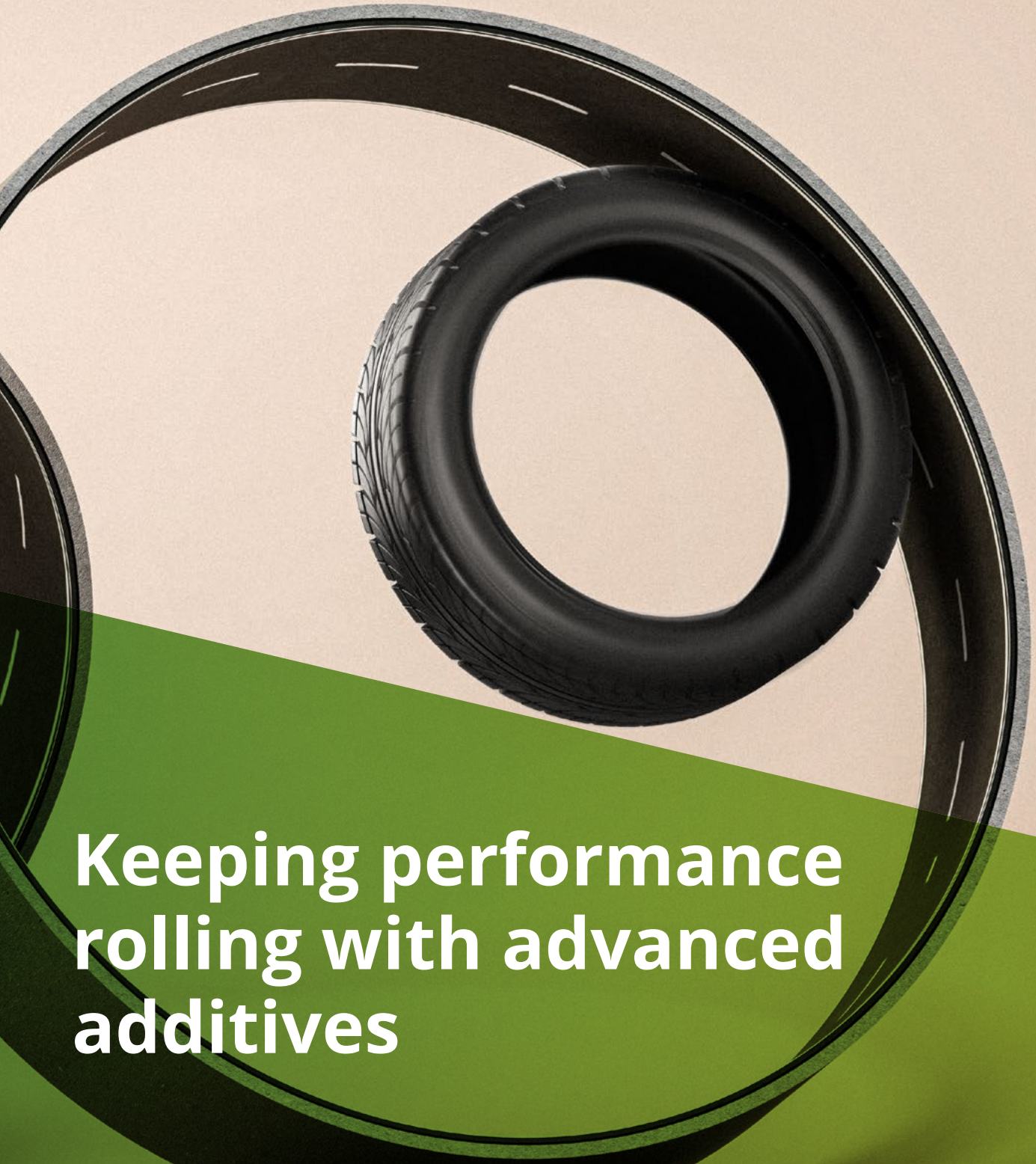


Keeping performance rolling with advanced additives

Amino and phenolic resins for tire and rubber manufacturing

www.allnex.com

Specialty resins – **The secret to better tires and rubbers**

Helping you drive innovation

As a leading global manufacturer of specialty resins, allnex supports tire manufacturers with an industry-leading offering of advanced, eco-friendly additives. With ALNOVOL® and CYREZ®, our broad range of technical additives includes two co-reactant resins that are specifically designed for the needs of the tire industry and also boost performance in other types of rubber compounding and processing.

ALNOVOL® resins for tire compounding

With profound expertise dating back to the beginnings of phenolic chemistry in the 1950s, allnex has established itself as the producer of a well-rounded and widely respected offering of phenolic and functionalized resins for tire compounding.

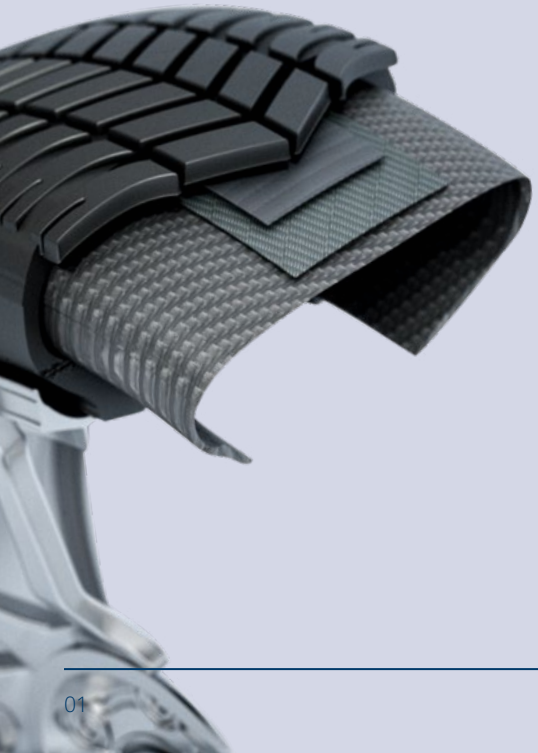
It is this expertise which today allows us to offer tire makers our ALNOVOL® functionalized phenolic resins as a highly effective replacement for problematic adhesion systems. Long the industry standard for steel and tire cord integration but linked with odor issues and environmental drawbacks, these systems can now be substituted with a high-performing alternative. To meet the industry's demand for the removal of chemicals of concern, allnex also offers resorcinol- and cobalt-free options.

By reducing the expense associated with adhesion promoter systems, these new resins can bring significant cost savings. Available globally, ALNOVOL® resins are manufactured in Germany, USA and China, and can be supplied in a variety of package sizes.

CYREZ® resins for better adhesion and crosslinking

CYREZ® resins are among the industry's best-known performance compounds and used by major tire producers worldwide. They function either as adhesion promoters for steel cord in the breaker compound or as crosslinkers in various applications. allnex has been at the forefront of melamine resin development (HMMM, or hexamethoxymethylmelamine), broadening its use in tire compounds. CYREZ® resins are available in both liquid form and as a powder blend on a silica carrier. They are manufactured at seven of our plants worldwide:

- **USA:** Kalamazoo, MI; Wallingford, CT
- **Norway:** Lillestrøm
- **Netherlands:** Botlek
- **Japan:** Shimonoseki
- **Brazil:** Ponta Grossa
- **China:** Zhuhai



Adding strength and sustainability – Our co-reactant resins

Product name	Reinforcement	Cord adhesion promoter	HMMM hardener
ALNOVOL® PN 160	▮		
ALNOVOL® PN 320	▮		
ALNOVOL® PN 760		▮	
ALNOVOL® VPN 1132	▮		
CYREZ® 963 FAMILY		▮	▮
CYREZ® 964 FAMILY		▮	▮
CYREZ® CRA FAMILY		▮	▮
ALNOVOL® UF 410 RPC	▮	▮	
ALNOVOL® PN 870		▮	
ALNOVOL® PN 871		▮	
ALNOVOL® PN 330	▮		

Tailored for tire and rubber performance – **Our range of phenolic and amino resins**

Products	Characteristics	Dynamic viscosity 50% in MP[1] [mPas] DIN 53177 23 °C	Softening point ring & ball [°C] DIN EN ISO 4625-1 5 °C/min	Content of free phenol [%] DIN EN ISO 8974	Properties	Uses
REINFORCING RESINS						
ALNOVOL® PN 160	Modified non-self-curing phenol novolac	700-1100	101-113	< 1.0	Suitable for reinforcing natural rubber, styrene butadiene rubber, EPDM rubber and nitrite rubber	Reinforcement of rubber
ALNOVOL® PN 320	Non-self-curing phenol novolac	1400-2200	108-120	< 0.3	High viscosity, very low free phenol	Reinforcement of rubber
ALNOVOL® VPN 1132	Modified non-self-curing phenol novolac	100-600	115-155	< 1.0	High tear resistance	Reinforcement of rubber
ADHESION PROMOTER						
ALNOVOL® PN 760	Functionalized phenol resin	800-1800	95-115	< 1.0	Very good aging, improved adhesion, environmentally friendly	Textile and steel cord adhesion promoter
ALNOVOL® PN 870	Functionalized phenol novolac	1000-2000	110-125	< 0.3	Excellent adhesion, resorcionol-free and cobalt-free compounding	Steel cord adhesion
ALNOVOL® PN 871	Functionalized phenol novolac	1000-2000	110-125	< 0.3	Excellent adhesion, resorcionol-free and cobalt-free compounding	Steel cord adhesion
PERFORMANCE RESINS						
ALNOVOL® PN 330	Modified phenol resin	1400-2200	108-120	< 0.3	Increasing wear resistance and chip & chunk	Performance resin for TBR and OTR tread compounds

Products	Characteristics	Content of HMMM[2] Content of ash[3] [%]	Carrier type	Properties	Uses
ADHESION PROMOTER/CROSSLINKER					
CYREZ® 963 FAMILY	Hexamethoxymethyl melamine resin	> 98[2]	None	Low content of free formaldehyde	Curing agent for resorcinol and novolac resins
CYREZ® 964 FAMILY	Hexamethoxymethyl melamine resin	31-35[3]	Precipitated amorphous silica	Good flow ability, easily dispersible	Curing agent for resorcinol and novolac resins
CYREZ® CRA FAMILY	Hexamethoxymethyl melamine resin	24-28[3]	Precipitated amorphous silica	High loading, easily dispersible	Curing agent for resorcinol and novolac resins

Products	Characteristics	Dynamic viscosity [mPas] DIN 53177 23 °C	Appearance	Properties	Uses
OTHERS					
ALNOVOL® UF 410 RPC	Carbamid resin	3500-13500	Liquid	Oil replacement, hardness improvement, low Mooney viscosity	Apex, bead, textile cord adhesion compounds

1 MP: Methoxy propanol
Product availability can vary by usage location. Please contact your local allnex representative regarding availability in specific countries and regions

Contact:
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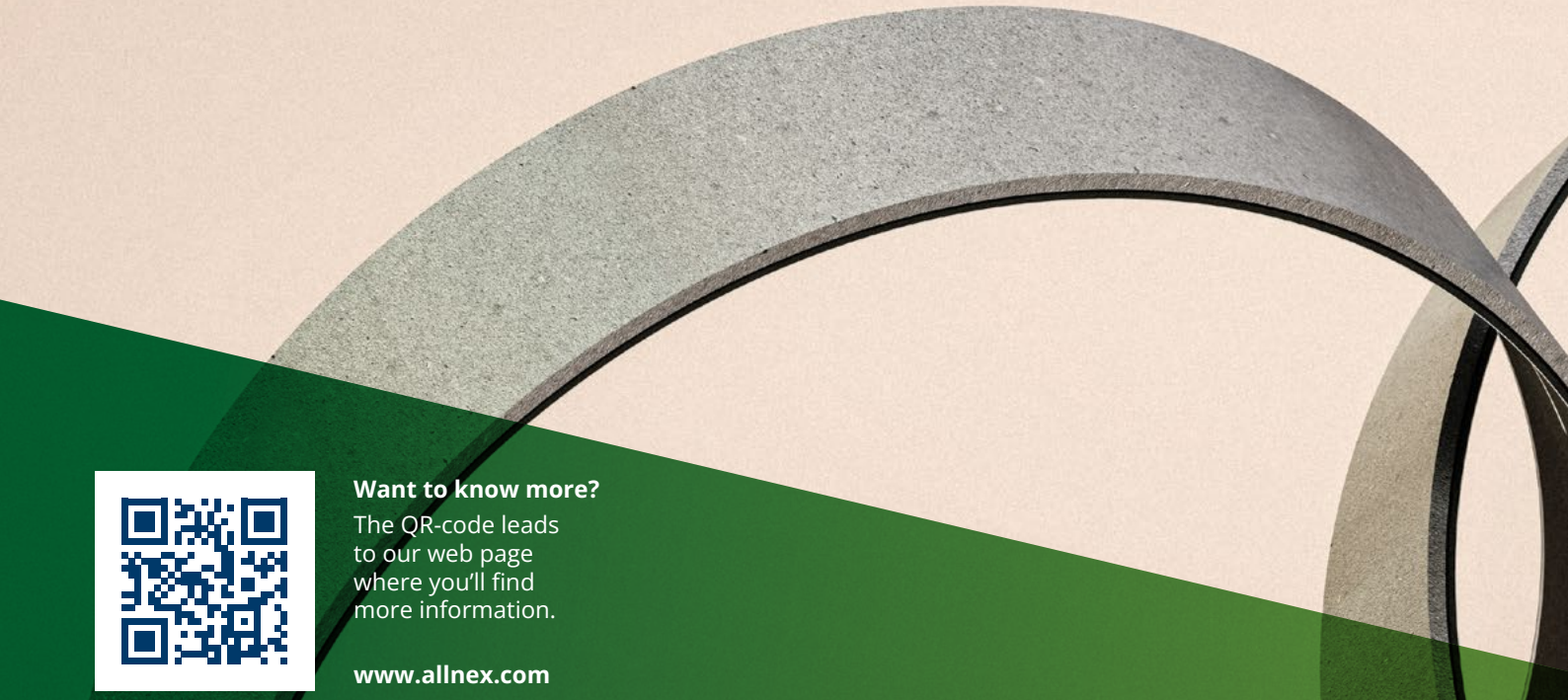

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The QR-code leads to our web page where you'll find more information.

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