



GLOBAL O-RING AND SEAL, LLC

Compound N50

Nitrile Rubber (NBR)

Material Description

Nitrile rubber (NBR), also known as 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 vary from 18% to 50%. Lower ACN content gives better low-temperature properties but inferior resistance to fuels and polar lubricants. Higher ACN content gives lesser quality 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 often are 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

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| TEST REPORT FOR COMPOUND N50 MATERIAL: BUTADIENE ACRYLONITRILE COPOLYMER DUROMETER: 50 COLOR: BLACK ASTM* D2000 M2BG510 A14 B14 EA14 EF11 F17 | | | | |
|--|--|--------------------|--------------|--------------------|
| SECTION OF | PROPERTIES | REQUIREMENTS | RESULTS | ASTM TEST |
| | ORIGINAL PHYSICAL PROPERTIES | | | |
| | Hardness, Shore A | 50±5 | 48 | D2240-05 |
| | Tensile Strength, psi (MPa) | 1450 (min.) | 1688 (11.64) | D412-06a |
| | Elongation, percent | 300 (min.) | 384 | D412-06a |
| | Modulus at 100%, psi (MPa) | | 230 (1.59) | D412-06a |
| | Specific Gravity (g/cm ³) | | 1.256 | |
| | HEAT AGE | | | |
| | 70 hours at 100°C (212°F) | | | |
| A14 | Hardness Change, points | ±15 | +6 | D573-04 |
| | Tensile Strength Change, percent | ±30 | -5 | |
| | Elongation Change, percent | -50 (max.) | -30 | |
| | Weight Change, percent | | -1.9 | |
| | COMPRESSION SET | | | |
| B14 | 22 hours at 100°C (212°F), percent | 25 (button) (max.) | 10.4 | D395-03, Method B |
| | WATER RESISTANCE | | | |
| | 70 hours at 100°C (212°F) | | | |
| EA14 | Hardness Change, points | ±10 | -1 | D471-06 |
| | Tensile Strength Change, percent | | -2 | |
| | Elongation Change, percent | | -17 | |
| | Volume Change, percent | ±15 | +7.9 | |
| | FUEL A RESISTANCE | | | |
| | 70 hours at 23°C (73.4°F) | | | |
| EF11 | Hardness Change, points | ±10 | +2 | D471-06 |
| | Tensile Strength Change, percent | -25 (max.) | -11 | |
| | Elongation Change, percent | -25 (max.) | -14 | |
| | Volume Change, percent | -5 to +10 | -2.0 | |
| | LOW-TEMPERATURE BRITTLNESS POINT | | | |
| | 3 minutes at -40°C (-40°F) | | | |
| F17 | Sample type: T-50 | | | D2137-05, Method A |
| | Coolant: Methanol | | | |
| | Brittleness temperature to nearest 1°C (1°F) | No crack | Pass | |

*American Society for Testing and Materials



www.GlobalORing.com • info@GlobalORing.com
 4250 N. Sam Houston Parkway E, Suite 100, Houston, TX 77032
 Phone: 832-448-5550 / 877-448-5550 Fax: 832-448-5551 / 877-448-5551