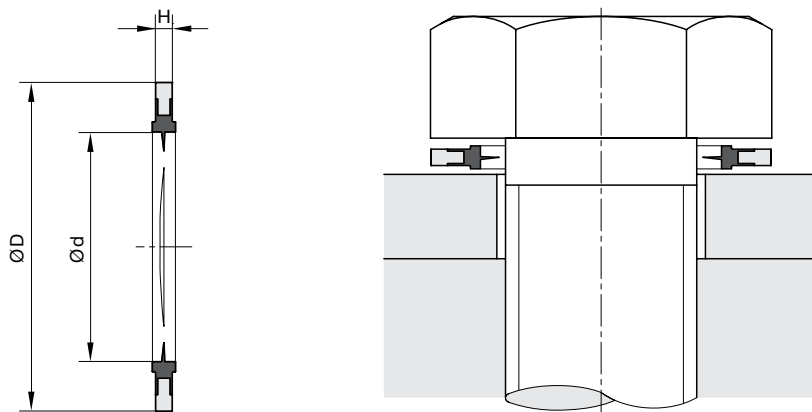
## Compounds

Materialcode	Metal compound	Coating	Elastomer	Hardness
Z5413	steel (1.0402/1.0528)	Zinc	NBR	60 Shore A
Z5414	steel (1.0402/1.0528)	Zinc	FKM	75 Shore A
Z5415	steel (1.0402/1.0528)	Zinc	EPDM	80 Shore A

Other materials on request.

For special media such as HFO 1234yf, CO<sub>2</sub> and natural gas elastomer materials with special approvals are available.

In case of special operating conditions please contact our consultancy service for a selection of the material and design best suiting your particular application requirements.



## Imperial dimensions

Thread (inch)	Elastomer	D (mm)	d (mm)	H (mm)	Bersting pressure <sub>min.</sub> (bar)	Order code
#6	NBR	10.31	3.58	1.27	65	WT 0310 Z5413
#6	FKM	10.31	3.58	1.27	65	WT 0310 Z5414
#8	NBR	10.31	4.24	1.27	65	WT 0410 Z5413
#8	FKM	10.31	4.24	1.27	65	WT 0410 Z5414
#10	NBR	11.91	4.93	1.27	65	WT 0512 Z5413
#10	FKM	11.91	4.93	1.27	65	WT 0512 Z5414
#12	NBR	14.27	5.59	1.27	65	WT 0514 Z5413
#12	FKM	14.27	5.59	1.27	65	WT 0514 Z5414
1/4	NBR	14.27	6.48	1.27	205	WT 0614 Z5413
1/4	FKM	14.27	6.48	1.27	205	WT 0614 Z5414
5/16	NBR	17.45	8.1	1.63	205	WT 0817 Z5413
5/16	FKM	17.45	8.1	1.63	205	WT 0817 Z5414
3/8	NBR	19.05	9.73	1.63	205	WT 1019 Z5413
3/8	FKM	19.05	9.73	1.63	205	WT 1019 Z5414
7/16	NBR	23.01	11.35	1.98	205	WT 1123 Z5413
7/16	FKM	23.01	11.35	1.98	205	WT 1123 Z5414
1/2	NBR	25.4	12.95	1.98	205	WT 1325 Z5413
1/2	FKM	25.4	12.95	1.98	205	WT 1325 Z5414
9/16	NBR	27.79	14.58	2.39	205	WT 1428 Z5413
9/16	FKM	27.79	14.58	2.39	205	WT 1428 Z5414
5/8	NBR	30.15	16.21	2.39	205	WT 5170 Z5413
5/8	FKM	30.15	16.21	2.39	205	WT 5170 Z5414
3/4	NBR	34.93	19.43	2.77	205	WT 1935 Z5413
3/4	FKM	34.93	19.43	2.77	205	WT 1935 Z5414
7/8	NBR	39.67	22.68	2.77	205	WT 2240 Z5413
7/8	FKM	39.67	22.68	2.77	205	WT 2240 Z5414
1	NBR	44.45	25.91	3.05	205	WT 2544 Z5413
1	FKM	44.45	25.91	3.05	205	WT 2544 Z5414

Further sizes on request.



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