

COMPARISON CHART FOR NITRILE,  
CARBOXYLATED NITRILE AND HYDROGENATED NITRILE



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NITRILE	CARBOXYLATED NITRILE	HIGHLY SATURATED NITRILE
Nitrile Butadiene Rubber (NBR)	Carboxylated Nitrile Butadiene Rubber (XNBR)	Hydrogenated Nitrile Butadiene Rubber (HNBR) or Highly Saturated Nitrile (HSN)
<b>TEMPERATURE RANGE:</b> (Buna-N) between -40°C and +135°C (Low-temperature) between -65°C and +120°C	<b>TEMPERATURE RANGE:</b> between -54°C and +135°C	<b>TEMPERATURE RANGE:</b> between -26°C and +160°C
<b>KEY USES:</b> <ul style="list-style-type: none"> <li>• Aircraft fuel systems</li> <li>• Automotive fuel systems</li> <li>• Can be used with petroleum oils, water and hydraulic fluids</li> <li>• Low-temperature military uses</li> <li>• Marine fuel systems</li> <li>• Off-road equipment</li> <li>• Oil resistance applications of all types</li> </ul>	<b>KEY USES:</b> <ul style="list-style-type: none"> <li>• Can be used with petroleum oils and water</li> <li>• Hoses</li> <li>• Reciprocating oil seals</li> <li>• Rubber belts</li> <li>• Sealing parts</li> <li>• Special purpose articles in oil well</li> <li>• Dynamic assemblies, such as seals and rod wipers</li> </ul>	<b>KEY USES:</b> <ul style="list-style-type: none"> <li>• All oil resistant applications, including exposure to such oil additives as detergents, anti-oxidants and anti-wear agents</li> <li>• Automotive and Oil industries</li> <li>• Automotive fuel handling systems</li> <li>• Can be used with petroleum oils and water, H<sub>2</sub>S and CO<sub>2</sub></li> <li>• Exposure to oil soured with metal sludge</li> <li>• Seals for oil well applications</li> </ul>
<b>LIMITATIONS:</b> <ul style="list-style-type: none"> <li>• Compounds are attacked by Ozone in small quantities. Phthalate plasticizers, which are used in compounding Nitrile rubber, migrate out and cause issues with some other plastics</li> <li>• Not recommended for exposure to ketones, phosphate esters, H<sub>2</sub>S, ether and chlorinated hydrocarbons</li> <li>• Do not use with brake fluid</li> </ul>	<b>LIMITATIONS:</b> <ul style="list-style-type: none"> <li>• Compounds are attacked by Ozone in small quantities</li> <li>• Not recommended for exposure to phosphate esters, ketones, ozone, weathering and strong acids</li> <li>• Do not use with brake fluid</li> </ul>	<b>LIMITATIONS:</b> <ul style="list-style-type: none"> <li>• Not recommended for exposure to ethers, esters, ketones or chlorinated hydrocarbons</li> <li>• Avoid using with brake fluid</li> </ul>

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CHEMICAL RESISTANCE:		CHEMICAL RESISTANCE:		CHEMICAL RESISTANCE:	
Acids, dilute	Good	Acids, dilute	Good	Acids, dilute	Good
Acids, Organic (dilute)	Good	Acids, Organic (dilute)	Good	Acids, Organic (dilute)	Good
Alcohols	Good	Alcohols	Good	Alcohols	Excellent
Alkalis, dilute	Good	Alkalis, dilute	Good	Alkalis, dilute	Good
Amines	Poor	Amines	Poor	Amines	Good
Ammonia	Good	Ammonia	Poor	Ammonia	Poor
Animal & Vegetable oils	Excellent	Animal & Vegetable oils	Excellent	Animal & Vegetable oils	Excellent
Brake fluids	Poor	Brake fluids	Poor	Biological oils	Good
Diester oils	Good	Diester oils	Good	Brake fluids	Fair
Esters	Poor	Esters	Poor	Diester oils	Good
Ethers	Poor	Ethers	Poor	Esters	Poor
Fuel, Aliphatic Hydrocarbon	Excellent	Fuel, Aliphatic Hydrocarbon	Excellent	Ethers	Poor
Fuel, Aromatic Hydrocarbon	Good	Fuel, Aromatic Hydrocarbon	Good	Fuel, Aliphatic Hydrocarbon	Excellent
Fuels	Excellent	Fuels	Excellent	Fuel, Aromatic Hydrocarbon	Good
Hydraulic fluids	Excellent	Hydraulic fluids	Excellent	Fuels	Excellent
Hydrocarbon	Fair	Hydrocarbon	Poor	Hydraulic fluids	Excellent
Ketones	Poor	Ketones	Poor	Hydrocarbon	Poor
LP Gasses & Fuel oils	Excellent	LP Gasses & Fuel oils	Excellent	Ketones	Poor
Mineral oils	Excellent	Mineral oils	Excellent	LP Gasses & Fuel oils	Excellent
Oil resistance	Excellent	Oil resistance	Excellent	Mineral oils	Excellent
Petroleum based oils & fluids	Excellent	Petroleum based oils & fluids	Excellent	Motor oils	Excellent
Silicone oils & greases	Good	Silicone oils & greases	Good	Oil resistance	Excellent
Solvents	Excellent	Solvents	Good	Ozone	Good
Water	Excellent	Water	Good	Petroleum based oils & fluids	Excellent
				Silicone oils & greases	Excellent
				Solvents	Poor
				Sour Gas	Good
				Water	Excellent

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<p><b>PHYSICAL &amp; WORKING PROPERTIES:</b></p> <table border="0"> <tr><td>Abrasion Resistance</td><td>Excellent</td></tr> <tr><td>Adhesion to Metal</td><td>Excellent</td></tr> <tr><td>Adhesion to Rigid Materials</td><td>Excellent</td></tr> <tr><td>Compression Set</td><td>Excellent</td></tr> <tr><td>Elongation Range</td><td>350% - 650%</td></tr> <tr><td>Flame Resistance</td><td>Poor</td></tr> <tr><td>Flex Cracking Resistance</td><td>Good</td></tr> <tr><td>Gas Permeability</td><td>Good</td></tr> <tr><td>Hardness Range</td><td>20 – 95 Shore A</td></tr> <tr><td>Impact Resistance</td><td>Good</td></tr> <tr><td>Oxidation Resistance</td><td>Good</td></tr> <tr><td>Ozone Resistance</td><td>Fair</td></tr> <tr><td>Radiation Resistance</td><td>Good</td></tr> <tr><td>Resilience</td><td>Good</td></tr> <tr><td>Steam Resistance</td><td>Good</td></tr> <tr><td>Tear Resistance</td><td>Excellent</td></tr> <tr><td>Tensile Strength Range</td><td>200 – 3,500 PSI</td></tr> <tr><td>Water Resistance</td><td>Excellent</td></tr> <tr><td>Weather Resistance</td><td>Good</td></tr> </table>	Abrasion Resistance	Excellent	Adhesion to Metal	Excellent	Adhesion to Rigid Materials	Excellent	Compression Set	Excellent	Elongation Range	350% - 650%	Flame Resistance	Poor	Flex Cracking Resistance	Good	Gas Permeability	Good	Hardness Range	20 – 95 Shore A	Impact Resistance	Good	Oxidation Resistance	Good	Ozone Resistance	Fair	Radiation Resistance	Good	Resilience	Good	Steam Resistance	Good	Tear Resistance	Excellent	Tensile Strength Range	200 – 3,500 PSI	Water Resistance	Excellent	Weather Resistance	Good	<p><b>PHYSICAL &amp; WORKING PROPERTIES:</b></p> <table border="0"> <tr><td>Abrasion Resistance</td><td>Excellent</td></tr> <tr><td>Adhesion to Metal</td><td>Excellent</td></tr> <tr><td>Adhesion to Rigid Materials</td><td>Excellent</td></tr> <tr><td>Compression Set</td><td>Good</td></tr> <tr><td>Elongation Range</td><td>250% - 600%</td></tr> <tr><td>Flame Resistance</td><td>Poor</td></tr> <tr><td>Flex Cracking Resistance</td><td>Fair</td></tr> <tr><td>Gas Permeability</td><td>Good</td></tr> <tr><td>Hardness Range</td><td>50 – 90 Shore A</td></tr> <tr><td>Impact Resistance</td><td>Excellent</td></tr> <tr><td>Oxidation Resistance</td><td>Good</td></tr> <tr><td>Ozone Resistance</td><td>Fair</td></tr> <tr><td>Radiation Resistance</td><td>Good</td></tr> <tr><td>Resilience</td><td>Good</td></tr> <tr><td>Steam Resistance</td><td>Good</td></tr> <tr><td>Tear Resistance</td><td>Excellent</td></tr> <tr><td>Tensile Strength Range</td><td>1,000 – 3,500 PSI</td></tr> <tr><td>Water Resistance</td><td>Good</td></tr> <tr><td>Weather Resistance</td><td>Fair</td></tr> </table>	Abrasion Resistance	Excellent	Adhesion to Metal	Excellent	Adhesion to Rigid Materials	Excellent	Compression Set	Good	Elongation Range	250% - 600%	Flame Resistance	Poor	Flex Cracking Resistance	Fair	Gas Permeability	Good	Hardness Range	50 – 90 Shore A	Impact Resistance	Excellent	Oxidation Resistance	Good	Ozone Resistance	Fair	Radiation Resistance	Good	Resilience	Good	Steam Resistance	Good	Tear Resistance	Excellent	Tensile Strength Range	1,000 – 3,500 PSI	Water Resistance	Good	Weather Resistance	Fair	<p><b>PHYSICAL &amp; WORKING PROPERTIES:</b></p> <table border="0"> <tr><td>Abrasion Resistance</td><td>Excellent</td></tr> <tr><td>Adhesion to Metal</td><td>Excellent</td></tr> <tr><td>Adhesion to Rigid Materials</td><td>Excellent</td></tr> <tr><td>Compression Set</td><td>Excellent</td></tr> <tr><td>Elongation Range</td><td>90% - 550%</td></tr> <tr><td>Flame Resistance</td><td>Poor</td></tr> <tr><td>Flex Cracking Resistance</td><td>Good</td></tr> <tr><td>Gas Permeability</td><td>Good</td></tr> <tr><td>Hardness Range</td><td>30 – 95 Shore A</td></tr> <tr><td>Impact Resistance</td><td>Excellent</td></tr> <tr><td>Oxidation Resistance</td><td>Excellent</td></tr> <tr><td>Ozone Resistance</td><td>Excellent</td></tr> <tr><td>Radiation Resistance</td><td>Good</td></tr> <tr><td>Resilience</td><td>Good</td></tr> <tr><td>Steam Resistance</td><td>Good</td></tr> <tr><td>Tear Resistance</td><td>Excellent</td></tr> <tr><td>Tensile Strength Range</td><td>1,500 – 3,500 PSI</td></tr> <tr><td>Water Resistance</td><td>Excellent</td></tr> <tr><td>Weather Resistance</td><td>Excellent</td></tr> </table>	Abrasion Resistance	Excellent	Adhesion to Metal	Excellent	Adhesion to Rigid Materials	Excellent	Compression Set	Excellent	Elongation Range	90% - 550%	Flame Resistance	Poor	Flex Cracking Resistance	Good	Gas Permeability	Good	Hardness Range	30 – 95 Shore A	Impact Resistance	Excellent	Oxidation Resistance	Excellent	Ozone Resistance	Excellent	Radiation Resistance	Good	Resilience	Good	Steam Resistance	Good	Tear Resistance	Excellent	Tensile Strength Range	1,500 – 3,500 PSI	Water Resistance	Excellent	Weather Resistance	Excellent
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<p><b>ADDITIONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>• Economical elastomer, very popular and extensively used</li> <li>• Presents a great balance of desirable qualities</li> <li>• Medium Nitrile compound with Nitrile (ACN) content of approximately 32%, most popular and broadly used</li> </ul>	<p><b>ADDITIONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>• Nitrile with a Carboxyl added to the formulation</li> <li>• Use of Carboxylated Nitrile elastomer can have improved abrasion resistance, while still retaining improved oil resistance</li> <li>• XNBR compounds present good physical qualities at high temperatures and a high tensile strength</li> </ul>	<p><b>ADDITIONAL INFORMATION:</b></p> <ul style="list-style-type: none"> <li>• Hydrogenated Nitrile is an outcome of the hydrogenation of Nitrile, effecting in fluctuating quantities of saturation of the polymeric sequence, together with a span of extended physical strength and chemical resistance characteristics</li> <li>• Also known as Saturated Nitrile, which is acquired by initiating Hydrogen into the Nitrile in</li> </ul>																																																																																																																		

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<ul style="list-style-type: none"><li>• High Nitrile compound with Nitrile (ACN) content of approximately 50%, commonly recommended for use with Hydrocarbon fuels</li><li>• Low Nitrile compound with Nitrile (ACN) content of approximately 18%, mostly defined for use in low-temperature applications</li><li>• Industries served: Water, Pump &amp; Gas, Agriculture, Food &amp; Drink, Rail, Automotive, and Bus, Truck and Trailer</li><li>•</li></ul>	<ul style="list-style-type: none"><li>• Industries Served: Water, Gas, Agriculture, Automotive, and Bus, Truck and Trailer</li></ul>	<p>order to saturate the hydrocarbon sequences in the elastomer</p> <ul style="list-style-type: none"><li>• HNBR presents improved wear and extrusion resistance than Nitrile and has a good chemical compatibility</li><li>• Enhanced resistance to heat, ageing and ozone, which makes it ideal for mechanical applications</li><li>• Properties in Hydrogenated Nitrile elastomers makes them ideas for industries that use oil resistant and high-powered applications</li><li>• Industries served: Petrochemical, Offshore Drilling, Agriculture, Earth Moving and Construction, and Automotive</li></ul>
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