



MAXWOR

Focus on Excellence

PUMPS • SEALS • GASKETS • BLOWERS • EXPANSION JOINTS • HEAT EXCHANGERS
COOLING SYSTEMS • WATER HEATER TANKS • ACCUMULATION TANKS
BUFFER TANKS • EXPANSION TANKS • SEPERATORS

PRODUCT CATALOGUE
GASKETS



- ✓ Reliability
- ✓ Sustainability
- ✓ Productivity
- ✓ High Quality
- ✓ Strong Sales Network
- ✓ Service Networks



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Maxwor Makina is the supplier needed by the leader companies in the sector with its engineering solutions and special products it produces.

Carry out in heating, cooling, transfer and storage of fluids; specializes in technology and process equipment manufacturing and offers sustainable solutions in these areas.

MAXWOR

GASKETS

- ✓ NON METALLIC FLAT GASKETS
- ✓ SEMI-METALLIC GASKETS
- ✓ METAL GASKETS
- ✓ NUTS & BOLTS, DISC SPRING WASHERS

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GASKETS

We assure high quality, environmentally-friendly sealing products to our customers. Comprehensive range of gaskets can fulfill different needs and is suitable for various industries and even the most challenging applications.

NON METALLIC FLAT GASKETS

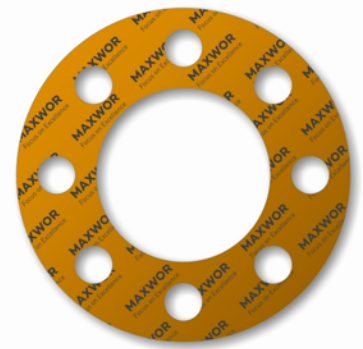
The non-metallic or flat gaskets are the most typical ones from the family of flat static gaskets. They are used in large numbers by various industries and in a variety of applications. Soft gaskets are made of non-asbestos (CSF), graphite, PTFE, mica, aramid/ graphite and rubber sealing materials. Available in standard and non-standard gasket design.

• Fiber Gasket Sheets & Gaskets

Our fiber sheets and gaskets are the most common in the family of flat static gaskets. They can be used in large numbers by various industries and in a variety of applications.

Properties / Applications

Our products are made from non-asbestos (CSF), graphite, aramid/graphite, PTFE, mica or rubber sealing materials.



• Graphite Gasket Sheets & Gaskets

Graphite sheets and gaskets have excellent resistance to various substances, excellent strength, excellent thermal properties and chemical stability. They are used in large numbers by various industries and in a variety of applications.

Properties / Applications

These products are made from flexible graphite sheets.

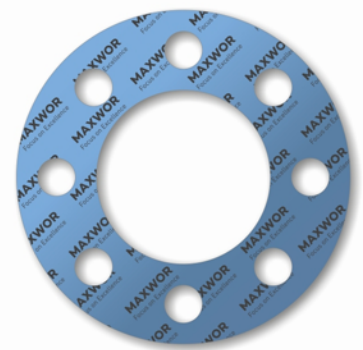


• Mica Gasket Sheets & Gaskets

Mica gaskets have a high temperature and chemical resistance. They are used in the automotive industry, in gas turbines, heat exchangers and industrial burners.

Properties / Applications

Mica sheets and gaskets are made from aluminosilicate.



• PTFE, Modified PTFE & Expanded PTFE Gaskets

PTFE, PTFE compounds and expanded PTFE are compound products which offer good mechanical, electrical and thermal properties as well as chemical resistance, a low friction coefficient and good resistance to wear.

Properties / Applications

All PTFE gaskets have excellent chemical resistance. Modified and expanded PTFE also have improved cold flow and creep resistance.



PTFE gaskets are one of the most suitable types of gaskets for a variety of sealing applications and are mostly based on virgin PTFE or filled PTFE. PTFE gaskets provide an extensive range of applications. PTFE is a fluoropolymer, which features an outstanding chemical resistivity to almost all chemicals, good thermal insulation properties, and useful mechanical and processing characteristics. The above-mentioned PTFE features can be usefully applied in PTFE gaskets. They can be mostly used in valve seats, bearings, requested to resin sliding and chemicals, elastic band for un-lubricated compressors, O-rings where elastomers are not durable. In addition, an extended range of improved mechanical and processing properties can be achieved by combining virgin PTFE with different fillers.

ADVANTAGES

Virgin PTFE, PTFE compounds and expanded PTFE offer a wide range of compounded products with good mechanical properties, electrical properties, thermal properties, chemical resistance, low friction coefficient and good resistance to wear.

• Flat PTFE Enveloped Gaskets

PTFE enveloped gaskets have a PTFE envelope open on one side, usually on the outside. Thanks to their high chemical stability, good mechanical properties and permanent resistance to the atmosphere (humidity, gas and temperature changes) they are suitable for use with various substances, particularly aggressive chemicals.



Properties / Applications

Products are made from PTFE.

The sealing insert is made of corrugated stainless steel, soft nonasbestos material, or rubber and different combinations. This insert is coated with PTFE and open on one side, usually on the outer.

Thanks to their high chemical stability, good mechanical properties and permanent resistance in the atmosphere (to humidity, gasses, temperature changes) they are suitable for all types of gaskets and different media, mostly for aggressive chemicals.

ADVANTAGES

Benefits from the high stability of C-F bond virgin PTFE, which is used for the envelope and exhibits extraordinary chemical resistance. Combinat number of different applications.

SEMI-METALLIC GASKETS

• Spiral Wound Gaskets

Spiral wound gaskets are very suitable for applications featuring heavy operating conditions. They can be used for sealing flange joints, manhole and handhold covers, tube covers, boilers, heat exchangers, pressure vessels, pumps, compressors and valves.



PROPERTIES AND APPLICATIONS

Spiral wound gaskets are special semi-metallic gaskets of great resilience, therefore they are very suitable for applications featuring heavy operating conditions. Spiral wound gaskets are manufactured by spirally winding a V-shaped metal strip and a strip of non-metallic filler material. The metal strip holds the filler, providing the gasket with mechanical resistance and resilience. Spiral wound gaskets can be reinforced by an outer centering ring and/or inner retaining ring. The outer centering ring controls the compression and holds the gasket centrally within the bolt circle. The inner retaining ring increases the axial rigidity and resilience of the gasket.

Spiral wound gaskets should always be in contact with the flange and should not protrude into the pipe or project from the flange. They can be used for sealing flange joints, manhole and handhold covers, tube covers, boilers, heat exchangers, pressure vessels, pumps, compressors and valves; in industries such as petrochemical, pharmaceutical, shipbuilding, and food processing, in power industries and nuclear power stations. They are ideal for sealing steam, oil, liquids, gases, acids, alkalines, various organic media and solvents.

ADVANTAGES

- ✓ Sealing under heavy operating conditions.
- ✓ Strong stress compensation, stable and reliable sealing performance even under frequent pressure fluctuation conditions.
- ✓ Solid construction provides stability and sealability even when the sealing surfaces are slightly corroded or bent.
- ✓ Easy installation.

• Metal Jacketed Gaskets

Metal Jacketed Gaskets are particularly suitable for sealing the flat surfaces of heat exchangers, pipe flanges, boilers and process equipment. The metal outer jacket protects the inner soft resilient filler from corrosive substances, pressure and temperature.



PROPERTIES AND APPLICATIONS

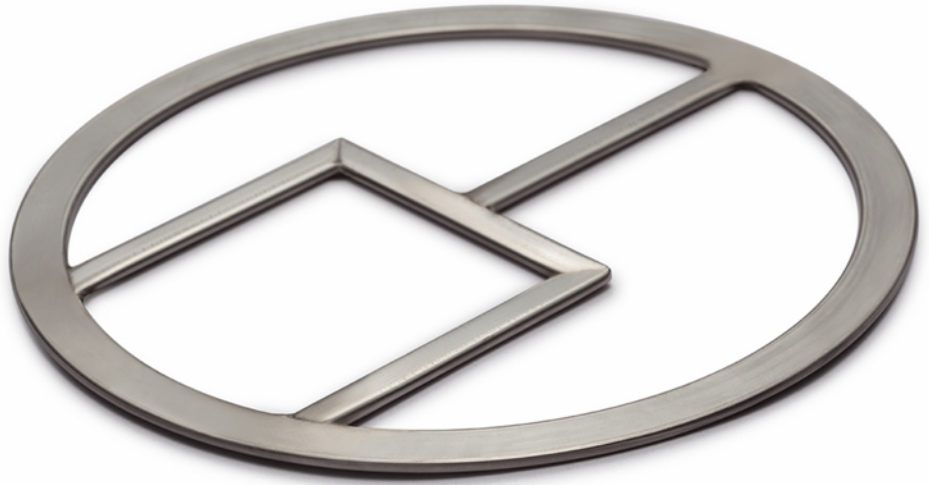
Metal-jacketed gaskets are particularly suitable for sealing flat surfaces of heat exchangers, gas pipes, cast iron flanges, autoclaves and similar. By their sealing efficiency, provided by exerting strong pressure on circular rims of the flanges, metal-jacketed gaskets can stand up to 30% deviation from the initial thickness, which is very useful in case of irregular or faulty flange rims. The chemical compatibility of the metal and the medium being sealed should be considered.

ADVANTAGES

- ✓ Suitable for high assembly stress.
- ✓ Highly resistant against blow-out.

• **Gaskets for Heat Exchangers**

Heat exchanger gaskets are manufactured using graphite, compressed fibersheet or millboard as a soft filler, protected by an outer double jacket in various metals such as soft iron, copper or stainless steel. These gaskets can be made with integral or welded pass bars.



Properties / Applications

Suitable for sealing flanges at high operating temperature and pressures, in both heat exchangers and pressure vessels.

Heat exchanger gasket is a term that has been given to gaskets used in heat exchangers. The structure of the gasket or its type varies according to the operating conditions of the exchangers. The heat exchanger gaskets come in a wide spectrum of types including single or double-jacketed, corrugated, plain metal, soft and many others. A large selection of different materials allows heat exchangers to operate at temperatures beyond the capabilities of most soft gasket materials.

ADVANTAGES

- ✓ Available in wide range of materials, since they are all custom made. There are few limitations regarding size and shape.
- ✓ The metal jacket provides mechanical strength to contain the filler and improves chemical resistance.
- ✓ Unique construction provides stability and ensures trouble-free handling and installation.

MATERIAL	ASTM	EN Material No.
Low Carbon Steel	CS	1.0038 (DC04 St14)
Stainless Steel	AISI 304	1.4301
Stainless Steel	AISI 309	1.4828
Stainless Steel	AISI 316, AISI 316L	1.4401, 1.4404
Stainless Steel	AISI 316Ti	1.4571
Stainless Steel	AISI 321	1.4541
Monel (NiCu30Fe)	Alloy 400	2.4360
Copper	Copper	2.0090
Brass	Brass Ms 63	2.0321
Titanium	Titanium Gr2	1.4462

• GROOVED GASKETS

PROPERTIES AND APPLICATIONS

The grooved gasket is the preferred gasket solution when improved performance at low seating stresses is required. It features excellent anti-blow-out properties. A tighter joint is provided with reliable solid metal to metal seal combined with a soft sealing face. Metal gaskets with grooved faces have proven to be very effective for sealing flange connections, and they are particularly suitable for applications where high temperatures, pressures and fluctuating conditions are encountered. Non-metallic cover layers ensure that flanges are not damaged, even at extreme loads, and that they provide excellent sealing properties when supported by the grooved metallic gasket. The grooved gasket can be used as an alternative for applications associated with jacketed gaskets (for heat exchangers, vessels and reactors and various flanged connections).



ADVANTAGES

- ✓ Capable of sealing pressures exceeding 250 bar.
- ✓ Capable of withstanding temperatures up to 700 °C.
- ✓ Particularly effective in maintaining performance under condition of fluctuating temperatures and pressures.
- ✓ Solid construction provides stability even for large diameters and ensures trouble-free handling and installation.
- ✓ Gaskets can be fitted to existing assemblies without modification.

• Corrugated Metal Gaskets

Corrugated gaskets can be used on uneven or distorted sealing surfaces, where a more elastic material with better sealing performance is needed. They are used in low-pressure applications usually in large diameter flue gas ducts at high temperatures.



ADVANTAGES

- ✓ Outstanding mechanical strength and thermal conductivity.
- ✓ Capable of withstanding high temperatures.
- ✓ There are almost no limitations regarding size.
- ✓ Solid construction provides stability even for large diameters and ensures trouble-free handling and installation.

• Gaskets with Metal Inner Eyelet

Gaskets with metal inner eyelet offer special protection against blowout where sealing critical or dangerous substances. The austenitic stainless steel inner eyelet offers excellent protection for the soft gasket material against erosion and corrosion, while it also prevents contamination towards the medium within the pipeline.



- **Flat Kammprofile Gaskets**

Kammprofile gaskets are the preferred gasket solution when improved sealing and safety performance is required. Metal gaskets with serrated faces have proven to be very effective for sealing flange connections, particularly for applications where high temperatures, pressures and cycling conditions are encountered.



METAL GASKETS

- **Ring Type Joints**

Metallic ring type joint gaskets are manufactured according to the API 6A and ASME B 16.20 standard for applications at elevated temperatures and pressures. The small sealing area with high contact pressure results in an excellent seal with greater reliability.



PROPERTIES AND APPLICATIONS

The metallic ring joint gaskets are manufactured according to the API 6A and ASME B16.20 standards for application at elevated temperatures and pressures. The small sealing area with high contact pressure results in great reliability. The contact surfaces of the gaskets and flange should be carefully processed. Some types of ring joints are pressure activated, which means, the higher the pressure the better the sealability.

ADVANTAGES

The metal ring joint gaskets have been designed to withstand exceptionally high assembly loads over a small area, thus producing high seating stresses.

- **Lens Ring Gaskets**

Lens ring gaskets are made from solid machined metal gaskets. These spherical shaped gaskets are mainly used in the chemical and petrochemical industries for high pressure and temperature applications.



NUTS & BOLTS, DISC SPRING WASHERS

• Nuts & Bolts

Stud nuts and bolts are manufactured in accordance with the highest quality standards for the petrochemical, offshore, steel, construction and OEM



• Disc Spring Washers

Washers provide a safe operation by removing the pre-tension of the bolt. It shows great resistance to vibration thanks to its specially designed closed form and notches on both sides. Long-term use for several times is another advantage.



PHYSICAL PROPERTIES OF METAL GASKET MATERIALS

AISI / ASTM	INDIVIDUAL NAME	MATERIAL NO	DIN 17006	HARDNESS HB	TENSILE STRENGTH - Rm (N/mm ²)	YIELD STRESS - Rp0.2 (N/mm ²)	TEMPERATURE (°C)		DENSITY (g/cm ³)
							MIN	MAX	
FERROUS METALS									
A 570 Gr. 36	Low carbon steel	1.0038	Rst 37-2	100-130	370-450	220	-40	+450	7.85
Soft-iron	Soft-iron	1.1003	M2 / Armco	90-110	270-350	190	-60	+450	7.85
430	Stainless steel	1.4016	X6Cr17	130-170	450-600	270	-20	+ 350	7.70
304 (304H)	Stainless steel	1.4301	X5CrNi18-10	130-180	500-700	195	-200	+ 425	7.90
304L	Stainless steel	1.4306	X2CrNi19-11	130-170	460-680	180	-270	+ 425	7.90
316	Stainless steel	1.4401	X5CrNiMo17-12-2	130-180	500-670	205	-200	+ 425	7.95
316L	Stainless steel	1.4404	X2CrNiMo17-13-2	120-170	490-690	190	-200	+ 550	7.95
321	Stainless steel	1.4541	X6CrNiTi18-10	130-190	500-730	205	-270	+ 550	7.90
347	Stainless steel	1.4550	X6CrNiNb18-10	130-190	510-740	205	-200	+ 870	7.90
316Ti	Stainless steel	1.4571	X6CrNiMoTi17-12-2	130-190	500-730	215	-270	+ 550	7.98
309	Stainless steel	1.4828	X15CrNiSi20-12	130-220	500-750	230	-110	+ 800	7.90
B408, B409	Incoloy 800	1.4876	X10NiCrAlTi32-20	130-220	500-750	210	-110	+ 850	8.00
NON-FERROUS METALS									
-	Copper	2.0090	SF-CU	55-65	200-250	90	-270	+350	8.94
Brass	Messing Ms 63	2.0321	CuZn 37	60-80	290-370	140	-200	+260	8.44
-	Plumbum 99.9	2.3040	Pb 99.9	4	12	-	-250	+ 200	11.50
-	Nickel 99.6	2.4060	Ni 99	100-150	340-400	140	-60	+ 600	8.90
Alloy 200	Nickel 99.2	2.4066	Ni 99.2	100-150	380-450	160	-60	+ 600	8.90
Alloy 200	Monel 400	2.4360	NiCu 30 Fe	100-130	450-580	200	-60	+ 500	8.88
Alloy 200	Inconel 600	2.4816	NiCr 15 Fe	140-200	550-800	200	-60	+ 600	8.42
-	Aluminium 99.5	3.0255	Al 99.5	20-25	70-80	509	-250	+ 300	2.70
-	Aluminium alloy	3.3315	AlMg 1	25-35	90-110	60	-250	+ 300	2.70
B 348 Gr. 1	Titan I	3.7025	71	110-140	290-410	180	-60	+ 300	4.50
B 348 Gr. 2	Titan II	3.7035	71	120-160	390-540	250	-60	+ 350	4.50

The values in the table are given only as guidance, since they depend not only on the type of material but also on the assembly conditions.

Very important factors are type of gasket, nature of service medium, type of flange and surface stress.

HOW TO SELECT AN INDUSTRIAL GASKET?

For any gasket application the choice of gasket material will depend on the operating conditions, mechanical features of the flanged assembly, the gasket characteristics and dimensions. In general, operating conditions determine the choice of jointing material, whereas the dimensional and mechanical features of the flange define the gasket type. The performance of any jointing material is influenced by the temperature, internal pressure, fluid, bolts (compressive stress), flange (type of flange, flange surface finish ...), cost-effectiveness and other special considerations.

HOW TO INSTALL AND USE GASKETS IN THE FIELD?

Successful sealing of a flanged connection depends upon many elements of a well-designed flanged system working well together. Here is a summary, which should serve as a guideline for maintenance operators, engineers, and fitters in order to ensure successful gasket installation and assembly of bolted flange connections.

TOOLS REQUIRED

Special tools are required for cleaning and tensioning the fasteners. In addition, always use standard safety equipment and follow good safety practice. Prepare the following equipment prior to installation:

- ✓ calibrated torque wrench, hydraulic or other tensioner,
- ✓ wire brush,
- ✓ lubricant,
- ✓ helmet and safety goggles,
- ✓ other plant-specified equipment.



1. Clean and examine

Remove all particles and debris from seating surfaces, fasteners (bolts or studs), nuts, and washers. Use plant-specified dust control procedures. Examine fasteners (bolts or studs), nuts, and washers for defects such as burrs or cracks. Examine flange surfaces for warping, radial scores, heavy tool marks, or anything prohibiting proper gasket seating. Replace components if found to be defective.

2. Align flanges

Align flange faces and bolt holes without using excessive force. Report any misalignment.

3. Install gasket

Verify if the gasket is of the specified size and material. Carefully insert gaskets between the flanges. Make sure the gasket is centred between the flanges. Do not use “jointing compounds”, graphite, grease or release agents on the gasket or seating surfaces. Bring flanges together, ensuring the gasket isn’t pinched or damaged.

4. Lubricate load-bearing surfaces

Use only specified or approved lubricants. Liberally apply lubricant uniformly to all thread, nut, and washer load-bearing surfaces. Ensure lubricant doesn't contaminate either flange or gasket face.

5. Install and tighten bolts

Always use proper tools: calibrated torque wrench or other controlled-tensioning device.

Consult our Technical expert.

Always torque nuts in a cross bolt-tightening pattern. Tighten the nuts in multiple steps:

Step-1 : Tighten all nuts initially by hand.

(Larger bolts may require a small hand wrench.)

Step-2 : Torque each nut to approximately 40% of full torque.

Step-3 : Torque the nuts to approximately 70% of full torque.

Step-4 : Torque each nut to full torque, again using the cross bolt-tightening pattern. (Large-diameter flanges may require additional tightening passes.)

Step-5 : Apply at least one final full torque to all nuts in a clock-wise direction until all torque is uniform.

(Large-diameter flanges may require additional tightening passes.)



6. Retightening

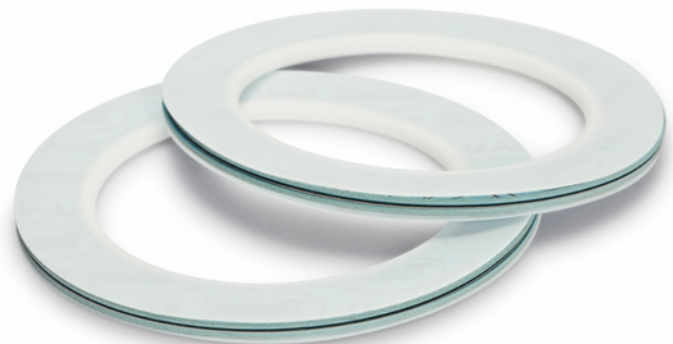
Do not retorque elastomer-based, asbestos free gaskets after they have been exposed to elevated temperatures unless otherwise specified. Retorque fasteners exposed to aggressive thermal cycling. All retorquing should be performed at ambient temperature and atmospheric pressure.

STORING GASKETS

Industrial gaskets consist of various materials, which are subjected to ageing, weathering, oxidation ... Ageing causes decreasing of the mechanical properties of gaskets. For this reason storage under the following conditions is recommended:

- ✓ ambient temperature of storage - move away from heaters,
- ✓ dark storage room - move away from direct sunlight,
- ✓ dry atmosphere,
- ✓ avoid areas where electric discharge appears - ozone production,
- ✓ gaskets must lie horizontally - avoid hanging on hooks or folding which could cause cracking.

Avoid storing gaskets for more than two years.



The background of the entire page is a photograph of an industrial facility, likely a refinery or chemical plant. Several tall, vertical distillation columns are visible, each equipped with multiple levels of red metal ladders and platforms. The columns are interconnected by a network of yellow and blue pipes. The sky is overcast with grey clouds. In the foreground, a large, horizontal, silver-colored metal pipe runs across the bottom of the frame, supported by a white bracket.

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