



GLOBAL O-RING AND SEAL, LLC

Compound N90

Nitrile Rubber (NBR)

Material Description

Nitrile rubber, also known as NBR or Buna N, is one of the most commonly used sealing elastomers due to 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

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 more difficult to process.

Other Common Variations

- 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 UL 157.
- 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	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	135°C (275°F)

PERFORMS WELL IN:

- Petroleum based oils and fuels
- Aliphatic hydrocarbons
- Vegetable oils
- Silicone oils and 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 fluids
- Strong acids
- Ozone/weathering/sunlight

TEST REPORT FOR COMPOUND N90

MATERIAL: BUTADIENE ACRYLONITRILE COPOLYMER

DUROMETER: 90

COLOR: BLACK

ASTM* D2000 M7BG910 B14 EO14 EO34 EF11 EF21 EA14 Z1

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SECTION OF SPEC.	PROPERTIES	REQUIREMENTS	RESULTS	ASTM TEST METHOD
	ORIGINAL PHYSICAL PROPERTIES			
	Hardness, Shore A	90±5	87	D2240-05
	Tensile Strength, psi (MPa)	1450 (min.)	2499 (17.23)	D412-06a
	Elongation, percent	100 (min.)	133	D412-06a
	Modulus at 100%, psi (MPa)		1990 (13.72)	D412-06a
	Specific Gravity (g/cm ³)		1.381	
B14	COMPRESSION SET 22 hours at 100°C (212°F), percent	25 (button) (max.)	7.8	D395-04, Method B
EA14	WATER RESISTANCE 70 hours at 100°C (212°F)			
	Hardness Change, points	±10	-2	D471-06
	Tensile Strength Change, percent		+5	
	Elongation Change, percent		-11	
	Volume Change, percent	±15	+3.3	
EF11	FUEL A RESISTANCE 70 hours at 23°C (73.4°F)			
	Hardness Change, points	±10	-3	D471-06
	Tensile Strength Change, percent	-25 (max.)	0	
	Elongation Change, percent	-25 (max.)	-5	
	Volume Change, percent	-5 to +10	+1.8	
EF21	FUEL B RESISTANCE 70 hours at 23°C (73.4°F)			
	Hardness Change, points	0 to -30	-14	D471-06
	Tensile Strength Change, percent	-60 (max.)	-28	
	Elongation Change, percent	-60 (max.)	-30	
	Volume Change, percent	0 to +40	+18.7	
EO14	NO. 1 OIL 70 hours at 100°C (212°F)			
	Hardness Change, points	-5 to +5	+3	D471-06
	Tensile Strength Change, percent	-25 (max.)	-2	
	Elongation Change, percent	-45 (max.)	-17	
	Volume Change, percent	-10 to +5	-2.8	
EO34	NO. 3 OIL 70 hours at 100°C (212°F)			
	Hardness Change, points	-10 to +5	-5	D471-06
	Tensile Strength Change, percent	-45 (max.)	-3	
	Elongation Change, percent	-45 (max.)	-16	
	Volume Change, percent	0 to +25	+6.0	

*American Society for Testing and Materials



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