

# **Uni-Seals Product Catalog**

**Category: Mechanical Seal**



**UNI-SEALS**

**Unimax International Limited**

[www.uni-seals.com](http://www.uni-seals.com)

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## Silicone Carbide



Silicone carbide is an ideal sealing material. It has good resistance to corrosion, wear and high temperature, high mechanical strength, good self-lubricity and heat conductivity, low friction factor, and easy combination property. The pressureless sintered silicone carbide can especially suit hard working conditions.

Silicone carbide products include: SiC rings, bushings and bearings etc.

As an excellent high-temperature structural material, the silicone carbide has been widely used in the industries of petroleum, chemical, machinery, military, shipping, spaceflight, and automobile etc. It is also widely applied as friction material in the mechanical seals, especially for slush pump.

## Specification:

Material	SP1001 Reaction bonded silicone carbide (RSIC)	SP1002 Pressureless sintered silicone carbide (SSIC)	SP1003 Silicone carbide + carbon (SiC +C)
Purity	SiC >90%	SiC >97%	30% carbon
Density	3.05~3.15g/cm <sup>3</sup>	>3.05g/cm <sup>3</sup>	2.65g/cm <sup>3</sup>
Hardness	>92 (HRA)	115~125 (HS)	≥85 (HS)
Grain size	0.5~0.7μm	8~20μm	20~40μm
Elastic modulus	400Gpa	420Gpa	---
Bend strength	400~580Mpa	250~450Mpa	200Mpa
Compressive strength	3900Mpa	3000Mpa	1800Mpa
Fracture toughness	4.5Mpa	4Mpa	---
Thermal conductivity	125.6wm/k	35~110wm/k	125wm/k
Coefficient of thermal expansion	4.02 x 10 <sup>-6</sup> /°C	4.3 x 10 <sup>-6</sup> /°C	3 x 10 <sup>-6</sup> /°C
Heat Resistance (atmosphere)	1650°C	1300°C	800°C
Poisson ratio	0.14	0.15	---

## Tungsten Carbide

**SP2000 Tungsten carbide**

Tungsten carbide (TC) occupies an important position in the sealing materials, due to its high hardness, rigidity, wearability, good thermal conductivity, and small heat expansion co-efficient.

It is widely used as seal faces, especially suitable in heavy load mediums containing solid particles and which are easy crystallizing.

**Specification:**

Material		YG6	YG8	YWN6	YWN8
Composition	WC	94%	94%	92%	92%
	Ni	---	6%	8%	---
	Co	6%	---	---	8%
Density		14.6~15g/cm <sup>3</sup>	14.5~14.9g/cm <sup>3</sup>	14.5~14.9g/cm <sup>3</sup>	14.4~14.8g/cm <sup>3</sup>
Hardness		89.5 (HRA)	89 (HRA)	88.5 (HRA)	88 (HRA)
Fractural strength		1421MPa	1470MPa	1490MPa	1470MPa
Heat expansion co-efficient		5 x 10 <sup>-6</sup> /K	5.1 x 10 <sup>-6</sup> /K	5.2 x 10 <sup>-6</sup> /K	5.3 x 10 <sup>-6</sup> /K

## Graphite

**SP3010 Hot-pressed graphite**

Hot-pressed graphite is made from the mixture of high-purity graphite powder, resin and other additives, which are hot pressed and solidified in mould. It is widely applied in clear water medium, in water seal devices of automobiles, small pumps, household electrical equipments, etc.

**Specification:**

<b>Density</b>	1.65g/cm <sup>3</sup>
<b>Hardness</b>	≥55 (HS)
<b>Compression strength</b>	≥135Mpa
<b>Bend strength</b>	50Mpa

**SP3020 Carbon-graphite**

Carbon-graphite has the advantages of good resistance to corrosion, wear and high temperature, good self-lubricity and heat conductivity, low friction factor and expansion coefficient. It is the ideal friction material used in various mechanical seals.

**Specification:**

Material		Density	Bending strength	Compression strength	Hardness	Porosity
<b>Epoxy resin impregnated (H)</b>	M106H	1.75g/cm <sup>3</sup>	65Mpa	200Mpa	85 (HS)	2.5%
	M120H	1.70g/cm <sup>3</sup>	60Mpa	180Mpa	80 (HS)	2.5%
	M205H	1.70g/cm <sup>3</sup>	60Mpa	200Mpa	70 (HS)	2.5%
	M252H	1.72g/cm <sup>3</sup>	45Mpa	120Mpa	45 (HS)	2.5%
<b>Furan resin impregnated (K)</b>	M106K	1.75g/cm <sup>3</sup>	67Mpa	200Mpa	90 (HS)	2.0%
	M120K	1.70g/cm <sup>3</sup>	62Mpa	180Mpa	85 (HS)	2.0%
	M205K	1.70g/cm <sup>3</sup>	62Mpa	180Mpa	75 (HS)	2.0%
	M252K	1.72g/cm <sup>3</sup>	47Mpa	120Mpa	48 (HS)	2.0%
	KC170	1.82g/cm <sup>3</sup>	68Mpa	200Mpa	80 (HS)	2.0%
<b>Phenol aldehyde resin impregnated (F)</b>	M106F	1.75g/cm <sup>3</sup>	60Mpa	200Mpa	85 (HS)	2.0%
	M120F	1.70g/cm <sup>3</sup>	55Mpa	180Mpa	80 (HS)	2.0%
	M205F	1.70g/cm <sup>3</sup>	55Mpa	200Mpa	70 (HS)	2.0%
	M252F	1.72g/cm <sup>3</sup>	40Mpa	120Mpa	45 (HS)	2.0%
	KC573	1.85g/cm <sup>3</sup>	85Mpa	370Mpa	110 (HS)	2.0%
	KC673	1.87g/cm <sup>3</sup>	78Mpa	245Mpa	87 (HS)	2.0%
<b>Antimony impregnated (D)</b>	M104D	2.25g/cm <sup>3</sup>	99Mpa	340Mpa	90 (HS)	0.57%

## PTFE

**SP4000 PTFE spare parts**

PTFE (polytetrafluoroethylene) has the best chemical resistance among known plastics. It also has good aging stability, electrical insulation, wear resistance, and extremely low friction coefficient. The unloaded operating temperature range is  $-180\sim +260^{\circ}\text{C}$ .

It is widely used in mediums of corrosion condition, due to its excellent corrosion resistant to strong acid, alkali and oxidant even in high temperature.

However, PTFE has low thermal conductivity. If pure PTFE is selected as the friction material, the heat will be difficult to be conducted and the temperature will get very high, making the sealing performance worse eventually. So usually different additives are used to fill in and improve the conductivity of PTFE.

**Specification:**

Material	Pure PTFE	20% fiberglass	20% graphite
Density	2.2g/cm <sup>3</sup>	2.22~2.24g/cm <sup>3</sup>	1.98~2.16g/cm <sup>3</sup>
Hardness	4.65 (HRA)	5.57 (HRA)	7 (HRA)
Tensile strength	≥27.6Mpa	≥17.3Mpa	≥16.4Mpa
Bend strength	≥20.6Mpa	≥21Mpa	≥29Mpa
Elongation at break	≥250%	≥276%	≥151%

### Alumina Ceramic



#### SP5000 Alumina ceramic

Alumina ceramic friction material is sintered from high temperature. It includes  $\text{Al}_2\text{O}_3$  (95%), high purity  $\text{Al}_2\text{O}_3$  (99%), and metal  $\text{Al}_2\text{O}_3$  (metal ceramic) (mainly contains Fe).

Alumina has the property of wear resistant, high temperature resistant, and good sealing property. It resists general corrosive mediums except hydrofluoric acid and strong alkali. Alumina is brittle and can crack under severe temperature changing.

#### Specification:

Material	95% $\text{Al}_2\text{O}_3$	99% $\text{Al}_2\text{O}_3$	Metal $\text{Al}_2\text{O}_3$
Density	3.6g/cm <sup>3</sup>	3.8g/cm <sup>3</sup>	4g/cm <sup>3</sup>
Hardness	82 (HRA)	87 (HRA)	84 (HRA)
Bend strength	2400Mpa	2600Mpa	3000Mpa
Thermal conductivity	8~20wm/k	0.5~0.7wm/k	20~40wm/k
Coefficient of thermal expansion	16~18 x 10 <sup>-6</sup> /°C	16~18 x 10 <sup>-6</sup> /°C	25~30 x 10 <sup>-6</sup> /°C

### Spring and Stamping



#### **SP9000 Spring and stamping**

Uni-seals also supply other spare parts such as spring and stampings for mechanical seals.

**Mechanical Seal MS1101**

MS1101 has unbalanced single-end-face structure with multi-springs. The driving through transmission sleeve ensures fine sealing property on the surface of seals.

In addition, different combinations of the face materials enable the seals to be applied in wider working conditions.

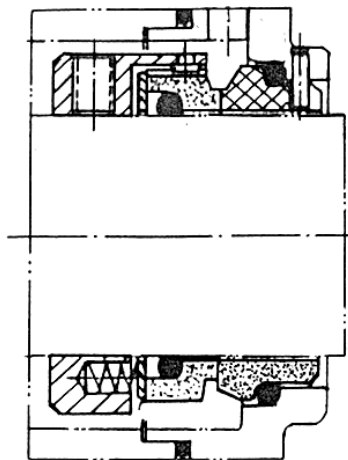
**Specification:**

Pressure:  $\leq 16$ bar.

Temperature:  $-20^{\circ}\text{C} \sim +120^{\circ}\text{C}$ .

Linear velocity:  $\leq 10$ m/s.

Medium: water, oil, acid, alkali, etc moderate and low corrosive mediums.

**Structure:**

**Mechanical Seal MS1102**



MS1102 offers reliable transmission as the transmission of rotating ring goes through shifting fork. There are eight kinds of sealing structures according to the balance styles, arrangements of spring and structures of static ring. The balanced style seal can be applied to pressure of 3MPa maximally.

**Specification:**

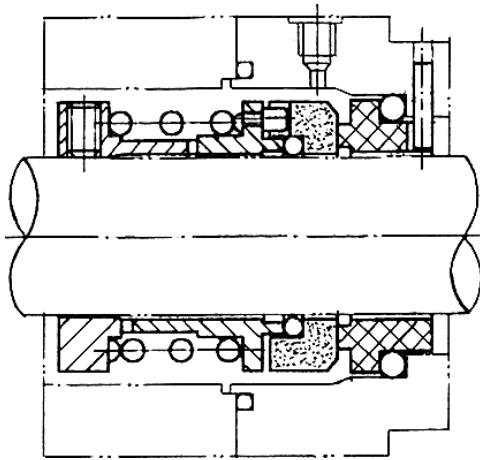
Pressure:  $\leq 10\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 25\text{m/s}$ .

Medium: water, oil, acid, alkali, etc moderate and low corrosive mediums.

**Structure:**



**Mechanical Seal MS1103**

MS1103 offers unbalanced structure of multi-springs and single end face with internal flow and is installed internally.

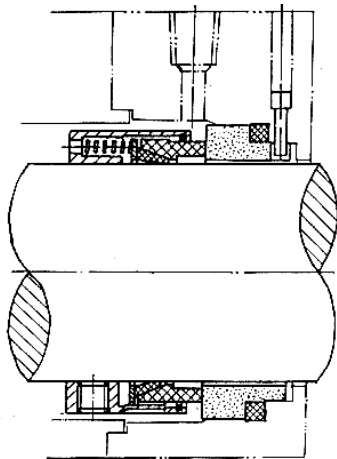
**Specification:**

Pressure:  $\leq 10$ bar.

Temperature:  $-50^{\circ}\text{C} \sim +200^{\circ}\text{C}$ .

Linear velocity:  $\leq 25$ m/s.

Medium: water, oil, etc moderate and low corrosive mediums.

**Structure:**

**Mechanical Seal MS1104**

MS1104 has unbalanced single-end-face structure with multi-springs, offering a reliable drive for rotating ring. With different friction pairs, the seal can be applied in different working conditions.

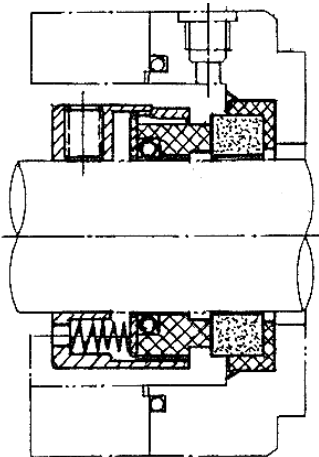
**Specification:**

Pressure:  $\leq 10\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 20\text{m/sec}$ .

Medium: water, oil, acid, alkali, etc moderate and low corrosive mediums.

**Structure:**

**Mechanical Seal MS1105**

MS1105 is a common seal offering rubber bellows structure with unbalanced single end face and large spring. Torque is passed through helical spring.

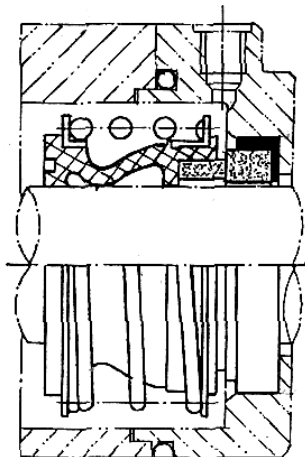
**Specification:**

Pressure:  $\leq 10$ bar.

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 10$ m/s.

Medium: waste water with particles, sewage etc common weak corrosive mediums.

**Structure:**

**Mechanical Seal MS1106**



MS1106 is one of the most commonly used mechanical seals. It is internally installed with internal flow. The kind of drive is that the rubber bellow drives the rotating ring in circumvolution by fastening force from fixture. The structure is simple and compact.

A two-end-faces technical seal can be formed if two sets of MS1106 seals are installed back to back.

**Specification:**

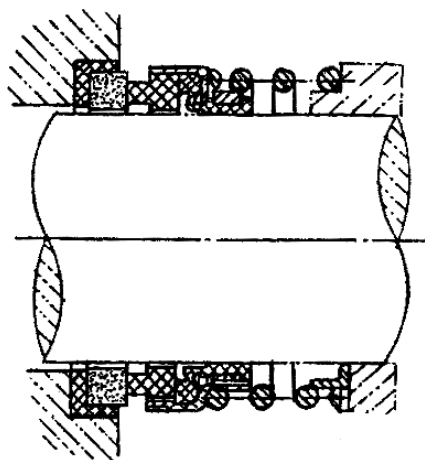
Pressure: ≤8bar.

Temperature: -20°C~+100°C (NBR rubber);  
 -20°C~+150°C (Fluorine rubber).

Linear velocity: ≤10m/s.

Medium: water, oil etc weak corrosive mediums.

**Structure:**



**Mechanical Seal MS1107**

MS1107 is specially developed in accordance with the illustration provided by Japan's EAGLE Company. It is internally installed with internal flow. The kind of drive is that the rubber bellow drives the rotating ring in circumvolution by fastening force from fixture

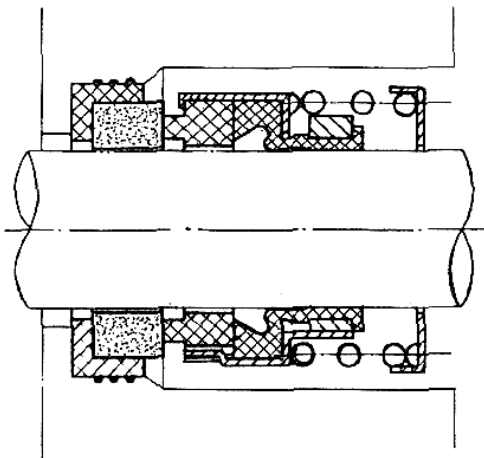
**Specification:**

Pressure:  $\leq 8\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 10\text{m/s}$ .

Medium: water, oil etc weak corrosive mediums.

**Structure:**

**Mechanical Seal MS1151**

MS1151 has a structure of rubber bellow and is in unbalanced style, internally installed and with internal flow. It is suitable to the machines with speedy revolution, and is a good choice for the cooling pump of diesel engine or combustion engine.

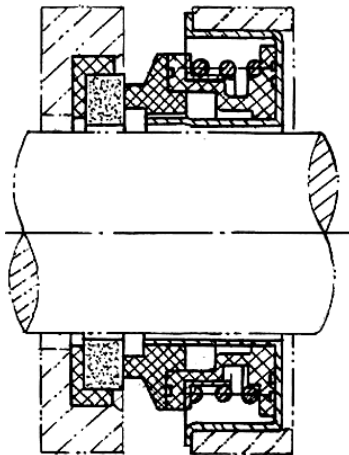
**Specification:**

Pressure:  $\leq 3\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +120^{\circ}\text{C}$ .

Linear velocity:  $\leq 10\text{m/s}$ .

Medium: water, oil etc weak corrosive mediums.

**Structure:**

**Mechanical Seal MS1201**



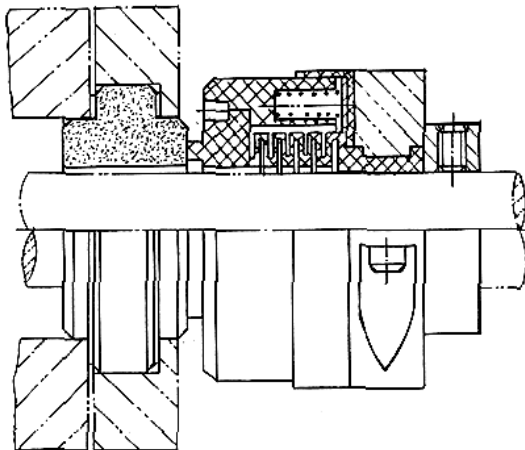
**Specification:**

<b>Temperature</b>	20°C	40°C	60°C	80°C	100°C	125°C
<b>Pressure</b>	10bar	8bar	7bar	5bar	3.5bar	2bar

Linear velocity: ≤15m/s.

Medium: all kinds of strong corrosive mediums like H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, HCL, organic acid etc.

**Structure:**



**Mechanical Seal MS2101**

MS2101 is in unbalanced back-to-back two-end-faces structure with internal-external flow. The kind of drive is that rubber bellows and shafts drive to rotating ring by fastening force from fixture. It is suitable to work in sump pumps etc.

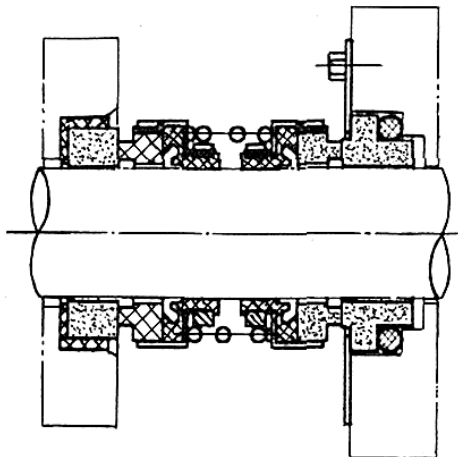
**Specification:**

Pressure:  $\leq 3\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 10\text{m/s}$ .

Medium: sewage with volume content of solid particle less than 4%, and other weak corrosive mediums.

**Structure:**

**Mechanical Seal MS2102**

MS2102 is an improved style developed from MS2101. It offers compact structure and reliable transmission, and overcomes the shortcomings of rubber bellows. It is suitable to sump pumps and underwater pumps, etc.

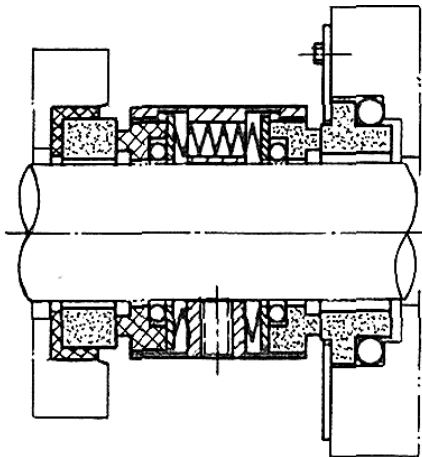
**Specification:**

Pressure:  $\leq 3\text{bar}$ .

Temperature:  $-20^{\circ}\text{C} \sim +150^{\circ}\text{C}$ .

Linear velocity:  $\leq 10\text{m/s}$ .

Medium: sewage with volume content of solid particle less than 4%, and other weak corrosive mediums.

**Structure:**

**Note:**

1. All technical details quoted throughout this catalogue are based on our extensive tests and years of experience, however, they can only serve as guide values. Your specific application should not be undertaken without independent study and evaluation for suitability. Failure to select proper products and specifications could result in property damage and/or personal injury.
2. Technical details subject to change without notice. This edition cancels all previous issues.

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