

NBR RUBBER ITS CLASSIFICATION AND SELECTION CRITERIA

ACRYLONITRILE BUTADIENE RUBBER POPULARY KNOWN AS NITRILE RUBBER Plays an vital role in the Rubber industry in designing several important products having usages in wide range of industries including Automotive, Industrial, Consumer, Textile, Aerospace, construction & Machinery industry, Food & Processing Industry.

Generally Nitrile Rubber (NBR) is classified into Three Categories based on the Acrylo Nitrile content (ACN Content)

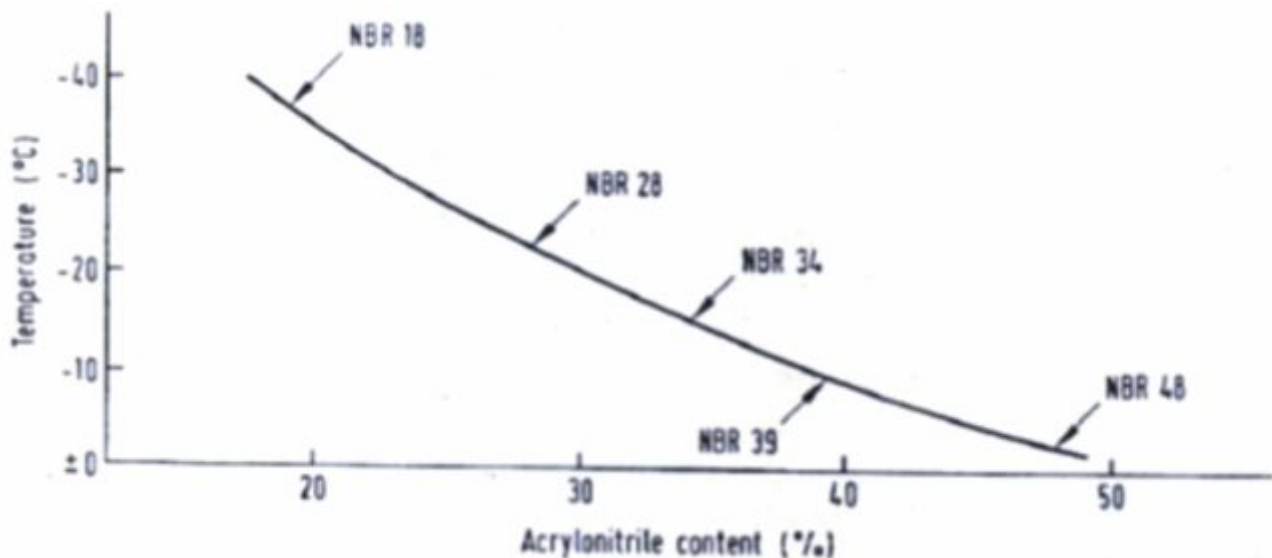
**LOW ACN CONTENT
LOW NITRILE**

**MEDIUM ACN CONTENT
MEDIUM NITRILE**

**HIGH ACN CONTENT
HIGH NITRILE**

Later in Modern days, with the addition of Very low ACN content NBR rubber and Ultra High ACN content NBR Rubber is also added in this Category.

Nitrile Rubber Properties depends on the Acrylonitrile content and with the increase in the CAN content, its Tg – Glass transition temperature is also increased which will also increase the Brittleness temperature of the Nitrile Rubber.



Influence of the acrylonitrile content on the glass transition temp. of Nitrile Rubber.

INFLUENCE ON THE EFFECT OF ACN/BUTADIENE RATIO IN NITRILE RUBBER PROPERTIES



WITH INCREASING ACN CONTENT, THE FOLLOWING PROPERTIES INCREASES

- Processability
- Rate Of Vulcanisation
- Oil Resistance, Fuel & Grease Resistance
- Permanent Set(ie. Higher Compression Set)
- Density
- Hysteresis Loss
- Compatibility With Other Polar Polymers Viz. Pvc, Phenolic Resin.
- Physical Properties Tensile Strength, Modulus, Hardness

With Increasing ACN content , the following property decreases

- Low Temperature Flexibility
- Resilience
- Gas Permeability

NBR RUBBER IS DESIGNATED BY THE FOLLOWING LETTERS IN THE SAE J200 / ASTM D 2000 LINE CALL OUT's in the specification as:

NITRILE RUBBER

BF , BG, BK, CH

OVERALL CHARACTERISTICS OF A PROPERLY COMPOUNDED NBR RUBBER TYPES & ITS EXPECTED PROPERTIES

CHARACTERISITCS	NITRILE RUBBER WITH		
	LOW A.C.N. CONTENT	MEDIUM A.C.N. CONTENT	HIGH A.C.N. CONTENT
Glass Transition Temp. Tg °C	-45	-34	-20
Low Temperature, TR, °C	-28	-20	-10
Compression Set, @ -20°C	40%	45%	45%
Compression Set, @ RT	8%	8%	8%
Compression Set, @ 120°C	45%	50%	55%
Heat Resistance Temp., After 5 hr.	170°C	180°C	190°C
Heat Resistance Temp., After 70 hr.	140°C	145°C	150°C
Heat Resistance Temp. After 1000 hr.	110°C	115°C	120°C
Working Temperature, in °C	125	125	125
Swelling in ASTM OIL#3, For 70 Hr. @ 100°C	25%	10%	5%
Swelling in Fuel C, for 70 hr. @ RT	45%	35%	25%

SOME OF THE END PRODUCTS OF THE VERSATILE APPLICATIONS OF NITRILE RUBBER

SELECTION CHART OF NITRILE RUBBERS
Perbunan®

Product range and typical properties							
Product	Acrylonitrile content (%)	Mooney viscosity ⁽¹⁾ ML (1+4) 100°C	Density (g/cm ³)	Stabilizer	Physical form	Standard packaging	Remarks
Standard grades							
Perbunan® 2255 VP*	22.0	55	0.97				
Perbunan® 2845 F	28.0	45	0.96			25 kg bales polyethylene wrapped	good elasticity and low temperature flexibility
Perbunan® 2870 F	28.0	70	0.96			on non-returnable	good elasticity and low temperature flexibility, high viscosity and good compression set behavior
Perbunan® 2895 F	28.0	95	0.96			box pallets, contents: 1050 kg or 900 kg	for a favorable compromise between oil and fuel resistance and low temperature flexibility
Perbunan® 28120 F	28.0	120	0.96	non-staining	bales		for optimal oil and fuel resistance
Perbunan® 3430 F	34.0	32	0.97				
Perbunan® 3445 F	34.0	45	0.97				
Perbunan® 3470 F	34.0	70	0.97				
Perbunan® 3945 F	39.0	45	0.99				
Perbunan® 3965 F	39.0	65	0.99				
CHM standard grades (CHM = Clean-High-Modulus, all CHM-grades are designed for low mold fouling processing)							
Perbunan® 1846 F	18.0	45	0.93				
Perbunan® 2831 F	28.6	30	0.96			25 kg bales polyethylene wrapped	optimal low temperature flexibility, optimal compression set behavior
Perbunan® 2846 F	28.6	42	0.96			on non-returnable	good elasticity and low temperature flexibility
Perbunan® 3431 VP*	34.7	29	0.97	non-staining	bales	box pallets, contents: 1050 kg or 900 kg	for a favorable compromise between oil and fuel resistance and low temperature flexibility
Perbunan® 3446 F	34.7	42	0.97				
Perbunan® 3481 F	34.7	78	0.97				
Perbunan® 4456 F	44.0	55	1.01				for optimal oil and fuel resistance

⁽¹⁾ unmassed (ISO 289)

* Trial product (VP=Versuchsprodukt), please see page 30.

SELECTION CHART OF NITRILE RUBBERS
Krynac®

Product range and typical properties							
Product	Acrylonitrile content (%)	Mooney viscosity ⁽¹⁾ ML (1+4) 100°C	Density (g/cm ³)	Stabilizer	Physical form	Standard packaging	Remarks
Krynac® 2645 F	26.0	45	0.96				
Krynac® 2840 F	28.0	40	0.97				
Krynac® 2865 F	28.0	65	0.97				
Krynac® 3330 F	33.0	30	0.97				
Krynac® 3345 F	33.0	45	0.97				
Krynac® 3370 F	33.0	70	0.97				
Krynac® 33110 F	33.0	110	0.97	non staining	bales	25 kg bales on pallets, contents: 900 kg or 1050 kg compounds	
Krynac® 3950 F	39.0	50	0.99				
Krynac® 4450 F	43.5	50	1.00				best fuel resistance
Krynac® 4975 F	48.5	75	1.01				
Krynac® M 3340 VP* (oil-extended, 52 phr Mesamoll®)	22.0	34 (base polymer 34%)	0.98				for low hardness compounds

PLEASE NOTE: * PERBUNAN & KRYNAC are the brand name of Nitrile Rubber & manufactured by our principal M/s.Lanxess

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