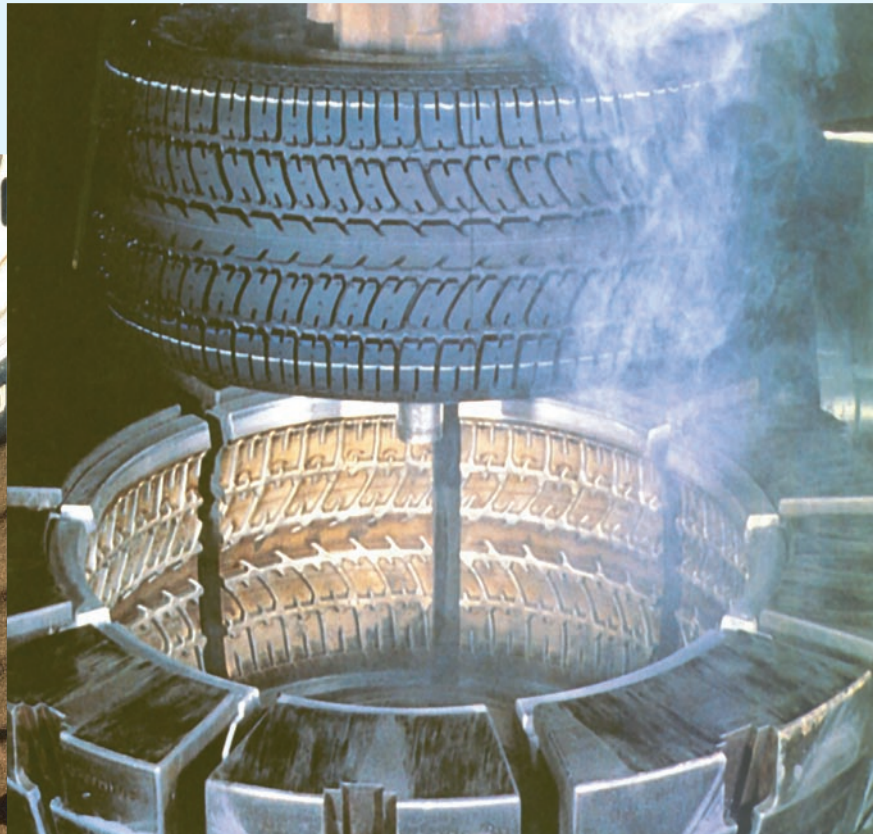


CYTEC



Resins for the Rubber Industry

Product Guide
Asia Pacific

Resins for the Rubber Industry

Cytec offers an industry-leading line of environmentally-friendly coating resins and additives to customers worldwide. Cytec also serves customers with a broad range of technical resins, which includes two co-reactant chemical additives, designed specifically for the needs of the tire manufacturing industry: **CYREZ™ rubber reinforcing resins** and **ALNOVOL™ phenolic resins**.

ALNOVOL™ Phenolic Resins for Tire Compounding

Cytec has deep expertise in phenolic resins - with experience that extends to the development of phenolic chemistry in the 1950's and the subsequent production of a well-rounded and widely respected line of modified and unmodified phenolic resins for tire compounding.

Today, Cytec is drawing on that expertise with **ALNOVOL™** modified phenolic resin - designed to be a problem solver for the industry as it offers tire manufacturers an effective replacement for resorcinol-based adhesion systems (which have long been the industry standard for steel- and textile-cord bonding applications but which have environmental and odor issues).

The new product delivers significant cost savings too particularly in the form of a lower adhesion promoter system cost.

Available globally, **ALNOVOL™** resins are manufactured in Wiesbaden, Germany and are supplied as pastilles in a variety of package sizes.

CYREZ™ Rubber Reinforcing Resins

CYREZ™ resins are among the industry's best-known performance compounds used by major tire producers worldwide. The resins function as either an adhesion promoter for steel cord in the breaker compound or as reinforcement material (e.g., in the apex) or both.

Cytec pioneered the development of high-solid versions of melamine resins that extended its use in reinforcing rubber compounds.

CYREZ™ resins can be supplied either as a liquid resin which comprise of 98% solids or as a powder blend which is carried usually on silica. **CYREZ™** resins are manufactured at four plants worldwide: Kalamazoo, Michigan, Wallingford, Connecticut, Lillestroem, Norway and Shimonoseki, Japan.

Fields of Application in Rubber

Products	ALNOVOL™ PN 160	ALNOVOL PN 320	ALNOVOL PN 759	ALNOVOL VPN 1132	CYREZ™ 963 Liquid resin	CYREZ 963 LF / 963 RPC	CYREZ 964 LF / 964 RPC	CYREZ CRA-100 RPC
Reinforcement	●	●		●				
Cord Adhesion Promoter			●		●	●	●	●
HMMM Hardener					●	●	●	●

Sales Range

Reinforcing Resins

Products	Characteristics	Dynamic viscosity (mPa.s) 50% in mp ¹ , DIN 53177/23°C	Softening point (°C) Ring & Ball (5°C/min) DIN EN ISO 4625-1	Content of free phenol (%) DIN EN ISO 8974	Properties	Uses
ALNOVOL™ PN 160 ⁺	Modified non self-curing phenol novolak	700 - 1100	101 - 113	< 1.0	Suitable for reinforcing natural rubber, styrene-butadiene rubber, EPDM rubber and nitrile rubber	Reinforcement of rubber
ALNOVOL PN 320	Modified non self-curing phenol novolak	1400 - 2200	108 - 120	< 0.3	High viscosity, very low free phenol	Reinforcement of rubber
ALNOVOL VPN 1132	Modified non self-curing phenol novolak	300 - 1000	115 - 155	< 1.0	High tear resistance	Reinforcement of rubber

Adhesion Promoter based on Modified Non Self-curing Phenol Novolak

Products	Characteristics	Dynamic viscosity (mPa.s) 50% in mp, DIN 53177/23°C	Softening point (°C) Ring & Ball (5°C/min) DIN EN ISO 4625-1	Content of free phenol (%) DIN EN ISO 8974	Properties	Uses
ALNOVOL PN 759	Functionalist phenol resin	500 - 1500	93 - 106	< 1.0	Very good ageing, improved adhesion, environmentally friendly	Textile and steel cord adhesion promoter

Adhesion Promoter based on Hexamethoxymethyl Melamine Resin (HMMM)

Products	Characteristics	Content of HMMM* content of ash ** (%)	Carrier type	Properties	Uses
CYREZ™ 963 Liquid resin ⁺	Hexamethoxymethyl melamine resin	>98*	None	Low content of free formaldehyde	Curing agent for resorcinol and novolak resins
CYREZ 963 LF* / 963 RPC**	Hexamethoxymethyl melamine resin	23 - 27**	Diatomaceous earth	High loading, easily dispersible	Curing agent for resorcinol and novolak resins
CYREZ 964 LF*	Hexamethoxymethyl melamine resin	31 - 35**	Precipitated amorphous silica	Good flow ability, easily dispersible	Curing agent for resorcinol and novolak resins
CYREZ 964 RPC**	Hexamethoxymethyl melamine resin	31 - 35**	Hydrated amorphous silica	Good flow ability, easily dispersible	Curing agent for resorcinol and novolak resins
CYREZ CRA-100 RPC	Hexamethoxymethyl melamine resin	24 - 28**	Micro pearls precipitated silica	Almost non dusty, highly flowable, easily dispersible, high bulk density	Curing agent for resorcinol and novolak resins

⁺ ALNOVOL™ phenolic resins
⁺ CYREZ™ rubber reinforcing resins
¹ mp: methoxypropanol
^{*} Europe source
^{**} US source



In flowability and low dust generation test, **CYREZ™ CRA-100 RPC** excels in performance compared to other HMMM resins.

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