

Basic O-Ring Elastomers

Butyl Rubber (BR, IIR)

Butyl rubber is composed by copolymerizing isobutylene which is with small amount of isoprene. It is like EPDM possessing excellent resistance to chemical and polar fluid, outstanding electrical insulation and good ozone resistance. The special properties of butyl rubber are low gas and moisture permeability and high shock absorption. These properties have made butyl rubber the polymer choice in a variety of applications.

Cure system - Sulfur-Cured

Standard BRs are sulfur-cured.

Other Common Variations

- BRs can be formulated with only "white list" ingredients as specified in 21.CFR 177.2600 for use in applications where the elastomer will be in contact with food or beverages, ex. bottle top seal for alcohol or medical.

General Information

ASTM D1418 Designation	IIR, CIIR, BIIR
ISO/DIN 1629 Designation	IIR, CIIR, BIIR
ASTM D2000 / SAE J 200 Codes	AA, BA
Standard Color(s)	Black
Hardness Range	50 to 80 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-55°C -65°F
Standard High Temperature	100°C 212°F



Performs Well In...

- Alcohols
- Ketones
- Dilute acids and alkalis
- Silicone oils & greases
- Water and Steam
- Phosphate ester based hydraulic fluids - Skydrol(R)
- Ozone, aging & weathering

Doesn't Perform Well In...

- Aliphatic & aromatic hydrocarbons
- Halogenated solvents
- Petroleum based oils & greases

Carboxylated Nitrile (XNBR)

Carboxylated Nitrile is similar to Nitrile rubber, but the polymer backbone has been chemically modified with Carboxylic Acid containing group. This result is XNBR with more excellent abrasion and tear resistance than traditional NBR. For this reason, XNBR based parts are usually used in dynamic applications such as seals and rod wipers.

Cure system - Sulfur-Cured

Standard XNBR compounds are sulfur-cured.



General Information

ASTM D1418 Designation	XNBR
ISO/DIN 1629 Designation	XNBR
ASTM D2000 / SAE J 200 Codes	BG, BK, CH
Standard Color(s)	Black
Hardness Range	50 to 90 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-20°C -4°F
Standard High Temperature	100°C 212°F
Special Compound High Temperature	125°C 257°F

Performs Well In...

- Aliphatic hydrocarbon
- Vegetable and mineral oils
- Greases
- Diesel
- Water
- Dilute acids, alkali and salt solutions

Doesn't Perform Well In...

- Aromatic hydrocarbon
- Chlorinated hydrocarbon
- Ketones
- Acetic acid
- Ethylene ester
- Strong acids
- Brake fluid with glycol base

Basic O-Ring Elastomers

Chloroprene Rubber (C, CR, Neoprene)

Chloroprene was one of the first successful synthetic elastomers in 1931 made by Dupont, and the trade name is Neoprene. It is prepared by emulsion polymerization of chloroprene, or 2-chlorobutadiene. CR is a multi-purposed elastomer which yields a balanced combination of properties. It has good resistance to sun, ozone, weather and performs well in contact with oils and many chemicals. It also displays outstanding physical toughness and good resistance to fire

Cure system - Metal oxide cured

Standard Chloroprenes are metal oxides & organic accelerators.

Other Common Variations

- Chloroprene has been used in thousands of diverse environment, including automotive, wire and cable industries.
- Chloroprene is often recommended for use in mobile and fixed air conditioning systems, especially those using R-12 or R-22 with mineral oil lubricant, but also extending to newer systems having ozone-friendly R-134a and PAG lubricants.



General Information

ASTM D1418 Designation	CR
ISO/DIN 1629 Designation	CR
ASTM D2000 / SAE J 200 Codes	BC, BE
Standard Color(s)	Black
Hardness Range	30 to 90 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-40°C -40°F
Standard High Temperature	100°C 212°F
Special Compound Low Temperature	-55°C -67°F
Special Compound High Temperature	125°C 257°F

Performs Well In...

- Refrigerants
- Ammonia
- Water
- Silicone grease and oils
- High aniline point mineral oil

Doesn't Perform Well In...

- Aromatic hydrocarbons
- Ketones
- Esters
- Ethers
- Strong oxidizing acids
- Chlorinated hydrocarbons

Epichlorohydrin (CO, ECO, GECO)

Hydrin® is the trade name of epichlorohydrin elastomers made by Zeon Chemicals. epichlorohydrin elastomers are available as a homopolymer (CO), copolymer (ECO, GCO), and terpolmer (GECO). All epichlorohydrin rubbers offer low temperature flexibilities; resistance to oils, fuel and common solvents; higher temperature resistance than NBR; good weather ability and good dynamic properties.

Cure system - Sulfur-Cured vs. Peroxide-Cured

ECO are usually Peroxide-cured for standard compounds. It also can be Sulfur-cured to improve flexibility in dynamic applications, but will reduce the heat resistance and cause poorer compression set.

Other Common Variations

- The typical applications of epichlorohydrin are fuels or LPG system in automotive.



Performs Well In...

- Mineral oil and grease
- LPG, fuels
- Silicone oil and grease
- Ozone, weather

Doesn't Perform Well In...

- Ketones and esters
- Aromatic and chlorinated hydrocarbon
- Brake fluid
- aldehydes

General Information

ASTM D1418 Designation	CO, ECO GECO
ISO/DIN 1629 Designation	CO, ECO GECO
ASTM D2000 / SAE J 200 Codes	CH
Standard Color(s)	Black
Hardness Range	50 to 80 Shore A
Relative Cost	Medium

Service Temperatures

Standard Low Temperature	-40°C -40°F
Standard High Temperature	125°C 257°F
Special Compound High Temperature	135°C 257°F

Basic O-Ring Elastomers

Ethylene Propylene Rubber (EPR, EPDM)

EPDM is a Copolymer of ethylene and propylene, and further a terpolymer of ethylene and propylene with a small amount of a third monomer (usually a diolefin) to permit vulcanization with sulfur. Generally Ethylene Propylene Rubber possesses excellent resistance to ozone, sunlight and weathering, and has very good flexibility at low temperature, good chemical resistance (many dilute acids and alkalis, polar solvents), and good electrical insulation property.

Cure system - Sulfur-Cured vs. Peroxide-Cured

- Standard EPDMs are usually sulfur-cured. Sulfur-cured compounds offer better flexible properties but are more prone to hardening and poorer compression set with high temperature. Peroxide-cured EPDMs have better heat resistance and lower compression set. It complies with long time usage especially for hose system of construction industry, but at the same time is more expensive and more difficult for production than the sulfur-cured

Other Common Variations

- EPDMs are often internally lubricated to improve ease of installation or reduce friction for dynamic applications.
- EPDMs can be formulated with only "white list" ingredients as specified in 21.CFR 177.2600 for use in applications where the elastomer will be in contact with food or beverages.
- EPDMs can be submitted for approval by the National Sanitation Foundation (NSF) for use in drinking water applications.
- EPDMs are usually used in automotive air conditioning system where R134a refrigerant gas and POE or PAG lubricant and new refrigerant for environment protection R744 is used. In R744 air conditioning system, it requires excellent resistance to explosive decomposition in hydrogen dioxide at high pressure and high temperature.
- EPDMs are usually used in phosphate ester type hydraulic fluids

General Information

ASTM D1418 Designation	EPM, EPDM
ISO/DIN 1629 Designation	EPM, EPDM
ASTM D2000 / SAE J 200 Codes	AA, BA CA, DA
Standard Color(s)	Black
Hardness Range	30 to 90 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-55°C -67°F
Standard High Temperature	125°C 257°F
Special Low Temperature	-55°C -67°F
Special High Temperature	150°C 302°F



Performs Well In...

- Alcohols
- Automotive brake fluid
- Ketones
- Dilute acids and alkalis
- Silicone oils & greases
- Steam to 400°F
- Water
- Phosphate ester based hydraulic fluids - Skydrol™
- Ozone, aging & weathering

Doesn't Perform Well In...

- Aliphatic & aromatic hydrocarbons
- Di-ester based lubricants
- Halogenated solvents
- Petroleum based oils & greases

Ethylene/Acrylic Elastomer (AEM, VAMAC)

Ethylene/ acrylic elastomer is a copolymer of ethylene and methyl acrylate plus a small amount of a curesite monomer containing carboxylic acid groups. Vamac is a tough, low-compression-set rubber with excellent resistance to high temperatures, hot mineral oil, fluids and weathering. The low temperature flexibility and mechanic properties are better than ACM, but it is not well resistant to low aniline oil (like ASTM No. 3 oil) and polar solvents. AEM is typically chosen for applications requiring improved performance versus Nitrile rubber, Neoprene or reduced cost versus higher-end elastomers such as HNBR, FKM. It also usually is applied in automatic industry.

Cure system - Amine-Cured

Standard AEM compounds are Amine based vulcanization system.

Other Common Variations

- AEM has good flexibility and good tear resistance, abrasion and compression set, and is typically used in shaft lip seals especially in automatic transmission fluids.



Performs Well In...

- Ozone, weather and hot air
- Automatic transmission fluids (ATF) and Power steering fluid
- Water

Doesn't Perform Well In...

- Ketones
- Fuels
- Brake fluid

General Information

ASTM D1418 Designation	AEM
ISO/DIN 1629 Designation	AEM
ASTM D2000 / SAE J 200 Codes	EE
Standard Color(s)	Black
Hardness Range	40 to 85 Shore A
Relative Cost	Medium-High

Service Temperatures

Standard Low Temperature	-30°C -22°F
Standard High Temperature	150°C 300°F
Special Compound Low Temperature	-40°C -40°F
Special Compound High Temperature	175°C 345°F

Basic O-Ring Elastomers

Fluorocarbon (V, FKM, Viton)

Fluorocarbon is a high performance rubber, and especially it has excellent resistance to high temperature, ozone, weather, oxygen, mineral oil, fuels, hydraulic fluids, aromatics and many organic solvents and chemicals.

Fluorine Content

Viton® general type (A-TYPE, 66% fluorine), medium fluorine content, type (B-, GBL-TYPE, 67~68.5% fluorine) high fluorine content, type (F-, GF-TYPE, 70% fluorine), improving low temperature flexibility type (GLT-, GFLT) and excellent resistance to more chemicals and solvents--Viton® ETP Extreme.

Excellent acid and alkali resistance can be met with VITON TBR.

Cure system Bisphenol cured vs. Peroxide-Cured

- Standard FKM compounds are Bisphenol cured. FKM compounds with peroxide-cured possess better acid solution resistance than the bisphenol cured, and can replace litharge-cured applied in acid solution. In Some lubricants adding a few organic amide or amine, choosing peroxide curing system Viton will be better than bisphenol curing system.

Other Common Variations

- FKM can also be submitted for approval to Underwriters Laboratories (UL) for use in applications as prescribed in UL157.
- FKM has excellent resistance to high temperature, oil, solvent, flame, chemical and weather, and it is usually applied in automotive, chemical processing, aerospace and many industrials.
- Viton GLT is broadly used in thermal range of -40°C to +250°C and it has outstanding resistance to aggressive HTS-type oils which are commonly used in aerospace industry.
- Viton ETP is usually applied in chemical industrial.
- In some fuels adding several methanol, Viton F and B-type are more usable than A-type especially F-type. If it requires lower temperature, GFLT and GBLT will be available.
- Viton TBR 605C(TFE/propylene polymer) is better base and steam resistant than other general Vitons. It can be use in amine, amide and some bases.

General Information

ASTM D1418 Designation	FKM
ISO/DIN 1629 Designation	FKM
ASTM D2000 / SAE J 200 Codes	HK
Standard Color(s)	Black
Hardness Range	50 to 90 Shore A
Relative Cost	High

Service Temperatures

Standard Low Temperature	-26°C -15°F
Standard High Temperature	232°C 450°F
Special Compound Low Temperature	-40°C -40°F
Special Compound High Temperature	275°C 525°F



Performs Well In...

- Petroleum products
- Fuel or blend with methanol or ethanol
- Diesel or blend with biodiesel
- Mineral oil and grease
- Silicone oil and grease
- High vacuum
- Ozone, weather and very high temperature air
- Strong acid

Doesn't Perform Well In...

- Ketones
- Low molecular weight organic acids (formic and acetic acids)
- Superheat steam
- Low molecular weight esters and ethers.
- Phosphate ester based hydraulic fluids - Skydrol(R)

Fluorosilicone Rubber (FVMQ)

Fluorosilicone is like silicone rubber, bonding trifluoropropyl, methyl, and vinyl as side chains. The mechanical and physical properties are similar to VMQ. However, FVMQ offers improved fuel and mineral oil resistance, but poorer hot air resistance than standard VMQ.

Cure system - Peroxide-Cured

Standard FVMQ compounds are peroxide-cured.

Other Common Variations

- FVMQ offers excellent low-temperature flexibility and good resistance to fuel and aromatic mineral oil. It is usually applied in contact with jet and automotive fuels, most solvents, and engine oil especially in aerospace industry.
- FVMQ compounds meet MIL-R-25988 specification.



General Information

ASTM D1418 Designation	FVMQ
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ISO/DIN 1629 Designation	FVMQ
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ASTM D2000 / SAE J 200 Codes	FK
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Standard Color(s)	Blue
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Hardness Range	40 to 85 Shore A
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Relative Cost	High
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Service Temperatures

Standard Low Temperature	-60°C -76°F
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Standard High Temperature	177°C 350°F
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Special Compound Low Temperature	-60°C -76°F
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Special Compound High Temperature	232°C 450°F
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Performs Well In...

- Fuels
- Aromatic mineral oils
- Benzene, Toluene
- Ozone and weather

Doesn't Perform Well In...

- Brake Fluids
- Ketones
- Hydrazine

Basic O-Ring Elastomers

Hydrogenated Nitrile Rubber (HNBR, HSN)

Hydrogenated Nitrile(HNBR) is a synthetic polymer that is obtained by saturating the double bonds in nitrile's butadiene segments with hydrogen. It is also called HSN (Highly Saturated Nitrile). This special hydrogenation process reduces double bonds in main chains of the NBR polymer, thus HNBR possesses superior heat, ozone, chemical resistance and mechanical characteristics over standard Nitrile.

Acrylonitrile Content

Same as NBR, there are different levels of Acrylonitrile (ACN) content in different HNBR polymers. The ACN content can be varied from 17% to 49%. Lower ACN content gives better low temperature properties but poorer fuels and polar lubricants. Higher ACN content gives poorer low temperature properties but improves fuels and polar lubricants resistance. Standard HNBRs typically have 36% ACN content.

Cure system - Peroxide-Cured

HNBRs are usually Peroxide-cured for standard compounds of Ge Mao. It also can be Sulfur-cured to improve flexible properties in dynamic system but will reduce the heat resistance and cause poorer compression set.

Other Common Variations

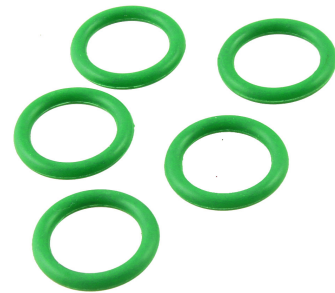
- HNBRs are often internally lubricated to improve ease of installation or reduce friction for dynamic applications.
- HNBRs can be formulated with only "white list" ingredients as specified in 21.CFR 177.2600 for use in applications where the elastomer will be in contact with food or beverages.
- HNBRs are often used in mobile air conditioning systems using R134a refrigerant or other new refrigerants such as R401a, R404a, R410a, R507 and R744.
- HNBRs are also used in other automotive systems because of their excellent abrasion resistance.
- In deeper oil wells, requiring resistance to heat, crude oil, hydrogen sulfide, steam and explosive decompression, etc. Special compounds of HNBR can be available for this application.

General Information

ASTM D1418 Designation	HNBR
ISO/DIN 1629 Designation	HNBR or NBM
ASTM D2000 / SAE J 200 Codes	CH, DF, DH
Standard Color(s)	Black Green
Hardness Range	50 to 90 Shore A
Relative Cost	High

Service Temperatures

Standard Low Temperature	-40°C -40°F
Standard High Temperature	150°C 302°F
Special Compound Low Temperature	-55°C -67°F
Special Compound High Temperature	165°C 330°F



Performs Well In...

- Petroleum based oils & fuels
- Aliphatic hydrocarbons
- Vegetable oils
- Silicone oils & greases
- Ethylene glycol
- Dilute acids, bases & salt solutions to moderate temperatures
- Water & steam to 150°C (300°F)

Doesn't Perform Well In...

- Chlorinated hydrocarbons
- Ketones
- Ethers
- Esters
- Strong acids

Natural Rubber (NR)

Natural rubber is produced from the latex of the *Hevea brasiliensis*, and the chemical name of this polymer is polyisoprene. Polyisoprene also can be synthesized by polymerization from its monomer isoprene. Natural rubber possesses many excellent physical properties including high resilience and strength and good abrasion resistance. The defects are like SBR, having poor resistance to hydrocarbon oil and not suitable in UV, oxygen, ozone because of the double bond in the polymer backbone. But its poor weathering resistance can be modified by special additive

Cure system - Sulfur-Cured

Standard NR compounds are sulfur-cured.

Other Common Variations

- NR is usually mixed with SBR and BR and applied in tire productions.

General Information

ASTM D1418 Designation	NR
ISO/DIN 1629 Designation	NR
ASTM D2000 / SAE J 200 Codes	AA
Standard Color(s)	Black
Hardness Range	40 to 90 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-50°C -58°F
Standard High Temperature	70°C 158°F



Performs Well In...

- Alcohols
- Organic acids

Doesn't Perform Well In...

- Ozone
- Petroleum oils
- Aromatic, aliphatic, or halogenated hydrocarbons

Basic O-Ring Elastomers

Nitrile Rubber (B, NBR)

Nitrile rubber, also known as NBR or Buna N, is one of the most commonly used sealing elastomers due its resistance to petroleum based fuels and lubricants and its relatively low price. Nitrile elastomers are copolymers of acrylonitrile and butadiene. There are a number of common variations of nitrile compounds.

Acrylonitrile Content

The acrylonitrile (ACN) content of the polymer chains can be varied from 18% to 50%. Lower ACN content gives better low temperature properties but poorer fuels and polar lubricants. Higher ACN content gives poorer low temperature properties but improved fuels and polar lubricants resistance. Standard NBRs typically have 34% ACN content.

Cure system - Sulfur-Cured vs. Peroxide-Cured

Standard Nitriles are usually sulfur-cured. Sulfur-cured compounds offer better low temperature properties but are more prone to hardening with high temperatures. Peroxide-cured nitriles have better heat resistance and lower compression sets but are more expensive and are more difficult to process

Cure system - Sulfur-Cured vs. Peroxide-Cured

- Nitriles are often internally lubricated to improve ease of installation or reduce friction for dynamic applications.
- Nitriles can be formulated with only "white list " ingredients as specified in 21.CFR 177.2600 for use in applications where the elastomer will be in contact with food or beverages.
- Nitriles can be submitted for approval by the National Sanitation Foundation (NSF) for use in drinking water applications.
- Nitriles can also be submitted for approval to Underwriters Laboratories (UL) for use in applications as prescribed in UL157.
- Nitrile rubber can be combined with polyvinyl chloride (PVC) to create fuel, ozone and weathering resistance NBR-PVC blends.

General Information

ASTM D1418 Designation	NBR
ISO/DIN 1629 Designation	NBR
ASTM D2000 / SAE J 200 Codes	BF, BG BK, CH
Standard Color(s)	Black
Hardness Range	40 to 90 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-40°C -40°F
Standard High Temperature	100°C 212°F
Special Compound Low Temperature	-55°C -67°F
Special Compound High Temperature	125°C 275°F



Performs Well In...

- Petroleum based oils & fuels
- Aliphatic hydrocarbons
- Vegetable oils
- Silicone oils & greases
- Ethylene glycol
- Dilute acids
- Water to below 100°C (212°F)

Doesn't Perform Well In...

- Aromatic hydrocarbons
- Automotive brake fluid
- Chlorinated hydrocarbons
- Ketones
- Ethers
- Esters
- Phosphate ester hydraulic fluid
- Strong acids
- Ozone / weathering / sunlight

Polyacrylate (ACM, PA)

Polyacrylates, or simply acrylate rubbers, are copolymers having two major components: the backbone (monomeric acid ester of alkyl or alkoxy) and the reactive cure site. ACMs have good resistance to high heat and oil which is better than NBRs. It also will resist oxygen and ozone even at high temperature, but has poorer water and low temperature flexibility compared to NBRs. Special ACM can improve low temperature flexibility to -40°C (TR10 value) without reducing oil and heat resistance.

Cure system - Amine based & metal soaps Cured

Standard ACM compounds are Amine based and metal soaps combined to vulcanize.

Other Common Variations

- Polyacrylates usually are applied in automatic industry, especially in automatic transmission and steering fluids



Performs Well In...

- Mineral oils (transmission and steering fluids)
- Ozone, weather and hot air.

Doesn't Perform Well In...

- Alcohol
- Aromatics and chlorinated hydrocarbons
- Hot water and steam
- Acids, alkalis and amines
- Brake fluid

General Information

ASTM D1418 Designation	ACM
ISO/DIN 1629 Designation	ACM
ASTM D2000 / SAE J 200 Codes	DF, DH, EH
Standard Color(s)	Black
Hardness Range	45 to 80 Shore A
Relative Cost	Medium-High

Service Temperatures

Standard Low Temperature	-15°C 5°F
Standard High Temperature	150°C 300°F
Special Compound Low Temperature	-40°C -40°F
Special Compound High Temperature	175°C 345°F

Basic O-Ring Elastomers

Polyurethane (PU, AU, EU)

The millable Polyurethane rubbers are distinguished into two types; one is polyester urethane (AU), the other is polyether urethane (EU). AU type urethanes have outstanding oil, fuel and solvent resistance but can be attacked by hydrolysis, EU type urethanes are not attacked by hydrolysis and still offer a fuel and oil resistance comparable to low ACN (18~22% ACN) Nitriles or HNBRs. Any type polyurethane has excellent wear resistance, high tensile strength and high elasticity in comparison with any other elastomers.

We also can offer any type thermoplastic urethane (TPU).

Cure system - Peroxide-Cured

Standard PU compounds are peroxide-cured.

Other Common Variations

- Polyurethane usually is applied in mechanical industry, especially in the place where material must have higher wear resistance and higher strength.
- In some applying environment, moisture condensing will happen on the surface of rubber seal, and this will cause hydrolysis of AU so choosing EU is better. But EU does not resist oil very well, thus higher aniline point oil must be used for lubricant application.
- Applying in hydraulic system, TPU will be better than millable Polyurethane.

General Information

ASTM D1418 Designation	AU, EU
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ISO/DIN 1629 Designation	AU, EU
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ASTM D2000 / SAE J 200 Codes	BG
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Standard Color(s)	Black
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Hardness Range	60 to 93 Shore A
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Relative Cost	Medium-High
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Service Temperatures

Standard Low Temperature	-40°C -40°F
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Standard High Temperature	80°C 176°F
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Special Compound Low Temperature	-55°C -67°F
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Special Compound High Temperature	100°C 212°F
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Performs Well In...

- Aliphatic hydrocarbon
- Mineral oil and grease
- Silicone oil and grease
- Ozone
- Water up to 50°C (EU type)

Doesn't Perform Well In...

- Ketones
- Alcohols
- Esters
- Ethers
- Hot water and steam
- Alkalis, amines
- Acids
- Glycols

Silicone Rubber (S, MQ, VMQ, PVMQ)

Physically, silicones are based on silicon, an element derived from quartz. To create this class of synthetic elastomers, pendant organic groups such as methyl, phenyl and vinyl are attached to silicon atoms. The different addition of side chains can achieve significant variations in properties. Silicones have excellent heat, ozone and corona resistance, very well dielectric stability, and resistance to many oils, chemicals, and solvents. And for all elastomers, silicones possess the best flexible property at low temperature. But it also has some weakness like low tensile strength, poor tear and wear resistance.

Cure system - Peroxide-Cured vs. Platinum cured

Standard silicone compounds are usually peroxide-cured. Platinum-cured compounds offer better flexible properties and very low volatile matter. Platinum-cured silicones usually are applied in medical system or other required low volatile matter, but they need to be produced in clean room and higher cost of platinum catalyzer so they are more expensive than peroxide-cured ones.

Other Common Variations

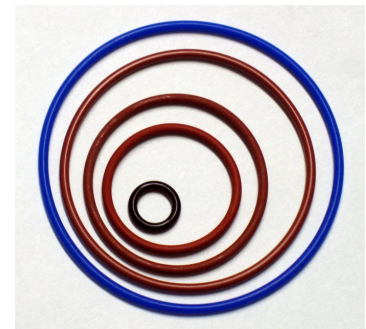
- Silicones can be formulated with only "white list " ingredients as specified in 21.CFR 177.2600 for use in applications where the elastomer will be in contact with food or beverages.
- Silicones can be submitted for approval by the National Sanitation Foundation (NSF) for use in drinking water applications.
- Silicones are often used in automotive system like boots, oil filter valve, lighting gaskets, etc.
- Silicone parts can be used in medical system which especially require compliance to USP CLASS VI.

General Information

ASTM D1418 Designation	Q, MQ, VMQ, PVMQ,
ISO/DIN 1629 Designation	Q, MQ, VMQ, PVMQ,
ASTM D2000 / SAE J 200 Codes	FC, FE, GE,
Standard Color(s)	Rust
Hardness Range	25 to 90 Shore A
Relative Cost	Medium-High

Service Temperatures

Standard Low Temperature	-60°C -76°F
Standard High Temperature	225°C 437°F
Special Compound Low Temperature	-100°C -150°F
Special Compound High Temperature	300°C 572°F



Performs Well In...

- Engine and transmission oil (mineral oils)
- Diluted salt solution
- Moderate water
- Dry heat
- Ozone, weather resistance

Doesn't Perform Well In...

- Concentrated acids and alkalis
- Steam over 120°C
- Petroleum oils and fuel
- Ketones

Basic O-Ring Elastomers

Styrene-Butadiene Rubber (SBR)

The most widely used synthetic rubber in the world is SBR, a copolymer of styrene and butadiene. SBR also was called Buna S (from the first trade name of Bayer). SBR is used the most commonly in tire manufacturing by blending it with natural and butadiene rubber. SBR is weak and unusable without reinforcement by carbon black, but with carbon black it is strong and abrasion resistant. The defects of SBR are poor resistant to oil and its unsuitability for weather, UV, oxygen, ozone exposure because of the double bond in its polymer backbone.

Cure system - Sulfur-Cured

Standard SBR compounds are sulfur-cured.

Other Common Variations

- SBR is usually mixed with NR and BR and applied in tire productions.
- SBRs are mostly applied seals for non-mineral oil based brake fluid

General Information

ASTM D1418 Designation	SBR
ISO/DIN 1629 Designation	SBR
ASTM D2000 / SAE J 200 Codes	AA,BA
Standard Color(s)	Black
Hardness Range	50 to 70 Shore A
Relative Cost	Low

Service Temperatures

Standard Low Temperature	-55°C -67°F
Standard High Temperature	100°C 212°F



Performs Well In...

- Water
- Alcohol
- Silicone oil and grease
- Non-mineral oil based brake fluid
- Weak acids

Doesn't Perform Well In...

- Petroleum oils and fuels
- Aromatic, aliphatic, or halogenated hydrocarbons
- Strong acids
- Mineral oils