Compound HNBR90

Hydrogenated Nitrile Rubber (HNBR)

Material Description

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

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

Acrylonitrile Content

Just like 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 lesser resistance to fuels and polar lubricants. Higher ACN content gives inferior 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 but can also be sulfur-cured to improve flexible properties in dynamic systems. However, sulfur-curing will reduce the heat resistance and cause an inferior compression set.

Other Common Variations

- HNBRs often are 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 usually are used in automotive air conditioning systems where R134a refrigerant gas or new refrigerant for environment protection like R401a, R404a, R410a, R507 and R744 is used.
- HNBRs also are used in automotive shaft systems because of their excellent abrasion resistance.
- Special compounds of HNBR can be available for use in deeper oil wells where there is a need for material resistance to heat, crude oil, hydrogen sulfide, steam, explosive decompression, etc.

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

DOESN’T PERFORM WELL IN:
• Chlorinated hydrocarbons
• Ketones
• Ethers
• Esters
• Strong Acids

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HNBR90

TEST REPORT FOR COMPOUND HNBR90

MATERIAL: HNBR
DUROMETER: 90
COLOR: BLACK
ASTM* D2000 M4DH910 A26 B16 B36 EO16 EO36 F17 Z1

SECTION OF SPEC.	PROPERTIES	REQUIREMENTS	RESULTS	ASTM TEST
	ORIGINAL PHYSICAL PROPERTIES			
	Hardness, Shore A	90±5	89	D2240-05
	Tensile Strength, psi (MPa)	1450 (min.)	3342 (23.05)	D412-06a
	Elongation, percent	100 (min.)	171	D412-06a
	Modulus at 100%, psi (MPa)		2024 (13.96)	D412-06a
	Specific Gravity (g/cm³)		1.29	
A26	**HEAT AGE**			D573-04
	70 hours at 150°C (302°F)			
	Hardness Change, points	+10 (max.)	+7	
	Tensile Strength Change, percent	-25 (max.)	+8	
	Elongation Change, percent	-25 (max.)	-24	
	Weight Change, percent		-3.8	
B16	**COMPRESSION SET**			D395-03, Method B
	22 hours at 150°C (302°F), percent	30 (button) (max.)	15.1	
B36	**COMPRESSION SET**			D395-03, Method B
	22 hours at 150°C (302°F), percent	35 (plied) (max.)	29.9	
EO16	**IRM 901 OIL**			D471-06
	70 hours at 150°C (302°F)			
	Hardness Change, points	-5 to +10	+3	
	Tensile Strength Change, percent	-20 (max.)	+2	
	Elongation Change, percent	-30 (max.)	-11	
	Volume Change, percent	-10 to +5	-2.8	
EO36	**IRM 903 OIL**			D471-06
	70 hours at 150°C (302°F)			
	Hardness Change, points	-15 (max.)	-4	
	Tensile Strength Change, percent	-40 (max.)	-6	
	Elongation Change, percent	-30 (max.)	-10	
	Volume Change, percent	+25 (max.)	+7.8	
F17	**LOW-TEMPERATURE BRITTLENESS POINT**			D2137-05, Method A
	3 minutes at -40°C (-40°F)			
	Sample type: T-50			
	Coolant : Methanol			
	Brittleness temperature to nearest 1°C (1°F)	No crack	Pass	

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