Rubber Material

Natural Rubber (NR)

Nitrile (NBR)

Styrene-butadiene rubber (SBR)

Ethylene Propylene Diene Monomer (EPDM)

Neoprene Rubber (CR)

Silicone (Q)

Viton® (FKM)

Butyl (IIR)

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Natural Rubber (NR)

Natural rubber (Isoprene) is derived from the latex sap of the Pará rubber tree (hevea brasiliensis). Natural rubber has a high tensile strength and is resistant to fatigue from wear, such as chipping, cutting or tearing. ON the downside, natural rubber is only moderately resistant to heat, light and ozone damage. Natural rubber is used in gaskets, seals, shock mounts, hoses and tubing.

Natural rubber has flexibility and strength, as well as impurities and vulnerability to environmental conditions and hydrocarbons. Compared to other rubbers, natural rubber is one of the most flexible types, and it's resistant to water and certain chemicals. It's also resistant to cutting, tearing, wear, fatigue, and abrasion, with a working range between -58 to 212 degrees F. Additionally, it has a lot of tensile strength and adheres easily to other materials.

Natural rubber is used in applications requiring a high level of wear and heat resistance. Thanks to its strength and compressibility, natural rubber is used in engineering applications, like anti-vibration mounts, drive couplings, springs, bearings, rubber bands, and adhesives. But the majority- 50% of natural rubber- is used in high-performance tires for race cars, buses, and aircraft thanks to its strength and heat resistance. It's also used in hoses, automotive parts, foam mattresses, and battery boxes.

However, thanks to its adhesive properties, natural rubber is also found in rubber cement and the soil stabilization materials used around new roads. Even raw rubber is sometimes used for adhesives and as part of shoe soles. Additionally, about 10% of latex harvested from trees is simply reduced down to 60% rubber solution to make products like latex gloves or to use as a coating.

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Physical & Mechanical Properties	
Durometer or Hardness Range:	30 – 95 Shore A
Tensile Strength Range:	500 – 3,500 PSI
Elongation (Range %):	300% – 900%
Abrasion Resistance:	Good to Excellent
Adhesion to Metal:	Excellent
Adhesion to Rigid Materials:	Excellent
Compression Set:	Excellent
Flex Cracking Resistance:	Excellent
Impact Resistance:	Good to Excellent
Resilience / Rebound:	Excellent
Tear Resistance:	Good to Excellent
Vibration Dampening:	Good to Excellent

Thermal Properties	
Low Temperature Range:	-20º F to -70º F
Minimum for Continuous Use (Static):	-60º F
Brittle Point:	-80º F
High Temperature Range:	+180º F to +220º F
Maximum for Continuous Use (Static):	+180º F

Environmental Performance	
Colorability:	Poor
Flame Resistance:	Fair to Good
Gas Permeability:	Fair to Good
Odor:	Good to Excellent
Ozone Resistance:	Poor
Oxidation Resistance:	Good
Radiation Resistance:	Fair to Good
Steam Resistance:	Good
Sunlight Resistance:	Poor to Fair
Taste Retention:	Fair to Good
Weather Resistance:	Poor to Fair
Water Resistance:	Excellent

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Chemical Resistance	
Acids, Dilute:	Fair to Excellent
Acids, Concentrated:	Poor to Good
Acids, Organic (Dilute):	Fair to Good
Acids, Organic (Concentrated):	Good
Acids, Inorganic:	Good
Alcohol's:	Good to Excellent
Aldehydes:	Good
Alkalies, Dilute:	Fair to Excellent
Alkalies, Concentrated:	Fair to Good
Amines:	Poor to Fair
Animal & Vegetable Oils:	Poor to Good
Brake Fluids, Non-Petroleum Based:	Good
Diester Oils:	Poor
Esters, Alkyl Phosphate:	Poor
Esters, Aryl Phosphate:	Poor
Ethers:	Poor
Fuel, Aliphatic Hydrocarbon:	Poor
Fuel, Aromatic Hydrocarbon:	Poor
Fuel, Extended (Oxygenated):	Poor
Halogenated Solvents:	Poor
Hydrocarbon, Halogenated:	Poor
Ketones:	Fair to Good
Lacquer Solvents:	Poor
LP Gases & Fuel Oils:	Poor
Mineral Oils:	Poor
Oil Resistance:	Poor
Petroleum Aromatic:	Poor
Petroleum Non-Aromatic:	Poor
Refrigerant Ammonia:	Good
Refrigerant Halofluorocarbons:	R-12, R-13
Refrigerant Halofluorocarbons w/ Oil:	Poor
Silicone Oil:	Good
Solvent Resistance:	Poor

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Nitrile (NBR)

Nitrile rubber, also known as NBR, Buna-N, and acrylonitrile butadiene rubber, is a synthetic rubber copolymer of acrylonitrile (ACN) and butadiene.

Although its physical and chemical properties vary depending on the polymer's composition of nitrile, this particular type of synthetic rubber is unusual in being generally resistant to oil, fuel, and other chemicals. So, the more nitrile within the polymer, the higher the resistance to oils but the lower the flexibility of the material.

Nitrile is the most widely used elastomer in the seal industry today. It is used in the automotive and aeronautical industry to make fuel and oil handling hoses, seals, grommets, and self-sealing fuel tanks, since ordinary rubbers cannot be used. NBR's ability to withstand a range of temperatures from -40 to 108 °C (-40 to 226 °F) makes it an ideal material for aeronautical applications. Nitrile butadiene is also used to create molded goods, footwear, adhesives, sealants, sponges, expanded foams, and floor mats. The uses of nitrile rubber include disposable non-latex gloves, automotive transmission belts, hoses, O-rings, gaskets, oil seals, V belts, static & dynamic hydraulic seals, synthetic leather, printer's form rollers, and as cable jacketing; NBR latex can also be used in the preparation of adhesives and as a pigment binder.

Typical applications: Aircraft Fuel Systems, Automotive Fuel Systems, Off-Road Equipment & Marine Fuel Systems.

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Physical & Mechanical Properties	
Durometer or Hardness Range	20 – 95 Shore A
Tensile Strength Range	200 – 3,500 PSI
Elongation (Range %)	350% – 650%
Abrasion Resistance	Good to Excellent
Adhesion to Metal	Excellent
Adhesion to Rigid Materials	Good to Excellent
Compression Set	Good to Excellent
Flex Cracking Resistance	Fair to Good
Impact Resistance	Fair to Good
Resilience / Rebound	Good
Tear Resistance	Good to Excellent
Vibration Dampening	Fair to Good

Thermal Properties	
Low Temperature Range	-70º F to 0º F
Minimum for Continuous Use (Static)	-40º F
Brittle Point	-70° F to 0º F
High Temperature Range	+210° F to +250º F
Maximum for Continuous Use (Static)	+250º F

Environmental Performance	
Colorability	Excellent
Flame Resistance	Poor
Gas Permeability	Fair to Excellent
Odor	Good
Ozone Resistance	Fair to Good
Oxidation Resistance	Good
Radiation Resistance	Fair to Good
Steam Resistance	Fair to Good
Sunlight Resistance	Poor to Good
Taste Retention	Fair to Good
Weather Resistance	Fair to Good
Water Resistance	Good to Excellent

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Chemical Resistance	
Acids, Dilute	Good
Acids, Concentrated	Poor to Fair
Acids, Organic (Dilute)	Good
Acids, Organic (Concentrated)	Poor
Acids, Inorganic	Fair to Good
Alcohol's	Fair to Good
Aldehydes	Poor to Fair
Alkalies, Dilute	Good
Alkalies, Concentrated	Poor to Good
Amines	Poor
Animal & Vegetable Oils	Good to Excellent
Brake Fluids, Non-Petroleum Based	Poor
Diester Oils	Fair to Good
Esters, Alkyl Phosphate	Poor
Esters, Aryl Phosphate	Poor to Fair
Ethers	Poor
Fuel, Aliphatic Hydrocarbon	Good to Excellent
Fuel, Aromatic Hydrocarbon	Fair to Good
Fuel, Extended (Oxygenated)	Fair to Good
Halogenated Solvents	Poor
Hydrocarbon, Halogenated	Poor to Fair
Ketones	Poor
Lacquer Solvents	Fair
LP Gases & Fuel Oils	Excellent
Mineral Oils	Excellent
Oil Resistance	Good to Excellent
Petroleum Aromatic	Good
Petroleum Non-Aromatic	Excellent
Refrigerant Ammonia	Good
Refrigerant Halofluorocarbons	R-11, R-12, R-13
Refrigerant Halofluorocarbons w/ Oil	R-11, R-12
Silicone Oil	Good
Solvent Resistance	Good to Excellent

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Styrene-butadiene rubber (SBR)

Styrene-butadiene rubber, or SBR as it is also known, is a general-purpose synthetic rubber that is manufactured from a copolymer of styrene and butadiene. Perhaps the most widely used synthetic rubber in production today, SBR is predominantly used in the manufacture of car tyres and is widely employed as an abrasion-resistant alternative to natural rubber.

Styrene-Butadiene rubber (SBR or Styrene-butadiene) is a synthetic rubber comprising of styrene and butadiene monomers. The random copolymer has characteristics like natural rubber and contains

- Abrasion resistance
- Perfect impact strength
- Good resilience
- High tensile strength

Styrene-butadiene rubber is the highest volume general-purpose synthetic rubber in production for a reason. It is used across a broad range of applications, spanning everything from car tyres, shoe soles and heels, drive couplings, automotive parts and mechanical rubber goods. A large proportion of SBR is also used in latex form as an adhesive.

SBR rubber is frequently employed as a direct replacement for natural rubber. It offers a number of advantages, including excellent abrasion resistance, crack endurance and ageing characteristics. Styrene-butadiene also delivers good compression set resistance and water resistance.

The main disadvantages of SBR are its poor strength without reinforcement (using fillers like carbon black), low resilience, low tear strength and inferior low-temperature properties compared to natural rubber.

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Physical & Mechanical Properties	
Durometer or Hardness Range	30 – 95 Shore A
Tensile Strength Range	500 – 3,000 PSI
Elongation (Range %)	450% – 600%
Abrasion Resistance	Excellent
Adhesion to Metal	Excellent
Adhesion to Rigid Materials	Excellent
Compression Set	Good to Excellent
Flex Cracking Resistance	Good
Impact Resistance	Excellent
Resilience / Rebound	Good
Tear Resistance	Fair to Excellent
Vibration Dampening	Fair to Good

Environmental Performance	
Colorability	Good
Flame Resistance	Poor
Gas Permeability	Fair
Odor	Good
Ozone Resistance	Poor
Oxidation Resistance	Fair to Excellent
Radiation Resistance	Poor to Good
Steam Resistance	Fair to Good
Sunlight Resistance	Poor
Taste Retention	Fair to Good
Weather Resistance	Fair to Good
Water Resistance	Good to Excellent

Thermal Properties	
Low Temperature Range	-60º F to -30º F
Minimum for Continuous Use (Static)	– 60º F
Brittle Point	-80º F
High Temperature Range	+210º F to +250º F
Maximum for Continuous Use (Static)	+225º F

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Chemical Resistance	
Acids, Dilute	Fair to Good
Acids, Concentrated	Poor to Fair
Acids, Organic (Dilute)	Good
Acids, Organic (Concentrated)	Poor to Good
Acids, Inorganic	Fair to Good
Alcohol's	Good
Aldehydes	Poor to Fair
Alkalies, Dilute	Fair to Good
Alkalies, Concentrated	Fair to Good
Amines	Poor to Good
Animal & Vegetable Oils	Poor to Good
Brake Fluids, Non-Petroleum Based	Poor to Good
Diester Oils	Poor
Esters, Alkyl Phosphate	Poor
Esters, Aryl Phosphate	Poor
Ethers	Poor
Fuel, Aliphatic Hydrocarbon	Poor
Fuel, Aromatic Hydrocarbon	Poor
Fuel, Extended (Oxygenated)	Poor
Halogenated Solvents	Poor
Hydrocarbon, Halogenated	Poor
Ketones	Poor to Good
Lacquer Solvents	Poor
LP Gases & Fuel Oils	Poor
Mineral Oils	Poor
Oil Resistance	Poor
Petroleum Aromatic	Poor
Petroleum Non-Aromatic	Poor
Refrigerant Ammonia	Good
Refrigerant Halofluorocarbons	R-12, R-13
Refrigerant Halofluorocarbons w/ Oil	Poor
Silicone Oil	Poor
Solvent Resistance	Poor

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Ethylene Propylene Diene Monomer (EPDM)

Ethylene propylene diene monomer, or EPDM, is a type of synthetic rubber that is commonly used across many industries. Developed in the early 1960s, it is made from ethylene, propylene, and diene monomers and is a very versatile and durable type of rubber with many applications.

EPDM is durable, flexible, and resistant to UV exposure, ozone, aging, weathering, acids, and many other chemicals. It is also one of the most water-resistant rubber materials. This durability makes it a very common choice for many different outdoor applications. Additionally, unlike many other types of rubber, it does not bloom, meaning its color doesn't fade when exposed to the elements. EPDM can last for decades if properly taken care of.

EPDM also has a very wide temperature operating range. It can withstand temperatures as low as -60°F(-51°C), and as high as 350°F(177°C). Unlike many other polymers, it can be exposed to a range of cycling temperatures and will not degrade. EPDM also processes well for injection, compression, or transfer molding.

EPDM is one of the best rubber polymers, but it still has its disadvantages. While it does well in extreme temperatures, it does not possess good flame resistance. It also does not have good resistance to mineral oils or petroleum oils. If exposed to these elements for an extended period, EPDM will deteriorate. It is also difficult to make a strong rubber-to-metal bond with EPDM.

EPDM rubber is known for its excellent resistance to ozone, weather conditions, UV rays, and aging—making it a prime material for outdoor applications. Additionally, EPDM is the most waterproof rubber available.

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Physical & Mechanical Properties	
Durometer or Hardness Range	30 – 90 Shore A
Tensile Strength Range	500 – 2,500 PSI
Elongation (Range %)	100% – 700%
Abrasion Resistance	Good
Adhesion to Metal	Good to Excellent
Adhesion to Rigid Materials	Good to Excellent
Compression Set	Poor to Excellent
Flex Cracking Resistance	Good
Impact Resistance	Very Good
Resilience / Rebound	Fair to Good
Tear Resistance	Fair to Good
Vibration Dampening	Fair to Good

Thermal Properties	
Low Temperature Range	-60º F to -40º F
Minimum for Continuous Use (Static)	-60º F
Brittle Point	-70º F
High Temperature Range	+220º F to +300º F
Maximum for Continuous Use (Static)	+300º F

Environmental Performance	
Colorability	Good to Excellent
Flame Resistance	Poor
Gas Permeability	Fair to Good
Odor	Good
Ozone Resistance	Good to Excellent
Oxidation Resistance	Excellent
Radiation Resistance	Good to Excellent
Steam Resistance	Excellent
Sunlight Resistance	Excellent
Taste Retention	Good to Excellent
Weather Resistance	Excellent
Water Resistance	Excellent

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Chemical Resistance	
Acids, Dilute	Excellent
Acids, Concentrated	Excellent
Acids, Organic (Dilute)	Excellen
Acids, Organic (Concentrated)	Fair to Good
Acids, Inorganic	Excellent
Alcohol's	Good to Excellent
Aldehydes	Good to Excellent
Alkalies, Dilute	Excellent
Alkalies, Concentrated	Excellent
Amines	Fair to Good
Animal & Vegetable Oils Good	
Brake Fluids, Non-Petroleum Based	Good to Excellent
Diester Oils	Poor
Esters, Alkyl Phosphate	Excellent
Esters, Aryl Phosphate	Excellent
Ethers	Fair
Fuel, Aliphatic Hydrocarbon	Poor
Fuel, Aromatic Hydrocarbon	Poor
Fuel, Extended (Oxygenated)	Poor
Halogenated Solvents	Poor
Hydrocarbon, Halogenated	Poor
Ketones	Good to Excellent
Lacquer Solvents	Poor
LP Gases & Fuel Oils	Poor
Mineral Oils	Poor
Oil Resistance	Poor
Petroleum Aromatic	Poor
Petroleum Non-Aromatic	Poor
Refrigerant Ammonia	Good
Refrigerant Halofluorocarbons	R-12, R-13
Refrigerant Halofluorocarbons w/ Oil	Poor
Silicone Oil	Excellent
Solvent Resistance	Poor

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Neoprene Rubber (CR)

Neoprene is a general-purpose synthetic rubber that is not only durable but also waterproof, thermally stable, and chemically resistant. One of the versatile polymer materials that TRP Polymer Solutions work with is neoprene. Neoprene is a synthetic rubber that is suitable for applications that require a general-purpose material that is durable, waterproof, thermally stable, and reasonably resistant to chemicals and corrosive mediums.

neoprene is commonly used to mass-produce reliable gaskets, cable jackets, tubing, O-rings, seals, tire-sidewalls, gasoline hoses, wetsuits, and orthopedic braces.

Advantage

- Good oil resistance
- Excellent ozone and sunlight resistance
- Good tear and abrasion resistance
- Good flame resistance
- Good acid resistance

Disadvantage

- Poor resistance to compression set
- Poor steam resistance
- Poor fuel resistance

Physical & Mechanical Properties	
Durometer or Hardness Range	20 – 95 Shore A
Tensile Strength Range	500 – 3,000 PSI
Elongation (Range %)	100% – 800%
Abrasion Resistance	Very Good to Excellent
Adhesion to Metal	Excellent
Adhesion to Rigid Materials	Good to Excellent
Compression Set	Poor to Good
Flex Cracking Resistance	Good
Impact Resistance	Good to Excellent
Resilience / Rebound	Fair to Good
Tear Resistance	Good to Excellent
Vibration Dampening	Good to Excellent

Thermal Properties	
Low Temperature Range	-70º F to -30º F
Minimum for Continuous Use (Static)	-80º F
Brittle Point	-85º F
High Temperature Range	+200º F to +250º
Maximum for Continuous Use (Static)	+250º F

Environmental Performance	
Colorability	Fair
Flame Resistance	Fair to Good
Gas Permeability	Fair to Good
Odor	Fair to Good
Ozone Resistance	Good to Excellent
Oxidation Resistance	Good to Excellent
Radiation Resistance	Fair to Good
Steam Resistance	Fair to Good
Sunlight Resistance	Good to Excellent
Taste Retention	Fair to Good
Weather Resistance	Fair to Good
Water Resistance	Fair to Good

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Chemical Resistance	
Acids, Dilute	Excellent
Acids, Concentrated	Poor
Acids, Organic (Dilute)	Good to Excellent
Acids, Organic (Concentrated)	Poor to Good
Acids, Inorganic	Good to Excellent
Alcohol's	Excellent
Aldehydes	Poor to Fair
Alkalies, Dilute	Good
Alkalies, Concentrated	Poor
Amines	Poor to Good
Animal & Vegetable Oils	Good
Brake Fluids, Non-Petroleum Based	Fair
Diester Oils	Poor
Esters, Alkyl Phosphate	Poor
Esters, Aryl Phosphate	Poor to Fair
Ethers	Poor
Fuel, Aliphatic Hydrocarbon	Poor to Good
Fuel, Aromatic Hydrocarbon	Poor to Fair
Fuel, Extended (Oxygenated)	Fair
Halogenated Solvents	Poor
Hydrocarbon, Halogenated	Poor
Ketones	Poor to Fair
Lacquer Solvents	Poor
LP Gases & Fuel Oils	Good
Mineral Oils	Fair to Good
Oil Resistance	Fair
Petroleum Aromatic	Good
Petroleum Non-Aromatic	Good
Refrigerant Ammonia	Excellent
Refrigerant Halofluorocarbons	R-11, R-12, R-13, R-21, R-22
Refrigerant Halofluorocarbons w/ Oil	R-11, R-12, R-22
Silicone Oil	Fair to Excellent
Solvent Resistance	Fair

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Silicone (Q)

Silicone rubber is an elastomer (rubber-like material) composed of silicone—itself a polymer—containing silicon together with carbon, hydrogen, and oxygen. Silicone rubbers are widely used in industry, and there are multiple formulations.

Silicone rubber is a durable & highly-resistant elastomer (rubber-like material) composed of silicone (polymer) containing silicon together with other molecules like carbon, hydrogen and oxygen. Its structure always comprises a siloxane backbone (silicon-oxygen chain) and an organic moiety bound to the silicon.

- Heat resistance
- Chemical stability
- Electrical insulation
- Abrasion resistance
- Weatherability as well as Ozone resistance

Advantage

- Excellent high and low temperature properties
- Good flame resistance
- Excellent ozone and sunlight resistance.

Disadvantage

- Poor tear strength & abrasion resistance
- High gas permeability
- Poor resistance to oils and non-polar solvents.

Physical & Mechanical Properties	
Durometer or Hardness Range	20 – 90 Shore A
Tensile Strength Range	200 – 1,500 PSI
Elongation (Range %)	100% – 900%
Abrasion Resistance	Poor to Good
Adhesion to Metal	Good
Adhesion to Rigid Materials	Good
Compression Set	Good to Excellent
Flex Cracking Resistance	Poor to Good
Impact Resistance	Poor to Good
Resilience / Rebound	Good to Excellent
Tear Resistance	Poor to Good
Vibration Dampening	Fair to Good

Thermal Properties	
Low Temperature Range	-178º F to -90º F
Minimum for Continuous Use (Static)	-170º F
Brittle Point	-178º F to -60º F
High Temperature Range	+400º F to +550º F
Maximum for Continuous Use (Static)	+550º F

Environmental Performance	
Colorability	Excellent
Flame Resistance	Fair to Excellent
Gas Permeability	Poor to Fair
Odor	Good
Ozone Resistance	Excellent
Oxidation Resistance	Excellent
Radiation Resistance	Poor to Good
Steam Resistance	Fair to Good
Sunlight Resistance	Excellent
Taste Retention	Good to Excellent
Weather Resistance	Excellent
Water Resistance	Excellent

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Chemical Resistance	
Acids, Dilute	Fair to Good
Acids, Concentrated	Poor to Fair
Acids, Organic (Dilute)	Good
Acids, Organic (Concentrated)	Fair
Acids, Inorganic	Fair to Good
Alcohol's	Fair to Good
Aldehydes	Good
Alkalies, Dilute	Poor to Good
Alkalies, Concentrated	Poor to Excellent
Amines	Good
Animal & Vegetable Oils	Good to Excellent
Brake Fluids, Non-Petroleum Based	Good
Diester Oils	Poor to Fair
Esters, Alkyl Phosphate	Good
Esters, Aryl Phosphate	Good
Ethers	Poor
Fuel, Aliphatic Hydrocarbon	Poor to Fair
Fuel, Aromatic Hydrocarbon	Poor
Fuel, Extended (Oxygenated)	Poor
Halogenated Solvents	Poor
Hydrocarbon, Halogenated	Poor
Ketones	Poor
Lacquer Solvents	Poor
LP Gases & Fuel Oils	Fair
Mineral Oils	Poor
Oil Resistance	Fair
Petroleum Aromatic	Fair
Petroleum Non-Aromatic	Good
Refrigerant Ammonia	Excellent
Refrigerant Halofluorocarbons	Poor
Refrigerant Halofluorocarbons w/ Oil	Poor
Silicone Oil	Poor
Solvent Resistance	Poor

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Viton® (FKM)

Fluorocarbon

Viton® is a specific brand of Fluorocarbon (FKM) and is a registered trademark of The Chemours Company. This synthetic rubber polymer is commonly used in o-ring applications for aircraft engines, automotive fuel handling systems and other applications requiring high temperatures and low compression set.

Viton is a common name for the copolymer of hexafluoropropylene and vinylidene difluoride. The material designation given by the ASTM to this copolymer is FKM.

Viton® is a fluoroelastomer material capable of handling a diverse array of applications. A brand name of DuPont, this durable synthetic rubber and fluoropolymer elastomer offers exceptional temperature stability ranging from -20 degrees Celsius to +205 degrees Celsius. The disadvantages of Viton® are that it can swell in fluorinated solvents, is relatively costly and can fail rapidly if the wrong grade is used. Along with nitrile, it is one of the most common elastomers used for sealing applications, including O-rings, gaskets and seals.

Advantage

- Excellent chemical resistance.
- High density and high-quality feel.
- Wide temperature range (-45°C – 204°C).
- Excellent weatherability and ozone resistance.
- Excellent gas and liquid permeation resistance.
- Suitable for explosive decompression, CIP, SIP and FDA.
- Good mechanical properties, improving sealing performance.
- More resistant to burning than non-fluorinated hydrocarbons.

Application

- Automotive
- Chemical processing
- Oil and gas
- Heavy duty machinery
- Aerospace

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Contact : +91 79 22742580, 22749345, 22730681 Mo.: +91-9227425800 E-mail : info@srp.co.in • Web : www.srp.co.in

Physical & Mechanical Properties	
Durometer or Hardness Range	50 – 95 Shore A
Tensile Strength Range	500 – 2,000 PSI
Elongation (Range %)	400% – 500%
Abrasion Resistance	Fair to Good
Adhesion to Metal	Good to Excellent
Adhesion to Rigid Materials	Fair to Good
Compression Set	Good to Excellent
Flex Cracking Resistance	Fair to Good
Impact Resistance	Good
Resilience / Rebound	Poor to Fair
Tear Resistance	Fair to Good
Vibration Dampening	Fair to Good

Thermal Properties	
Low Temperature Range	-30º F to 0º F
Minimum for Continuous Use (Static)	+10º F to -30º F
Brittle Point	0º F to -40º F
High Temperature Range	+450º F to +500º F
Maximum for Continuous Use (Static)	+500º F

Environmental Performance	
Colorability	Good to Excellent
Flame Resistance	Good to Excellent
Gas Permeability	Good to Excellent
Odor	Good
Ozone Resistance	Excellent
Oxidation Resistance	Excellent
Radiation Resistance	Fair to Good
Steam Resistance	Good to Excellent
Sunlight Resistance	Good to Excellent
Taste Retention	Fair to Good
Weather Resistance	Excellent
Water Resistance	Excellent

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Chemical Resistance	
Acids, Dilute	Good to Excellent
Acids, Concentrated	Good to Excellent
Acids, Organic (Dilute)	Fair to Good
Acids, Organic (Concentrated)	Poor to Good
Acids, Inorganic	Good to Excellent
Alcohol's	Fair to Excellent
Aldehydes	Poor
Alkalies, Dilute	Fair to Good
Alkalies, Concentrated	Poor
Amines	Poor
Animal & Vegetable Oils	Excellent
Brake Fluids, Non-Petroleum Based	Poor to Fair
Diester Oils	Good to Excellent
Esters, Alkyl Phosphate	Poor
Esters, Aryl Phosphate	Excellent
Ethers	Poor
Fuel, Aliphatic Hydrocarbon	Excellent
Fuel, Aromatic Hydrocarbon	Excellent
Fuel, Extended (Oxygenated)	Excellent
Halogenated Solvents	Good to Excellent
Hydrocarbon, Halogenated	Good to Excellent
Ketones	Poor
Lacquer Solvents	Poor
LP Gases & Fuel Oils	Excellent
Mineral Oils	Excellent
Oil Resistance	Excellent
Petroleum Aromatic	Excellent
Petroleum Non-Aromatic	Excellent
Refrigerant Ammonia	Poor
Refrigerant Halofluorocarbons	R-11, R-12, R-13
Refrigerant Halofluorocarbons w/ Oil	R-11, R-12
Silicone Oil	Excellent
Solvent Resistance	Excellent

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Butyl (IIR)

Butyl rubber, sometimes just called "butyl", is a synthetic rubber, a copolymer of isobutylene with isoprene. The abbreviation IIR stands for isobutylene isoprene rubber. Polyisobutylene, also known as "PIB" or polyisobutene , is the homopolymer of isobutylene, or 2-methyl-1-propene, on which butyl rubber is based.

Resistances

- Aging Weather - Good
- Abrasion Resistance: Poor
- Ozone Resistance: Good
- Weather Resistant: Excellent
- Water Resistant: Excellent
- Oil Resistance: Poor
- Chemical Resistant: Good
- Heat Resistant: Good

Applications

- Shock mounts
- Tubeless tire liners
- Inner tubes
- Stoppers
- Sealants and adhesives
- O-rings
- Pond Liners
- Tank Liners

Advantage

- Low gas permeation
- Excellent water resistance
- Good resistance to acids
- Good resistance to bases
- Good damping properties
- Good weather & sunlight resistance.

Disadvantage

Poor oil resistance
Poor fuel resistance

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All type of Rubber

Styrene-butadiene - Styrene-butadiene or styrene-butadiene rubber describe families of synthetic rubbers derived from styrene and butadiene. These materials have good abrasion resistance and good aging stability when protected by additives.

EPDM rubber - EPDM rubber is a type of synthetic rubber that is used in many applications. Dienes used in the manufacture of EPDM rubbers are ethylidene norbornene, dicyclopentadiene, and vinyl norbornene. 4-8% of these monomers are typically used

Nitrile rubber - Nitrile rubber, also known as nitrile butadiene rubber, NBR, Buna-N, and acrylonitrile butadiene rubber, is a synthetic rubber derived from acrylonitrile and butadiene. Trade names include Perbunan, Nipol, Krynac and Europrene. This rubber is unusual in being resistant to oil, fuel, and other chemicals.

Butyl rubber - Butyl rubber, sometimes just called "butyl", is a synthetic rubber, a copolymer of isobutylene with isoprene. The abbreviation IIR stands for isobutylene isoprene rubber. Polyisobutylene, also known as "PIB" or polyisobutene, $_n$, is the homopolymer of isobutylene, or 2-methyl-1-propene, on which butyl rubber is based.

Silicone rubber - Silicone rubber is an elastomer composed of silicone—itself a polymer—containing silicon together with carbon, hydrogen, and oxygen. Silicone rubbers are widely used in industry, and there are multiple formulations.

Neoprene - Neoprene is a family of synthetic rubbers that are produced by polymerization of chloroprene. Neoprene exhibits good chemical stability and maintains flexibility over a wide temperature range.

Silicone - A silicone or polysiloxane is a polymer made up of siloxane. They are typically colorless oils or rubber-like substances. Silicones are used in sealants, adhesives, lubricants, medicine, cooking utensils, thermal insulation, and electrical insulation.

Chloroprene - Chloroprene is the common name for 2-chlorobuta-1,3-diene with the chemical formula CH_2=CCl−CH=CH2. Chloroprene is a colorless volatile liquid, almost exclusively used as a monomer for the production of the polymer polychloroprene, better known as neoprene, a type of synthetic rubber.

Polyisoprene - Polyisoprene is strictly speaking a collective name for polymers that are produced by polymerization of isoprene. In practice polyisoprene is commonly used to refer to synthetic cis-1,4-polyisoprene, made by the industrial polymerisation of isoprene

FKM - FKM is a family of fluorocarbon-based fluoroelastomer materials defined by ASTM International standard D1418, and ISO standard 1629. It is commonly called fluorine rubber or fluoro-rubber. FKM is an abbreviation of Fluorine Kautschuk Material. All FKMs contain vinylidene fluoride as a monomer

Polyurethane rubber - Polyurethanes are a family of plastics, or more specifically, elastomeric polymers, that includes rubber, which, since first invented in 1937, have been adapted to produce a broad spectrum of products. The material is exceptionally versatile, durable, flexible, adaptable, and resilient.

Epichlorohydrin - Epichlorohydrin is an organochlorine compound and an epoxide. Despite its name, it is not a halohydrin. It is a colorless liquid with a pungent, garlic-like odor, moderately soluble in water, but miscible with most polar organic solvents.

Natural rubber (nr) - Natural Rubber (NR) – Natural rubber is derived from the latex of Rubber Tree through a natural process. Natural Rubber has excellent Tensile Strength.

Polyethylene - Polyethylene or polythene is the most commonly produced plastic. It is a polymer, primarily used for packaging. As of 2017, over 100 million tonnes of polyethylene resins are being produced annually, accounting for 34% of the total plastics market.

Fluoroelastomer - A fluoroelastomer is a fluorocarbon-based synthetic rubber. Fluroelastomers generally have wide chemical resistance

Polyacrylic acid - Poly is a polymer with the formula $_{n}$. It is a derivative of acrylic acid. In addition to the homopolymers, a variety of copolymers and crosslinked polymers, and partially deprotonated derivatives thereof are known and of commercial value.

Fluoroelastomer rubber - Fluoroelastomers (FKM/FPM) are fluorinated synthetic polymers designed for harsh environments including aggressive chemical and temperature applications.

Reinforced rubber - Reinforced rubber products are one of the largest groups of composite materials, though rarely referred to as composite materials. Familiar examples are automobile tyres, hoses and conveyor belts.

Perfluoroelastomer rubber - FFKM, or perfluoroelastomer, contains higher amounts of fluorine than standard FKM, and features higher temperature ratings, up to approximately 325°C. FFKM also has improved chemical resistance, with nearly universal chemical compatibility

Hypalon rubber - CHLOROSULPHONATED POLYETHYLENE. More commonly known as Hypalon. This is a special purpose rubber formed by substituting chlorine and sulphonylchloride groups into polyethylene. General properties include moderate mechanical properties; excellent resistance to ozone, oxidation, weathering, and oxidizing chemicals.

The original Hypalon fabric was made by the chemical giant DuPont who patented the material, for many years it was the most popular material for building inflatable boats. Therefore, high-end inflatable boats can no longer be made of Hypalon; these days they are made with a fabric called CSM, a mix of synthetic rubber and neoprene, which is chemically similar to Hypalon.

Hypalon is a trademark for chlorosulfonated polyethylene (CSPE) synthetic rubber (CSM) noted for its resistance to chemicals, temperature extremes, and ultraviolet light. Along with PVC, it is one of the most common materials used to make inflatable boats. Hypalon has become the common name for all kinds of CSM.

Hypalon was popular because of its resilience to heat, UV, and chemicals like gasoline. While it had great properties, it was very expensive. As more consumers chose more cost-effective PVC boats, demand dropped and Hypalon production costs continued to rise until the material was discontinued by DuPont in 2010.

Advantage

- Excellent chemical resistance and stability against UV-rays.
- Expands and flexes with heat, shock and impact.
- Longer life cycle 15-20 yrs.

Disadvantage

- More expensive than PVC (100% to 150% more expensive).
- Will loses air a bit quicker over time due to its structure.

SATYANARAYAN
RUBBER AND PLASTIC INDUSTRIES

Physical & Mechanical Properties						
	Natural	**Nitrile**	**Epdm**	**silicon**	**viton**	**neoprene**
Durometer or Hardness Range	30 – 95 Shore A	20 – 95 Shore A	30 – 90 Shore A	20 – 90 Shore A	50 – 95 Shore A	20 – 95 Shore A
Tensile Strength Range	500 – 3,500 PSI	200 – 3,500 PSI	500 – 2,500 PSI	200 – 1,500 PSI	500 – 2,000 PSI	500 – 3,000 PSI
Elongation (Range %)	300% – 900%	350% – 650%	100% – 700%	100% – 900%	400% – 500%	100% – 800%
Abrasion Resistance	Good to Excellent	Good to Excellent	Good	Poor to Good	Fair to Good	Very Good to Excellent
Adhesion to Metal	Excellent	Excellent	Good to Excellent	Good	Good to Excellent	Excellent
Adhesion to Rigid Materials	Excellent	Good to Excellent	Good to Excellent	Good	Fair to Good	Good to Excellent
Compression Set	Excellent	Good to Excellent	Poor to Excellent	Good to Excellent	Good to Excellent	Poor to Good
Flex Cracking Resistance	Excellent	Fair to Good	Good	Poor to Good	Fair to Good	Good
Impact Resistance	Good to Excellent	Fair to Good	Very Good	Poor to Good	Good	Good to Excellent
Resilience / Rebound	Excellent	Good	Fair to Good	Good to Excellent	Poor to Fair	Fair to Good
Tear Resistance	Good to Excellent	Good to Excellent	Fair to Good	Poor to Good	Fair to Good	Good to Excellent
Vibration Dampening	Good to Excellent	Fair to Good	Fair to Good	Fair to Good	Fair to Good	Good to Excellent
Chemical Resistance						
Acids, Concentrated	Poor to Good	Good	Excellent	Fair to Good	Good to Excellent	Excellent
Acids, Organic (Dilute)	Fair to Good	Poor to Fair	Excellent	Poor to Fair	Good to Excellent	Poor
Acids, Organic (Concentrated)	Good	Good	Excellen	Good	Fair to Good	Good to Excellent
Acids, Inorganic	Good	Poor	Fair to Good	Fair	Poor to Good	Poor to Good
Alcohol's	Good to Excellent	Fair to Good	Excellent	Fair to Good	Good to Excellent	Good to Excellent
Aldehydes	Good	Fair to Good	Good to Excellent	Fair to Good	Fair to Excellent	Excellent
Alkalies, Dilute	Fair to Excellent	Poor to Fair	Good to Excellent	Good	Poor	Poor to Fair
Alkalies, Concentrated	Fair to Good	Good	Excellent	Poor to Good	Fair to Good	Good
Amines	Poor to Fair	Poor to Good	Excellent	Poor to Excellent	Poor	Poor
Animal & Vegetable Oils Good	Poor to Good	Poor	Fair to Good	Good	Poor	Poor to Good
Brake Fluids, Non-Petroleum Based	Good	Good to Excellent		Good to Excellent	Excellent	Good
Diester Oils	Poor	Poor	Good to Excellent	Good	Poor to Fair	Fair
Esters, Alkyl Phosphate	Poor	Fair to Good	Poor	Poor to Fair	Good to Excellent	Poor
Esters, Aryl Phosphate	Poor	Poor	Excellent	Good	Poor	Poor
Ethers	Poor	Poor to Fair	Excellent	Good	Excellent	Poor to Fair
Fuel, Aliphatic Hydrocarbon	Poor	Poor	Fair	Poor	Poor	Poor
Fuel, Aromatic Hydrocarbon	Poor	Good to Excellent	Poor	Poor to Fair	Excellent	Poor to Good
Fuel, Extended (Oxygenated)	Poor	Fair to Good	Poor	Poor	Excellent	Poor to Fair
Halogenated Solvents	Poor	Fair to Good	Poor	Poor	Excellent	Fair
Hydrocarbon, Halogenated	Poor	Poor	Poor	Poor	Good to Excellent	Poor
Ketones	Fair to Good	Poor to Fair	Poor	Poor	Good to Excellent	Poor
Lacquer Solvents	Poor	Poor	Good to Excellent	Poor	Poor	Poor to Fair
LP Gases & Fuel Oils	Poor	Fair	Poor	Poor	Poor	Poor
Mineral Oils	Poor	Excellent	Poor	Fair	Excellent	Good
Oil Resistance	Poor	Excellent	Poor	Poor	Excellent	Fair to Good
Petroleum Aromatic	Poor	Good to Excellent	Poor	Fair	Excellent	Fair
Petroleum Non-Aromatic	Poor	Good	Poor	Fair	Excellent	Good
Refrigerant Ammonia	Good	Excellent	Poor	Good	Excellent	Good
Refrigerant Halofluorocarbons	R-12, R-13	Good	Good	Excellent	Poor	Excellent
Refrigerant Halofluorocarbons w/ Oil	Poor	R-11, R-12, R-13	R-12, R-13	Poor	R-11, R-12, R-13	R-11, R-12, R-13, R-21, R-22
Silicone Oil	Good	R-11, R-12	Poor	Poor	R-11, R-12	R-11, R-12, R-22
Solvent Resistance	Poor	Good	Excellent	Poor	Excellent	Fair to Excellent
Solvent Resistance		Good to Excellent	Poor	Poor	Excellent	Fair
Thermal Properties						
Low Temperature Range	-28° C to -56° C	-56° C to 0° C	-50° C to -40° C	-116° C to -67° C	-34° C to 0° C	-56° C to -34° C
Minimum for Continuous Use (Static)	-50° C	-40° C	-50° C	-112° C	-12° C to -34° C	-62° C
Brittle Point	-80º F	-56° C to 0º C	-56° C	-116° C to -50° C	0° C to -40° C	-65° C
High Temperature Range	80° C to 105° C	100° C to 122° C	105° C to 150° C	204° C to 287° C	232° C to 260° C	93° C to 120° C
Maximum for Continuous Use (Static)	80° C	122° C	150° C	287° C	260° C	120° C
Environmental Performance						
Colorability	Poor	Excellent	Good to Excellent	Excellent	Good to Excellent	Fair
Flame Resistance	Fair to Good	Poor	Poor	Fair to Excellent	Good to Excellent	Fair to Good
Gas Permeability	Fair to Good	Fair to Excellent	Fair to Good	Poor to Fair	Good to Excellent	Fair to Good
Odor	Good to Excellent	Good	Good	Good	Good	Fair to Good
Ozone Resistance	Poor	Fair to Good	Good to Excellent	Excellent	Excellent	Good to Excellent
Oxidation Resistance	Good	Good	Excellent	Excellent	Excellent	Good to Excellent
Radiation Resistance	Fair to Good	Fair to Good	Good to Excellent	Poor to Good	Fair to Good	Fair to Good
Steam Resistance	Good	Fair to Good	Excellent	Fair to Good	Good to Excellent	Fair to Good
Sunlight Resistance	Poor to Fair	Poor to Good	Excellent	Excellent	Good to Excellent	Good to Excellent
Taste Retention	Fair to Good	Fair to Good	Good to Excellent	Good to Excellent	Fair to Good	Fair to Good
Weather Resistance	Poor to Fair	Fair to Good	Excellent	Excellent	Excellent	Fair to Good
Water Resistance	Excellent	Good to Excellent	Excellent	Excellent	Excellent	Fair to Good

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Physical & Mechanical Properties

	Urethane	ECO	HNBR	XNBR	SNR	IIB	VA	FMQC
Durometer or Hardness Range	35 – 95 Shore A	40 – 90 Shore A	30 – 95 Shore A	50 – 90 Shore A	30 – 95 Shore A	40 – 90 Shore A	35 – 95 Shore A	35 – 80 Shore A
Tensile Strength Range	500 – 6,000 PSI	500 – 2,500 PSI	1,500 – 3,500 PSI	1,000 – 3,500 PSI	500 – 3,500 PSI	500 – 3,000 PSI	500 – 3,000 PSI	200 – 1,500 PSI
Elongation (Range %)	250% – 900%	200% – 800%	90% – 550%	250% – 600%	300% – 900%	300% – 850%	200% – 850%	100% – 480%
Abrasion Resistance	Excellent	Fair to Good	Good to Excellent	Excellent	Good to Excellent	Fair to Good	Good to Excellent	Poor
Adhesion to Metal	Excellent	Fair to Good	Excellent	Good to Excellent	Excellent	Good	Good	Good
Adhesion to Rigid Materials	Good	Fair to Excellent	Good to Excellent	Good to Excellent	Excellent	Fair to Good	Good	Fair to Good
Compression Set	Poor to Good	Good to Excellent	Good to Excellent	Fair to Good	Excellent	Fair to Good	Poor to Good	Fair to Good
Flex Cracking Resistance	Fair to Good	Good	Fair to Good	Fair	Excellent	Good to Excellent	Good	Poor to Good
Impact Resistance	Good to Excellent	Fair to Excellent	Excellent	Good to Excellent	Good to Excellent	Good	Good to Very Good	Poor to Good
Resilience / Rebound	Poor to Good	Good	Good	Fair to Good	Excellent	Fair to Good	Poor to Fair	Poor to Fair
Tear Resistance	Good to Excellent	Fair to Excellent	Good to Excellent	Excellent	Good to Excellent	Good	Good to Excellent	Poor to Good
Vibration Dampening	Fair to Good	Good	Fair to Good	Fair to Good	Good to Excellent	Excellent	Good	Good

Thermal Properties

Low Temperature Range	-54° C to -40° C	-51° C to -34° C	-56° C to -35° C	-45° C to -29° C	-29° C to -56° C	-56° C to -40° C	-48° C to -34° C	-65° C to -56° C
Minimum for Continuous Use (Static)	-54° C	-51° C	-40° C	-40° C	-51° C	-51° C	-45° C	-62° C
Brittle Point	-51° C to -63° C	-62° C to -40° C	-56° C to -35° F	-45° C to -29° C	-62° C	-67° C to -45° C	-60° C	-65° C
High Temperature Range	82° C to 104° C	121° C to 135° C	121° C to 148° C	98° C to 121° C	82° C to 104° C	121° C to 148° C	121° C to 176° C	204° C to 230° C
Maximum for Continuous Use (Static)	94° C	135° C	162° C	121° C	82° C	148° C	176° C	230° C

Environmental Performance

Colorability	Good to Excellent	Good	Excellent	Good	Poor	Good	Good	Good to Excellent
Flame Resistance	Poor to Good	Poor to Good	Poor	Poor	Fair to Good	Poor	Poor	Excellent
Gas Permeability	Good to Excellent	Excellent	Fair to Excellent	Fair to Excellent	Fair to Good	Good	Excellent	Poor to Good
Odor	Excellent	Good	Good	Good	Good to Excellent	Good	Good	Good
Ozone Resistance	Excellent	Good to Excellent	Good to Excellent	Fair	Poor	Excellent	Excellent	Excellent
Oxidation Resistance	Good to Excellent	Good to Excellent	Excellent	Good	Good	Excellent	Excellent	Excellent
Radiation Resistance	Good to Excellent	Poor	Fair to Good	Fair to Good	Fair to Good	Poor to Good	Good	Fair to Excellent
Steam Resistance	Poor	Fair to Good	Fair to Good	Fair to Good	Good	Good to Excellent	Poor to Fair	Fair
Sunlight Resistance	Good to Excellent	Good	Good to Excellent	Poor to Good	Poor to Fair	Excellent	Excellent	Excellent
Taste Retention	Fair to Good	Good	Fair to Good	Fair to Good	Fair to Good	Fair to Good	Fair to Good	Good
Weather Resistance	Excellent	Good	Good to Excellent	Fair to Good	Poor to Fair	Excellent	Excellent	Excellent
Water Resistance	Poor to Good	Good	Excellent	Good	Excellent	Good to Excellent	Good to Excellent	Excellent

Chemical Resistance

	Urethane	ECO	HNBR	XNBR	SNR	IIB	VA	FMQC
Acids, Concentrated	Fair to Good	Good	Good	Good	Fair to Excellent	Good	Good	Excellent
Acids, Organic (Dilute)	Poor	Poor to Fair	Fair to Good	Fair to Good	Poor to Good	Poor to Fair	Poor to Fair	Good
Acids, Organic (Concentrated)	Fair	Fair	Good	Good	Fair to Good	Good to Excellent	Good to Excellent	Good
Acids, Inorganic	Poor	Poor	Fair to Good	Poor	Good	Poor to Excellent	Poor to Excellent	Fair
Alcohol's	Poor to Fair	Fair to Good	Fair to Good	Fair to Good	Good	Fair to Good	Fair to Good	Fair
Aldehydes	Good	Fair to Good	Good to Excellent	Fair to Good	Good to Excellent	Good to Excellent	Good to Excellent	Fair to Excellent
Alkalies, Dilute	Poor	Poor	Fair to Good	Poor to Fair	Good	Fair to Good	Fair to Good	Poor
Alkalies, Concentrated	Fair to Good	Poor	Good	Good	Fair to Excellent	Good to Excellent	Good to Excellent	Excellent
Amines	Poor to Good	Fair to Good	Poor to Good	Poor to Good	Fair to Good	Poor	Poor	Good
Animal & Vegetable Oils Good	Poor to Good	Poor to Good	Good	Poor	Poor to Fair	Good	Good	Poor
Brake Fluids, Non-Petroleum Based	Fair to Excellent	Excellent	Good to Excellent	Good to Excellent	Poor to Good	Good	Good	Excellent
Diester Oils	Poor	Poor	Fair	Poor	Good	Poor	Poor	Poor
Esters, Alkyl Phosphate	Poor to Good	Poor to Good	Good	Fair to Good	Poor	Poor	Poor	Good to Excellent
Esters, Aryl Phosphate	Poor	Poor	Poor	Poor	Poor	Poor	Poor	Poor to Fair
Ethers	Poor	Poor	Poor to Fair	Poor to Fair	Poor	Poor	Poor	Good to Excellent
Fuel, Aliphatic Hydrocarbon	Fair	Good	Poor to Fair	Poor	Poor	Poor	Poor	
Fuel, Aromatic Hydrocarbon	Good to Excellent	Good to Excellent	Excellent	Good to Excellent	Poor	Good	Good	Excellent
Fuel, Extended (Oxygenated)	Poor to Fair	Good to Excellent	Fair to Good	Fair to Good	Poor	Poor to Fair	Poor to Fair	Good to Excellent
Halogenated Solvents	Fair to Good	Fair to Good	Good to Excellent	Fair to Good	Poor	Fair	Fair	Excellent
Hydrocarbon, Halogenated	Poor to Good	Poor	Poor to Fair	Poor	Poor	Poor to Good	Poor to Good	Good to Excellent
Ketones	Fair to Good	Excellent	Poor	Poor	Poor	Poor	Poor	Good to Very Good
Lacquer Solvents	Poor	Fair	Poor	Poor	Fair to Good	Poor	Poor	Poor
LP Gases & Fuel Oils	Poor	Fair	Fair	Fair	Poor	Poor	Poor	Poor
Mineral Oils	Fair to Good	Excellent	Excellent	Good to Excellent	Poor	Poor	Poor	Excellent
Oil Resistance	Good to Excellent	Excellent	Good to Excellent	Good to Excellent	Poor	Poor	Poor	Good to Excellent
Petroleum Aromatic	Good	Excellent	Good to Excellent	Good to Excellent	Poor	Poor	Poor	Good
Petroleum Non-Aromatic	Good	Good to Excellent	Good to Excellent	Good	Poor	Poor	Poor	Good
Refrigerant Ammonia	Good	Poor	Good to Excellent	Excellent	Poor	Poor	Poor	Good
Refrigerant Halofluorocarbons	Poor	Poor	Good	Good	Good	Poor to Good	Poor to Good	Excellent
Refrigerant Halofluorocarbons w/ Oil	R-12	R-12	R-11, R-12, R-13	R-11, R-12, R-13	R-12, R-13	Poor to Good	Poor to Good	R-11, R-12
Silicone Oil	R-12	Good to Excellent	R-11, R-12	R-11, R-12	Poor	Poor	Poor	R-11, R-12
Solvent Resistance	Excellent	Good to Excellent	Good to Excellent	Oil Good	Good	Good to Excellent	Good to Excellent	Excellent
Solvent Resistance	Poor	Good to Excellent	Poor	Good	Poor	Poor	Poor	Excellent

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