

### TYPE

Non-self curing resin, phenol novolac

### FORM OF DELIVERY (f.o.d.)

Pastilles

### USES

Reinforcing rubber  
Powder Coating  
Spirit lacquers, petrol-resistant coatings, varnishes

### PRODUCT DATA

The data are determined by our quality control for each batch (lot) before release.

#### Determined per batch:

#### Colour / Appearance

colour yellow-brown

#### HPLC PM 279

content [%] <= 0.3  
(content of free phenol)

#### Softening Point

Softening point Mettler [°C] 108 - 120  
Index  
ASTM D 6090  
(85°C; 2.5°C/min; 19 mm; 50%)

### SOLUBILITY

Soluble in the commonly used alcohols, glycol ethers, esters and ketones. Insoluble in aliphatic and aromatic hydro-carbons.

### PROPERTIES AND USES

#### Rubber

ALNOVOL PN 320 is suitable for reinforcing natural rubber, styrene-butadiene rubber and nitrile rubber. ALNOVOL PN 320 is odourless and an environmental friendly product due to its very low content of free phenol. The resin is absorbed by the rubbermix rapidly and gives a strong plasticizing effect.

#### Paint

ALNOVOL PN 320 dries by solvent evaporation. It is commonly applied as a solution in ethanol. Solution of ALNOVOL PN 320 dry very rapidly to hard coatings with good resistance to water, weak acids and also petrol, mineral oils and tar. Coatings are weakly yellowish and possess moderate. The addition of small amounts of plasticizing components such as suitable alkyd resins or polyvinyl butyral has proved to be an effective way of modifying.

#### Spirit varnishes

ALNOVOL PN 320 serves as a binder for fast-drying spirit varnishes. Such varnishes are used, for instance, in iron foundries for coating moulds and for coating toys and other consumer goods. Other fields of application are brewery enamels for vats and barrels and French polish.

#### Coatings with resistance to petrol and mineral oils

ALNOVOL PN 320 is combined with the PHENODUR® PR 373 or PR 263 and, if necessary, plasticized by alkyd resins and/or polyvinyl butyral usable for the manufacture of coatings which dry by solvent evaporation. Such coatings are resistant to petrol and mineral oils and used for protecting the interior of tanks, storage containers, pipe systems and machine housings.

#### Powder coatings

In combination with type 2 or 3 epoxy resins ALNOVOL PN 320 powder coatings with improved heat and chemical resistance as well as high gloss are feasible. Calculation on OH-equivalent not possible, ratio approx. 60 : 40 (epoxy : PN 320) weight by weight.

### PROCESSING

#### Rubber

ALNOVOL PN 320 should be dosed at level of 10 to 20 pts by wt to 100 pts by wt rubber. Higher additions are possible. For curing hexamethylenetetramine or another methylene donors such as CYREZ® 963 or 964 LF, are required. For proper curing a resin to hardener ratio of 7 : 3 in the case of CYREZ resin is recommended. In case of hexamethylenetetramine a ratio of 9 : 1 works best. The resin can be incorporated into the rubber together with fillers, antioxidants, zinc oxide and stearic acid in the first mixing stage. For better dispersion the temperature should be raised of more than 120°C. The hardener should be added together with the vulcanizing system in the second mixing stage. The reinforced vulcanizate has a higher modulus, increased hardness and better resistance to tear propagation.

#### Paint

ALNOVOL PN 320 is dissolved at normal temperature in alcohols or mixtures of alcohols, ketones, esters and glycol ethers and, if necessary, mixed with solutions of the modifying resins mentioned above.

### STORAGE

At temperatures up to 25°C storage stability packed in original containers amounts standard to 365 days.

The expiration date may be extended and COA updated after QC testing of retained samples, only for material in allnex possession.

### DISTINGUISHING FEATURES

#### Paint

The use of ALNOVOL PN 320 results to a lighter colour. ALNOVOL® PN 430 coatings are harder and possess better water resistance and stability to ageing than coatings produced with ALNOVOL PN 320.

**TYPICAL COMPOUNDS**

**Natural rubber compound**

Typical formulation	Pts by wt	Pts by wt
Natural rubber (RSS)	100,0	100,0
HAF carbon black	80,0	80,0
Stearic acid	1,5	1,5
Zinc oxide RS	5,0	5,0
Antioxidants	2,0	2,0
ALNOVOL PN 320	-	9,0
Hexamethylenetetramine	-	1,0
Sulphur	2,5	2,5
Benzothiazyl-2-cyclohexylsulfenamide	0,9	0,9
Tetramethylthiurammonosulfide	0,3	0,3

**Test values before vulcanization**

	Unit	Value	Value
Mooney L 1 + 4 (100 °C)	[ME]	69	71

**Test values after vulcanization (20 min.at 145°C)**

Tensile strength	[Mpa]	18	17
Elongation at break	[%]	171	178
Modulus at 10% elongation	[Mpa]	1,7	3,1
Modulus at 50% elongation	[Mpa]	4,6	5,6
Modulus at 100% elongation	[Mpa]	9,9	10,3
Hardness (Shore A)	[°]	80	90
Resilience	[%]	35	34