GARLAST SEAL COMPANY, LLC

Garlast® Brochure

Company Profile

Beijing Garlast Sealing Technology Co., Ltd. was established in 2005 and primarily manufactures specialty rubber parts and O-rings. Its products have earned recognition from customers worldwide. To meet customer needs and support market development, Garlast Seal Company, LLC was established.

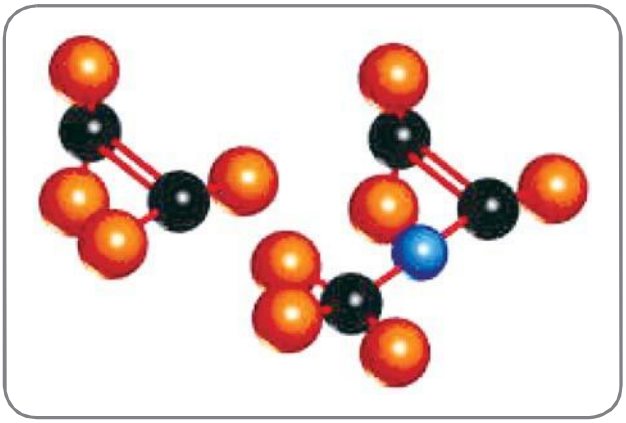
Since the mid-1990s, our core technical personnel have been dedicated to developing Garlast perfluoroelastomers with unique properties. We have since developed a variety of FFKM seals with performance comparable to leading international brands to meet global market needs.

Contents

Garlast® FFKM Perfluoroelastomer

Construction of Garlast® perfluoroelastomers

Garlast® is copolymerized from tetrafluoroethylene, perfluoromethyl vinyl ether, and a third monomer. The polymer backbone is essentially free of carbon-hydrogen bonds, giving Garlast® perfluoroelastomers their unique properties.



Properties of Garlast® perfluoroelastomers

- Excellent corrosion resistance to almost all chemicals, including acids, alkalis, ketones, esters, ethers, aldehydes, amines, alcohols, and strong oxidants, etc.
- Excellent heat resistance, with long-term temperature resistance up to 316°C.

Garlast® high-performance seals significantly extend the average maintenance interval of equipment and reduce irregular production downtime and maintenance costs.

Advantages of Garlast® perfluoroelastomers

- Lower price
- Fast delivery
- Professional technical support

Garlast® Perfluoroelastomer Seals

O-rings: The following specifications are available

- National Standard GB34521-92
- American Standard AS 568A
- German standard DIN 3701
- Japanese standard JIS B2401
- International standard ISO 3601
- Non-standard specifications

Other products

- rubber strips, hoses, rubber sheets, and custom gaskets.
- Composite seal bonded to metal.
- Rotary shaft lip seal (oil seal), V-ring (water seal), valve stem seal.
- Diaphragms, bellows and customized products for customers.

Garlast® Perfluoroelastomer Applications

Applications:

- Chemical industry
- Oil fields, natural gas
- Semiconductors, liquid crystals, photovoltaics
- Aerospace
- Food & Pharmaceutical

Application Equipment

- Mechanical seals • Pumps
- Valves • Reactors, agitators, & grinders
- Turbine engines •Measuring and control instruments
- Analytical instruments • Compressors
- Centrifuges • Spraying equipment





Garlast® Perfluoroelastomer Grades

Grade	Characteristics	Hardness	Operating temperature	Color
1075	Wide range of corrosion resistance	75	- 15°C ~ 230°C	Black
1065		65		
1090		90		
2075	Excellent high temperature resistance	75	- 15°C ~ 316°C	Black
2090		90		
2175		75		
3075	Resistant to high temperature superheated water and water vapor	75	- 15°C ~ 300°C	Black
3090		90		
7080	Highest temperature resistance	80	- 15°C ~ 325°C	Black
7092		90		
4075	FDA compliant	75	- 15°C ~ 230°C	White
6378	Wide range of corrosion resistance	76	- 15°C ~ 275°C	Black
6091	EDR (explosion-decompression resistant)	90	- 15°C ~ 230°C	Black
5080	Resistant to strong oxidation media (halogens, thermo-oxidizing acids)	79	- 20°C ~ 230°C	Creamy yellow
6075	High temperature amine resistance (>70°C)	75	- 15°C ~ 230°C	Black
9075	Resistant to low temperatures	75	- 42°C ~ 230°C	Black
1095	Explosion relief (ED)	95	- 15°C ~ 230°C	Black

Garlast® FFKM Grades - Chemical Compatibility and Physical Properties

Chemical Environment	Garlast® 1075	Garlast® 2075	Garlast® 3075	Garlast® 4075	Garlast® 6075	Garlast® 6378	Garlast® 6091	Garlast® 7080	Garlast® 7092	Garlast® 9075
	General purpose — broad chemical resistance	High temperature to 316 °C	Superheated water & steam to 300 °C	FDA-compliant, white	High-temperature amine resistance	Broad chemical resistance to 275 °C	EDR — explosion-decompression resistant	Highest temperature — 325 °C	Highest temperature, 90 Shore A	Low-temperature service to −42 °C
Aromatic / aliphatic hydrocarbons	E	E	E	E	E	E	E	E	E	E
Acids	E	E	G	E	E	E	E	E	E	E
Inorganic bases (alkalis)	G	G	G	G	G	G	G	G	G	G
Alcohols	E	E	E	E	E	E	E	E	E	E
Aldehydes	E	G	E	E	E	E	E	E	E	E
Amines	F	P	F	F	E	P	E	F	F	F
Ethers	E	E	E	E	E	E	E	E	E	E
Esters	E	E	E	E	E	E	E	E	E	E
Ketones	E	E	E	E	E	E	E	E	E	E
Water / steam	G	P	E	G	G	E	G	F	F	G
Strong oxidants	F	F	F	F	F	F	F	F	F	F
Ethylene oxide / propylene oxide	E	N/A	E	E	E	E	E	G	G	E
Dry heat (hot air)	F	E	G	F	F	G	F	E	E	F
Solvents (general)	E	E	E	E	E	E	E	E	E	E
High-pressure / extrusion resistance	F	F	F	F	F	F	G	F	G	F
RGD (rapid gas decompression)	P	P	P	P	P	P	E	P	P	P

E Excellent (++++) G Good (+++) F Fair (++) P Poor (+) N/A Not applicable (×)

Typical physical properties[1]	Garlast® 1075	Garlast® 2075	Garlast® 3075	Garlast® 4075	Garlast® 6075	Garlast® 6378	Garlast® 6091	Garlast® 7080	Garlast® 7092	Garlast® 9075
Maximum service temperature, °C (°F)	230 (446)	316 (601)	300 (572)	230 (446)	230 (446)	275 (527)	230 (446)	325 (617)	325 (617)	230 (446)
Minimum service temperature, °C (°F)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−15 (5)	−42 (−44)
Color	Black	Black	Black	White	Black	Black	Black	Black	Black	Black
Hardness, Shore A[1]	76	74	76	73	75	76	90	80	90	75
100% modulus, MPa[2]	15.0	9.3	12.5	7.4	6.3	11.6	18.4	12.5	12.5	4.3
Tensile strength at break, MPa[2]	22.1	14.7	16.4	13.8	21.4	15.8	20.1	17.0	17.0	16.7
Elongation at break, %[2]	139	177	144	175	194	129	118	153	153	257
Compression set[3], 70 h at 204 °C, %	23	19	25	22	19	15	26	14	14	30

[1] Hardness — ASTM D2240. [2] Modulus, tensile strength, elongation — ASTM D412, 500 mm/min. [3] Compression set — ASTM D395B, 214 O-ring. [4] Chemical ratings: ++++ Excellent · +++ Good · ++ Fair · + Poor · × N/A.

Garlast® Brand Comparison

Garlast® perfluoroelastomer (FFKM) grades are engineered to meet the same demanding requirements as leading industry brands, including broad chemical resistance, high-temperature service, and reliable sealing in critical applications. In Garlast internal testing, several grades match or exceed comparable reference compounds in specific areas – such as superheated water and steam, hot-air aging, amine exposure, ethylene oxide/propylene oxide, and extreme service temperatures – while offering a consistent supply and application support from Garlast Seal Company. **Grade selection should always be based on your operating conditions, media, and hardware. Garlast technical support can help you identify the most suitable compound and confirm performance for your application.**

For example, the following grades show measurable advantages over the comparable Kalrez® reference grade in Garlast internal testing.

Garlast® Grade	Kalrez® Grade	Primary Advantage	Garlast Rating	Application Notes
1075	2035	Ethylene oxide / propylene oxide	**Excellent**	Kalrez® 2035 rated not applicable (×) for EtO/PO; Garlast® 1075 rated Excellent
2075	4079	Hot air	**Excellent**	Superior hot-air aging at 316 °C continuous service
3075	7375	Superheated water & steam	**Excellent**	Steam and hot-water resistance for 300 °C service
6075	1050LF	Amines	**Excellent**	High-temperature amine environments (>70 °C)
6378	6375	Superheated water & steam	**Excellent**	Extended chemical envelope to 275 °C with improved steam resistance
7080	7075	Hot air; maximum service temperature	**Excellent / 325 °C**	Highest continuous-use temperature in the Garlast® line
7092	7090	Hot air; maximum service temperature	**Excellent / 325 °C**	High-hardness (90 Shore A) grade for extreme temperature sealing
9075	0040	Minimum service temperature	**Excellent / −42 °C**	Lowest minimum operating temperature vs comparable Kalrez® grade (−15 °C)

Garlast® 1075 Perfluoroelastomer

Overview

Garlast® 1075 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 1075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	78
100% constant tensile stress [2]	MPa	15.0
Tensile strength [2]	MPa	22.1
Elongation at break[2]	%	139
Compression set deformation [3], 70h×204°C	%	23

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 1075 Chemical Media Resistance

Chemical media	Soaking temperature °C	Soak time (h)	Tensile strength variation %	Elongation change (%)	Hardness variation Shore A	Volume expansion %
Polar Solvents						
Acetone acetone	23	168	-7	+6	-1	1.3
Methyl ethyl ketone (MEK).	23	168	-5	+5	0	0.8
Ethyl acetate	23	168	-10	-6	0	1.2
Isopropyl alcohol (IPA).	70	168	-11	+1	-2	1.6
MPA Methylpropanol Acetate	23	168	-5	+2	-1	0.1
Toluene toluene	70	168	-14	+10	-4	0.1
MIBK Methylisobutanone	120	168	-28	+6	-5	4.1
Acetonitrile acetonitrile	23	168	-12	+8	-2	0.5
DMF N,N-dimethylformamide	150	168	-18	-20	-3	7.4
Fluorine Fluids						
HFA 123 Mobil Aviation Hydraulic Fluid HFA	23	720	-79	-54	-11	30.0
Halothane halothane (22 trifluorochlorobromoethane).	23	168	-53	-75	-5	17.0
Galden HT135 Heat Transfer Fluid	100	168				60.0
Galden ZT130/ HT135 Heat Transfer Fluid 50/50	100	168	-79	-63	-8	54.0
Other Fluids						
Methylcyclohexane Methylcyclohexane	23	168	-4	-5	0	0.3
Kerosene kerosene	150	168	-21	-4	-1	4.0
Fuel C	40	504				6.0
Fuel C + Methanol Methanol 85/15	40	504				5.0
Fuel C + MTBE Methyl tert-butyl ether (MTBE) 85/15	40	504				7.0
ASTM 3# + Benzylamine 1%	160	72	-25	-38	+2	2.9
Chlorobenzene chlorobenzene	100	168	-1	+5	-1	2.8
1,2 Dichlorobenzene 1, Dichlorobenzene	180	168	-13	-1	-2	5.7
Phenol	220	168	-15	+10	-1	4.7
Ethylene Oxide	23	168	-24	+7	-3	1.5
Petroleum oil	235	168	-24	+17	-2	2.8

Garlast® 1075 Chemical Media Resistance

Chemical media	Soaking temperature ℃	When the soaking time is small	Tensile strength variation %	Tear off the elongation variation %	Hardness variation Shore A	Volume expansion %
Polar Solvents						
Acetone	23	168	-7	+6	-1	1.3
Methyl ethyl ketone (MEK).	23	168	-5	+5	0	0.8
Ethyl acetate	23	168	-10	-6	0	1.2
Isopropyl alcohol (IPA).	70	168	-11	+1	-2	1.6
MPA Methylpropanol Acetate	23	168	-5	+2	-1	0.1
Toluene	70	168	-14	+10	-4	0.1
MIBK Methylisobutanone	120	168	-28	+6	-5	4.1
Acetonitrile	23	168	-12	+8	-2	0.5
DMF N,N-dimethylformamide	150	168	-18	-20	-3	7.4
Fluorine Fluids						
HFA 123 Mobil Aviation Hydraulic Fluid HFA	23	720	-79	-54	-11	30.0
Halothane halothane (22 trifluorochlorobromoethane).	23	168	-53	-75	-5	17.0
Galden HT135 Heat Transfer Fluid	100	168				60.0
Galden ZT130/ HT135 Heat Transfer Fluid 50/50	100	168	-79	-63	-8	54.0
Other Fluids						
Methylcyclohexane	23	168	-4	-5	0	0.3
Kerosene	150	168	-21	-4	-1	4.0
Fuel C	40	504				6.0
Fuel C + Methanol Methanol 85/15	40	504				5.0
Fuel C + MTBE Methyl Tertiobutyl Ether 85/15	40	504				7.0
ASTM 3# + Benzylamine 1%	160	72	-25	-38	+2	2.9
Chlorobenzene	100	168	-1	+5	-1	2.8
1,2 Dichlorobenzene 1, Dichlorobenzene	180	168	-13	-1	-2	5.7
Phenol	220	168	-15	+10	-1	4.7
Ethylene Oxide	23	168	-24	+7	-3	1.5
Petroleum oil	235	168	-24	+17	-2	2.8

Garlast® 1065 Perfluoroelastomer

Overview

Garlast® 1065 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 1065 is particularly suitable for low-pressure sealing rings.

Garlast® 1065 can be processed into O-rings, diaphragms, gaskets, rubber strips, hoses and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	65
100% constant tensile stress [2]	MPa	3.8
Tensile strength [2]	MPa	7.8
Elongation at break[2]	%	179
Compression set deformation [3], 70h×204°C	%	30

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B, 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 1090 Perfluoroelastomer

Overview

Garlast® 1090 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 1090 is particularly suitable for high-pressure corrosion environments.

Garlast® 1090 can be processed into O-rings and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	93
100% constant tensile stress [2]	MPa	
Tensile strength [2]	MPa	19.0
Elongation at break[2]	%	100
Compression set deformation [3], 70h×204°C	%	30

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 1095 Perfluoroelastomers

Overview

Garlast® 1095 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 1095 is suitable for explosion relief (ED). Garlast® 1095 can be processed into O-rings and customized products for customers.

Application Equipment

- Pumps
- Valves
- Oilfield equipment such as logging and wellheads

Color

Black

Mechanical properties

Hardness [1]	Shore A	95
100% constant tensile stress [2]	MPa	
Tensile strength [2]	MPa	22.1
Elongation at break[2]	%	81
Compression set deformation [3], 70h×204°C	%	30

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 2075 Perfluoroelastomers

Overview

Garlast® 2075 has excellent resistance to chemical corrosion and hot air aging. The maximum continuous service temperature is 316°C, which can be used at slightly higher temperatures for a short period of time, and has a very low temperature in the high temperature environmentCompression set deformation, good resilience under high and low temperature alternating loop conditions.

Garlast® 2075 is not intended for use with amines, superheated water and water vapor, ethylene oxide, and propylene oxide.

Garlast® 2075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	74
100% constant tensile stress [2]	MPa	9.3
Tensile strength [2]	MPa	14.7
Elongation at break[2]	%	177
Compression set deformation [3], 70h×204°C	%	19

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	+++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	+
Strong oxidant	++
Ethylene oxide / propylene oxide	×
Hot air	++++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 2075 Chemical Media Resistance

Chemical media	Soaking temperature °C	Soak time (h)	Volume swelling %
Glacial acetic acid	50	168	7
Ammonium Hydroxide Ammonia	23	168	1
Ammonium Hydroxide Ammonia	100	168	15
Black Liquor	150	168	5
Epoxyethane ethylene oxide	23	168	2
Freon 11	15	168	8
Freon Freon 134A	23	168	15
Freon Freon 134A	100	168	25
Hydrochloric acid 10% hot	40	168	< 1
Hydrochloric acid 60%	23	168	1
Hydrogen peroxide 30%	70	168	25.9
RM-903	230	70	3
Methanol methanol	23	168	< 1
Methyl ethyl ketone (MEK).	23	70	< 1
Methylene dichloride dichloromethane	23	168	2
Nitric acid	40	168	6
Propylene oxide propylene oxide	23	168	2
Sodium Hydroxide 20% Sodium Hydroxide	23	168	< 1
Sodium Hydroxide 20% Sodium Hydroxide	100	168	< 1
Sodium Hydroxide 50% Sodium Hydroxide	23	168	0
Steam water vapor	160	168	9
Steam water vapor	230	168	10
Steam water vapor	250	168	Blistering / cracking
Styrene phenylethylene	23	168	< 1
Sulfuric acid 98%	40	168	< 1
Toluene toluene	23	168	< 1
Triethyl amine	40	168	< 1
Water water	100	168	4
Water water	160	168	11
Water water	230	168	10
Water water	250	168	Blistering / cracking
Xylene xylene	23	168	< 1

Garlast® 2090 Perfluoroelastomer

Overview

Garlast® 2090 has excellent chemical corrosion resistance and hot air aging properties. With a maximum continuous service temperature of 316 °C, the Garlast® 2090 is particularly suitable for high-pressure environments.

Garlast® 2090 is not suitable for use with amines, superheated water and water vapor, ethylene oxide, and propylene oxide.

The Garlast® 2090 can be processed into O-rings and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	87
100% constant tensile stress [2]	MPa	11.8
Tensile strength [2]	MPa	15.6
Elongation at break[2]	%	123
Compression set deformation [3],70h×204°C	%	35

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	+++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	+
Strong oxidant	++
Ethylene oxide / propylene oxide	×
Hot air	++++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 2175 Perfluoroelastomer

Overview

Garlast® 2175 has excellent resistance to chemical corrosion and hot-air aging. The maximum continuous service temperature is 316°C, which can be used at slightly higher temperatures for a short period of time, and has a very low temperature in the high temperature environmentCompression set deformation, good resilience under high and low temperature alternating loop conditions.

Garlast® 2175 is not intended for use with amines, superheated water and water vapor, ethylene oxide, and propylene oxide.

Garlast® 2175 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	75
100% constant tensile stress [2]	MPa	9.8
Tensile strength [2]	MPa	16.5
Elongation at break[2]	%	160
Compression set deformation [3], 70h×204°C	%	25

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	+++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	+
Strong oxidant	++
Ethylene oxide / propylene oxide	×
Hot air	++++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 3075 Perfluoroelastomer

Overview

Garlast® 3075 offers excellent chemical corrosion resistance up to 300°C for continuous use.

Garlast® 3075 is especially suitable for high-temperature superheated water and water vapor.

Garlast® 3075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	78
100% constant tensile stress [2]	MPa	12.5
Tensile strength [2]	MPa	16.4
Elongation at break[2]	%	144
Compression set deformation [3], 70h×204°C	%	19

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	+++
Alkali	+++
alcohol	++++
Aldehyde	+++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	+
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 3090 Perfluoroelastomer

Overview

Garlast® 3090 offers excellent chemical corrosion resistance, with a maximum continuous service temperature of 300°C.

Garlast® 3090 is particularly suitable for high-temperature and high-pressure superheated water and water vapor.

Garlast® 3090 can be processed into O-rings and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments

Color

Black

Mechanical properties

Hardness [1]	Shore A	92
100% constant tensile stress [2]	MPa	15.8
Tensile strength [2]	MPa	17.6
Elongation at break[2]	%	111
Compression set deformation [3], 70h×204°C	%	23

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	+++
Alkali	+++
alcohol	++++
Aldehyde	+++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	+
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 4075 Perfluoroelastomer

Overview

Garlast® 4075 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 4075 is particularly suitable for FDA-cleared food, pharmaceutical, and other industries that require high-cleanliness environments.

Garlast® 4075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products for customers.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

white

Mechanical properties

Hardness [1]	Shore A	73
100% constant tensile stress [2]	MPa	7.4
Tensile strength [2]	MPa	13.8
Elongation at break[2]	%	175
Compression set deformation [3], 70h×204°C	%	22

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 5080 Perfluoroelastomer

Overview

Garlast® 5080 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum operating temperature is 230°C.

Garlast® 5080 is particularly suitable for strong oxidizing media (halogens, thermooxygenating acids).

Garlast® 5080 can be processed into O-rings, washers and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Creamy yellow

Mechanical properties

Hardness [1]	Shore A	79
100% constant tensile stress [2]	MPa	8.4
Tensile strength [2]	MPa	12.6
Elongation at break[2]	%	165
Compression set deformation [3], 70h×204°C	%	35

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	++++
Amine	++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	+++
Strong oxidant	+++
Ethylene oxide / propylene oxide	+++
Hot air	++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 6075 Perfluoroelastomer

Overview

Garlast® 6075 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, amines, superheated water and water vapor, etc. It has a maximum operating temperature of 230°C and excellent low compression set in high-temperature environments.

Garlast® 6075 is particularly suitable for high-temperature amines (> 70°C).

Garlast® 6075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates, and customized products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	75
100% constant tensile stress [2]	MPa	6.3
Tensile strength [2]	MPa	21.4
Elongation at break[2]	%	194
Compression set deformation [3], 70h×204°C	%	19

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	++++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast®6378 Perfluoroelastomer

Overview

Garlast® 6378 offers a wide range of chemical corrosion resistance, with a maximum continuous service temperature of 275°C.

Garlast® 6378 delivers excellent resistance to superheated water and water vapor across a broad chemical envelope.

Garlast® 6378 can be processed into O-rings and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments

Color

Black

Mechanical properties

Hardness [1]	Shore A	76
100% constant tensile stress [2]	MPa	11.6
Tensile strength [2]	MPa	15.8
Elongation at break[2]	%	129
Compression set deformation [3], 70h×204°C	%	15

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 6091 Perfluoroelastomer

Overview

Garlast® 6091 is an EDR (explosion-decompression resistant) grade with high hardness (90 Shore A), for service up to 230°C.

Garlast® 6091 offers excellent resistance to amines and a wide range of aggressive chemicals.

Garlast® 6091 can be processed into O-rings and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments

Color

Black

Mechanical properties

Hardness [1]	Shore A	90
100% constant tensile stress [2]	MPa	18.4
Tensile strength [2]	MPa	20.1
Elongation at break[2]	%	118
Compression set deformation [3], 70h×204°C	%	26

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	++++
Amine	++++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	+++
Strong oxidant	++
Ethylene oxide / propylene oxide	++++
Hot air	++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 7080 Perfluoroelastomer

Overview

Garlast® 7080 offers the highest continuous service temperature in the Garlast® FFKM line, rated to 325°C.

Garlast® 7080 provides excellent hot-air aging performance and broad chemical resistance for extreme-temperature sealing.

Garlast® 7080 can be processed into O-rings and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments

Color

Black

Mechanical properties

Hardness [1]	Shore A	80
100% constant tensile stress [2]	MPa	12.5
Tensile strength [2]	MPa	17
Elongation at break[2]	%	153
Compression set deformation [3], 70h×204°C	%	14

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	++++
Amine	++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++
Strong oxidant	++
Ethylene oxide / propylene oxide	+++
Hot air	++++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 7092 Perfluoroelastomer

Overview

Garlast® 7092 offers maximum continuous service temperature to 325°C with high hardness (90 Shore A) for demanding applications.

Garlast® 7092 provides excellent hot-air aging performance and broad chemical resistance.

Garlast® 7092 can be processed into O-rings and custom products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments

Color

Black

Mechanical properties

Hardness [1]	Shore A	90
100% constant tensile stress [2]	MPa	12.5
Tensile strength [2]	MPa	17
Elongation at break[2]	%	153
Compression set deformation [3], 70h×204°C	%	14

1. ASTM D2240
2. ASTM D412 , 500mm/min
3. ASTM D395B, 214 O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	+++
alcohol	++++
Aldehyde	++++
Amine	++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++
Strong oxidant	++
Ethylene oxide / propylene oxide	+++
Hot air	++++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® 9075 Perfluoroelastomer

Overview

Garlast® 9075 has excellent chemical corrosion resistance, including organic and inorganic acids, alkalis, esters, ethers, and ketones, aldehydes, superheated water and water vapor, etc. The maximum service temperature is 230°C and the minimum service temperature is -30°C

Garlast® 9075 is suitable for use in low temperature applications.

Garlast® 9075 can be processed into O-rings, diaphragms, gaskets, rubber strips, adhesive plates and customized products.

Application Equipment

- Mechanical seals
- Pumps
- Valves
- Compressors
- Centrifuges
- Metering and control instrumentation
- Reactors
- Agitators and grinders
- Analytical instruments
- Spraying equipment

Color

Black

Mechanical properties

Hardness [1]	Shore A	75
100% constant tensile stress [2]	MPa	4.3
Tensile strength [2]	MPa	16.7
Elongation at break[2]	%	257
Compression set deformation [3], 70h×204°C	%	30

1. ASTM D2240
2. ASTM D412, 500mm/min
3. ASTM D395B , 214-O-RING

Chemical media resistance

Chemical media	Media resistant grade
Aromatic hydrocarbon-based / aliphatic hydrocarbon-based oils	++++
Acid	++++
Alkali	++++
alcohol	++++
Aldehyde	++++
Amine	+++
Ether	++++
esters	++++
Ketones	++++
Superheated water, water vapor	++++
Strong oxidant	++
Ethylene oxide / propylene oxide	+++
Hot air	+++

++++ = Excellent
+++ = Good
++ = Fair
+ = Poor
×= N/A

Garlast® Perfluoroelastomer Seal Design

Garlast® perfluoroelastomer seal design

Garlast perfluoroelastomers should be primarily used to seal fluids, and for optimal sealing performance, it is important to pay attention to the parameters of seal design, especially those related to the mechanical properties of Garlast perfluoroelastomers. In most cases, Garlast perfluoroelastomers can replace other rubber seals without modifying standard seal design and installation methods.

The sealing performance of rubber depends on the stability of the rubber in the sealing environment, the mechanical properties and the installation structure design of the seal. Garlast perfluoroelastomer is a very stable material that can be used in most chemical media and can withstand temperatures up to 260 - 316°C. The following discusses the factors that need to be considered in the design of Garlast perfluoroelastomer seals.

Overview of groove design

Standard Garlast perfluoroelastomer O-rings are manufactured to the dimensions and tolerances specified in AS-568A. Therefore, groove sizes for dynamic and static seals should comply with that standard; GB 3452.1-92 O-rings are also available. Thermal expansion of Garlast perfluoroelastomer seals must be considered, especially at high temperature. When a backup ring is required, groove width should be adjusted accordingly. For static or dynamic applications, groove surface finish should be at least 32 µin; for gas sealing, at least 16 µin.

Many factors affect seal design, and these factors are critical to the success of rubber seals. Generally speaking, rubber seals are the weakest components in the sealing device, if the sealing design cannot fully deal with the limitations of rubber, then usually the first component to be destroyed is the rubber seal. The three factors that need to be paid the most attention are thermal expansion, extrusion, and compression set.

Groove design for Garlast perfluoroelastomer O-rings

O-ring compression

Garlast perfluoroelastomer's experience shows that for the longest seal life, the recommended installation compression ratio is 12 - 18% (room temperature). Excessive compression can cause O-rings to break, tear, and extrusion, especially when used at high temperatures. Thermal expansion is a major consideration at this time.

When the temperature is below 0°C, the compression ratio should be increased by 15 - 21%, but if the O-ring should be used for high and low temperature loops (From low to hot.)
>149°C), such a high compression ratio may cause problems and must be considered.

Elongation of O-rings

For a satisfactory seal and long life, installation stretch is generally recommended at 1–3%, with a maximum of 5%. If stretch is too low, the O-ring may not seat properly; if stretch is too high, an oversized O-ring may break or experience excessive internal stress (Gow-Joule effect) and fail prematurely.

Thermal expansion

The linear coefficient of thermal expansion of Garlast perfluoroelastomers is approximately 3.2×10^{-4}/°C over 25–250°C. Volumetric thermal expansion is about 75% higher than that of conventional fluoroelastomers. In high-temperature service, this expansion must be considered; otherwise premature seal failure can occur.

When designing seals, standard groove geometry is generally the starting point. In most cases, standard grooves are suitable for Garlast perfluoroelastomer seals. However, at high temperature, if groove volume is insufficient to accommodate O-ring thermal expansion, mating-gap extrusion can occur. Even without extrusion, annular cracks may form (often along a parting line). In any of these cases, groove volume must be increased to accommodate thermal expansion.

The table below illustrates the linear and volumetric thermal expansion of Garlast perfluoroelastomers when heated from room temperature.

Coefficient of Thermal Expansion of Garlast Perfluoroelastomers

temperature		Expansion coefficient %	
°C	°F	Linear expansion	Volume expansion
25	77	0.0	0.0
38	100	0.4	1.3
93	200	2.2	6.7
149	300	4.0	12.4
204	400	5.7	18.2
260	500	7.5	24.3
316	600	9.3	30.6

Installation of Garlast perfluoroelastomer O-rings

Lubrication

The use of lubricants in rubber seal installation passages reduces wear and cuts. Generally speaking, it is necessary to apply a lubricating film. Because Garlast perfluoroelastomers are meant to be used in harsh high-temperature environments, the lubricant should be resistant to this high-temperature carbonization. In many cases, the sealing fluid can be used to lubricate the seal, or it can be used with perfluoroether oil or graphite powder [like] Krytox®. Even if the seal is lubricated, care should be taken to minimize damage to it during the installation process.

Stretch

Most Garlast perfluoroelastomers have elongation at break in the 120% to 170% range. See the mechanical properties tables for grade-specific values.

It is important not to exceed the rubber's elongation at break during installation, to avoid O-ring damage. Normally, installation stretch should be limited to 50% of elongation at break. For difficult installations, O-rings may be softened briefly in hot water and installed with suitable tools to avoid seal damage.

Other design elements

Squeeze out

O-ring extrusion depends on sealing temperature, rubber mechanical properties at that temperature, mating clearance, and operating pressure. Because rubber seals are often the weakest component in a sealing system, extrusion failure usually means the seal design did not fully account for rubber mechanical properties.

Under the pressure force, the rubber seal deforms and tends to extrude through any sealing gap. A little extrusion is good for maintaining an effective seal, however, if you extrude too much, the seal will be broken. The increase in temperature, pressure and mating gap will aggravate the extrusion degree.

In many cases, Garlast perfluoroelastomer seals are used at very high temperatures because they are among the few elastomers that maintain thermal stability at such temperatures. At high temperature, Garlast perfluoroelastomer softens somewhat and its mechanical properties decrease, which increases the risk of O-ring extrusion. Hardness decreases with temperature, so extrusion is more likely at high temperature than at low temperature.

Even at moderate pressure (<7 MPa) and high temperatures of 149°C, backup rings are used to reduce stress on the rubber and thus extend seal life. Because the O-ring fills the groove when loaded, high stress can cause the O-ring to be squeezed into the groove corner. To reduce this stress, chamfer the groove edges. If stress exceeds the material's limit, the O-ring may tear locally. In that case, use a backup ring that matches the O-ring profile and install it on the extrusion side. The backup ring material should suit the sealing environment, and the groove dimensions should be adjusted so the backup ring and O-ring fit together.

In order to prevent crowding out, the following suggestions are made:

- Use conventional machining to minimize mating gap (typical range 0.05–0.13 mm).
- If reducing mating gap is not enough, use PTFE filled with 25% glass fiber or another suitable anti-extrusion backup ring. Adjust groove width and sealing cavity to fit the backup ring. Radius the inner corner of the backup ring to reduce the risk of cutting the O-ring and local stress concentration.

Compression set

Compression set affects the seal's ability to maintain a seal when subjected to large thermal deformation. When a Garlast seal is used at high temperature for a long time, it reaches an equilibrium state and continues to seal; when the temperature decreases, the seal will "remember" that equilibrium state. Relative to that state, the seal body shrinks, which can lead to leakage. This can even occur at room temperature unless a restorative force, similar to a mechanical spring, keeps the seal in equilibrium.

If the seal leaks at lower temperature, it can be restored to size by heating before pressurization; the seal will then regain the desired sealing force.

Garlast perfluoroelastomer O-rings sometimes have a higher compression set than other rubbers; however, experience shows that this compression set is mainly caused by stress relaxation, not by thermal aging or chemical degradation, as confirmed by sealing performance tests.

A very useful method for predicting seal performance is called the Lucas test. In simple terms, this method measures the sealing force that rubber can maintain, expressed as a percentage of the original sealing force. Tests comparing perfluoroelastomer O-rings and conventional fluoroelastomer O-rings after aging at 204°C show that Garlast perfluoroelastomer maintains sealing ability steadily over time, while conventional fluoroelastomer loses sealing ability much more quickly.

Design elements for special applications

High vacuum applications

Generally speaking, increasing the section compression of rubber seals will reduce the permeability of gases. Some related theories include:

- The necessary path of gas through rubber is lengthened.
- The effective surface of gas entering the rubber is reduced.
- The increased compression of the rubber eliminates surface defects.

It has also been confirmed that the use of vacuum grease reduces gas permeability, which is only useful for low compression O-rings, such as initial compression rate is less than 30%.

For seals used in high-temperature environments, increasing O-ring compression can negatively affect Garlast perfluoroelastomer parts. Due to thermal expansion, excessive compression can create excessive force on the O-ring, causing rupture and seal failure.

The recommended standard compression ratio is 12 - 18% for most applications, and it is suitable for some special high-vacuum compression ratio can be increased to 20 - 25%. Use face seals whenever possible, and small mating gaps, reduced penetration surfaces, and predictable compression are all conducive to seal design in this environment.

Additional help

For harsh-environment sealing support, please contact Garlast Seal Company, LLC.

Garlast® perfluoroelastomer seal is produced at
Shanghai Garlast Rubber Sealing Technology Co., Ltd.

O-Ring AS568A Standard Size

Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter
001	0.74	1.02	040	72.75	1.78	130	40.94	2.62
002	1.07	1.27	041	75.92	1.78	131	42.52	2.62
003	1.42	1.52	042	82.27	1.78	132	44.12	2.62
004	1.78	1.78	043	88.62	1.78	133	45.69	2.62
005	2.57	1.78	044	94.97	1.78	134	47.29	2.62
006	2.90	1.78	045	101.32	1.78	135	48.90	2.62
007	3.68	1.78	046	107.67	1.78	136	50.47	2.62
008	4.47	1.78	047	114.02	1.78	137	52.07	2.62
009	5.28	1.78	048	120.30	1.78	138	53.64	2.62
010	6.07	1.78	049	126.72	1.78	139	55.25	2.62
011	7.65	1.78	050	133.07	1.78	140	56.82	2.62
012	9.25	1.78	102	1.24	2.62	141	58.42	2.62
013	10.82	1.78	103	2.06	2.62	142	59.99	2.62
014	12.42	1.78	104	2.84	2.62	143	61.60	2.62
015	14.00	1.78	105	3.63	2.62	144	63.17	2.62
016	15.60	1.78	106	4.42	2.62	145	64.77	2.62
017	17.17	1.78	107	5.23	2.62	146	66.34	2.62
018	18.77	1.78	108	6.02	2.62	147	67.95	2.62
019	20.35	1.78	109	7.59	2.62	148	69.52	2.62
020	21.95	1.78	110	9.19	2.62	149	71.12	2.62
021	23.52	1.78	111	10.77	2.62	150	72.69	2.62
022	25.12	1.78	112	12.37	2.62	151	75.87	2.62
023	26.70	1.78	113	13.94	2.62	152	82.22	2.62
024	28.30	1.78	114	15.54	2.62	153	88.57	2.62
025	29.87	1.78	115	17.12	2.62	154	94.92	2.62
026	31.47	1.78	116	18.72	2.62	155	101.27	2.62
027	33.05	1.78	117	20.29	2.62	156	107.62	2.62
028	34.65	1.78	118	21.89	2.62	157	113.97	2.62
029	37.82	1.78	119	23.47	2.62	158	120.32	2.62
030	41.00	1.78	120	25.07	2.62	159	126.67	2.62
031	44.17	1.78	121	26.64	2.62	160	133.02	2.62
032	47.35	1.78	122	28.24	2.62	161	139.37	2.62
033	50.52	1.78	123	29.82	2.62	162	145.72	2.62
034	53.70	1.78	124	31.42	2.62	163	152.07	2.62
035	56.87	1.78	125	32.99	2.62	164	158.42	2.62
036	60.05	1.78	126	34.59	2.62	165	164.77	2.62
037	63.22	1.78	127	36.17	2.62	166	171.12	2.62
038	66.40	1.78	128	37.77	2.62	167	177.47	2.62
039	69.57	1.78	129	39.34	2.62	168	183.82	2.62

O-Ring AS568A Standard Size

Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter
169	190.17	2.62	230	63.09	3.53	269	221.84	3.53
170	196.52	2.62	231	66.27	3.53	270	228.19	3.53
171	202.87	2.62	232	69.44	3.53	271	234.54	3.53
172	209.22	2.62	233	72.62	3.53	272	240.89	3.53
173	215.57	2.62	234	75.79	3.53	273	247.24	3.53
174	221.92	2.62	235	78.97	3.53	274	253.59	3.53
175	228.27	2.62	236	82.14	3.53	275	266.29	3.53
176	234.62	2.62	237	85.32	3.53	276	278.99	3.53
177	240.97	2.62	238	88.49	3.53	277	291.69	3.53
178	247.32	2.62	239	91.67	3.53	278	304.39	3.53
201	4.34	3.53	240	94.84	3.53	279	329.79	3.53
202	5.94	3.53	241	98.02	3.53	280	355.19	3.53
203	7.52	3.53	242	101.19	3.53	281	380.59	3.53
204	9.12	3.53	243	104.37	3.53	282	405.26	3.53
205	10.69	3.53	244	107.54	3.53	283	430.66	3.53
206	12.29	3.53	245	110.72	3.53	284	456.06	3.53
207	13.87	3.53	246	113.89	3.53	309	10.46	5.33
208	15.47	3.53	247	117.07	3.53	310	12.07	5.33
209	17.04	3.53	248	120.24	3.53	311	13.64	5.33
210	18.64	3.53	249	123.42	3.53	312	15.24	5.33
211	20.22	3.53	250	126.59	3.53	313	16.81	5.33
212	21.82	3.53	251	129.77	3.53	314	18.42	5.33
213	23.39	3.53	252	132.94	3.53	315	19.99	5.33
214	24.99	3.53	253	136.12	3.53	316	21.59	5.33
215	26.57	3.53	254	139.29	3.53	317	23.16	5.33
216	28.17	3.53	255	142.47	3.53	318	24.77	5.33
217	29.74	3.53	256	145.64	3.53	319	26.34	5.33
218	31.34	3.53	257	148.82	3.53	320	27.94	5.33
219	32.92	3.53	258	151.99	3.53	321	29.51	5.33
220	34.52	3.53	259	158.34	3.53	322	31.12	5.33
221	36.09	3.53	260	164.69	3.53	323	32.69	5.33
222	37.69	3.53	261	171.04	3.53	324	34.29	5.33
223	40.87	3.53	262	177.39	3.53	325	37.47	5.33
224	44.04	3.53	263	183.74	3.53	326	40.64	5.33
225	47.22	3.53	264	190.09	3.53	327	43.82	5.33
226	50.39	3.53	265	196.44	3.53	328	46.99	5.33
227	53.57	3.53	266	202.79	3.53	329	50.17	5.33
228	56.74	3.53	267	209.14	3.53	330	53.34	5.33
229	59.92	3.53	268	215.49	3.53	331	56.52	5.33

O-Ring AS568A Standard Size

Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter	Code name	Inner diameter	Cross-sectional diameter
332	59.69	5.33	371	215.27	5.33	438	158.12	6.99
333	62.87	5.33	372	221.62	5.33	439	164.47	6.99
334	66.04	5.33	373	227.97	5.33	440	170.82	6.99
335	69.22	5.33	374	234.32	5.33	441	177.17	6.99
336	72.39	5.33	375	240.67	5.33	442	183.52	6.99
337	75.57	5.33	376	247.02	5.33	443	189.87	6.99
338	78.74	5.33	377	253.37	5.33	444	196.22	6.99
339	81.92	5.33	378	266.07	5.33	445	202.57	6.99
340	85.09	5.33	379	278.77	5.33	446	215.27	6.99
341	88.27	5.33	380	291.47	5.33	447	227.97	6.99
342	91.44	5.33	381	304.17	5.33	448	240.67	6.99
343	94.62	5.33	382	329.57	5.33	449	253.37	6.99
344	97.79	5.33	383	354.97	5.33	450	266.07	6.99
345	100.97	5.33	384	380.37	5.33	451	278.77	6.99
346	104.14	5.33	385	405.26	5.33	452	291.47	6.99
347	107.32	5.33	386	430.66	5.33	453	304.17	6.99
348	110.49	5.33	387	456.06	5.33	454	316.87	6.99
349	113.67	5.33	388	481.46	5.33	455	329.57	6.99
350	116.84	5.33	389	506.86	5.33	456	342.27	6.99
351	120.02	5.33	390	532.26	5.33	457	354.97	6.99
352	123.19	5.33	391	557.66	5.33	458	367.67	6.99
353	126.37	5.33	392	582.68	5.33	459	380.37	6.99
354	129.54	5.33	393	608.08	5.33	460	393.07	6.99
355	132.72	5.33	394	633.48	5.33	461	405.26	6.99
356	135.89	5.33	395	658.88	5.33	462	417.96	6.99
357	139.07	5.33	425	113.67	6.99	463	430.66	6.99
358	142.24	5.33	426	116.84	6.99	464	443.36	6.99
359	145.42	5.33	427	120.02	6.99	465	456.06	6.99
360	148.59	5.33	428	123.19	6.99	466	468.76	6.99
361	151.77	5.33	429	126.37	6.99	467	481.46	6.99
362	158.12	5.33	430	129.54	6.99	468	494.16	6.99
363	164.47	5.33	431	132.72	6.99	469	506.86	6.99
364	170.82	5.33	432	135.89	6.99	470	532.26	6.99
365	177.17	5.33	433	139.07	6.99	471	557.66	6.99
366	183.52	5.33	434	142.24	6.99	472	582.68	6.99
367	189.87	5.33	435	145.42	6.99	473	608.08	6.99
368	196.22	5.33	436	148.59	6.99	474	633.48	6.99
369	202.57	5.33	437	151.77	6.99	475	658.88	6.99
370	208.92	5.33						

Customer Seal Request Form

Contact information							
Name				Position			
Company							
Address						Zip code	
URL				Mail			
Telephone				Fax			

Operating conditions							
Part name				Size:			
Equipment				Parts for use			
Temperature		The highest		Lowest		Rated	
Pressure / Vacuum				Cyclic pressure loading?			
Medium				Concentration			

Customer needs	□ Design	□ Quality	□ Quote	□ Analysis	□ Other		
Current materials used					Hardness		
Current service life		Expected service life			Quantity		

Questions and Requirements :

Please fax to 021-51687902

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Specifications and parameters are subject to change without notice. Please contact us for the latest version.

Last Updated in May 2026