Koresin® – The tackifier for the rubber industry
The connecting power of Koresin®

- Koresin is the industry benchmark with regard to
  - superior tack performance
  - processing flexibility
  - reliability
  - high quality and uniformity
- Production capacity expansion to ensure all future demands
- Koresin is the only formaldehyde-free phenolic tackifier in the market
- Over 70 years of product expertise
Your solution – Koresin®
The tackifier for high quality applications

Koresin is successfully applied in the manufacturing of

- quality and premium tires of all kind
  - for cars, trucks and special vehicles
  - for OEM, replacement and re-treading
  - in light, medium, heavy and speed use operations
  - in earth and air transport rubber compounds

- other industrial and technical rubber goods, such as
  - conveyor belts
  - power transmission belts
  - hoses
  - cable / roll coverings
  - lining materials
Your solution – Koresin®
When overall performance is key

Outstanding advantages

■ High initial and long-term tackiness of rubber compounds
■ Compatible with all current rubber formulations
■ Processing flexibility
  ■ degree of tackiness can be adjusted
  ■ tackiness can be maintained for up to several weeks when needed
■ Koresin has no negative influence on the
  ■ vulcanization kinetics
  ■ properties of the vulcanized rubber
■ Proven effectiveness also in formulations with high loading of silica filler
Your solution – Koresin®
Reliable tack at desired level

Koresin allows fine-tuning of tackiness to achieve specific requirements

- A low loading of Koresin increased tack by 300%
- Higher loadings offer further significant improvement
- Tack is maintained over extended time periods

Passenger tire sidewall:
(base formulation in phr)
Natural rubber 50
Butadiene-rubber 50
Carbon black 40
Silica 10
Plasticizing oil 10
Koresin 0 / 2 / 4
Your solution – Koresin®
Tack stability provides safer processing

Koresin has excellent efficiency together with long-term performance compared to standard phenol-formaldehyde based tackifiers (PF resins)

Truck tire tread:
(base formulation in phr)
Natural rubber 80
Butadiene-rubber 20
Carbon black 50
Plasticizing oil 4
Tackifier 0 / 5
Your solution – Koresin®
For low rolling resistance tires

Koresin allows adjustment of tackiness according to the processing needs

Performance of Koresin in High-Silica / Low rolling resistance tread formulation

Passenger tire tread:
(base formulation in phr)
Vinyl-SBR 70
Butadiene-rubber 30
Carbon black 40
Silica 80
Silan 8
Carbon black 10
Plasticizing oil 20
Tackifier 0 / 5
Your solution – Koresin®
Minor effect on vulcanization kinetics

Koresin has a lower scorch influence compared to standard phenol-formaldehyde resins

Koresin minimizes impact on scorch time

Truck tire tread:
(base formulation in phr)
Natural rubber 80
Butadiene-rubber 20
Carbon black 50
Plasticizing oil 4
Tackifier 0 / 5
Your solution – Koresin®
No effect on mechanical properties

Koresin does not reduce hardness. Tensile strength and elongation are maintained and maybe improved by use of Koresin

Koresin does not affect the physical properties of rubber

Passenger tire sidewall:
(base formulation in phr)
Natural rubber 50
Butadiene-rubber 50
Carbon black 40
Silica 10
Plasticizing oil 10
Koresin 0 / 4
Global supply security is vital

BASF constantly challenges all related processes to best meet customers’ expectations in terms of

- sophisticated raw materials sourcing
- compliance with the highest safety standards in each step of manufacturing
- professional logistics and warehousing facilities around the globe
- installed Quality and Risk Management Systems along the complete Supply Chain including a scenario-based inventory plan
Your solution – Koresin®
Worldwide availability

- Produced at BASF’s Ludwigshafen plant
- Production facility also comprising a pelletizing and packaging line
- Pellets in 25-kilogram bags and super-sacks/big bags
- Delivered on plastic pallets
- Available worldwide
BASF just invested into a new production line for Koresin at its integrated production site in Ludwigshafen

- Koresin capacity increased by 50 %
- Dual-train production to better meet Koresin customers’ needs
  - satisfaction of demand in rising high-end rubber applications
  - optimization of supply security
- Expansion completed in 2015
## Your solution – Koresin®
### Specifications and properties

<table>
<thead>
<tr>
<th>Test criteria</th>
<th>Specification</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ubbelohde dropping point</td>
<td>140 – 160 °C</td>
<td>DIN 51801</td>
</tr>
<tr>
<td>Ring and ball softening point</td>
<td>135 – 150 °C</td>
<td>DIN 52011</td>
</tr>
<tr>
<td>Solubility in hydrocarbons</td>
<td>soluble</td>
<td>BASF method</td>
</tr>
</tbody>
</table>

### Properties

<table>
<thead>
<tr>
<th>Property</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Physical form</td>
<td>yellow to brown pellets</td>
</tr>
<tr>
<td>Odor</td>
<td>almost odorless</td>
</tr>
<tr>
<td>Softening point (ball and ring/DIN 52011)</td>
<td>135 – 150 °C</td>
</tr>
<tr>
<td>Dropping point (Ubbelohde/DIN 51801)</td>
<td>140 – 160 °C</td>
</tr>
<tr>
<td>Density (20 °C)</td>
<td>1.02 – 1.04 g/cm³</td>
</tr>
<tr>
<td>Solubility</td>
<td>soluble in hydrocarbons</td>
</tr>
</tbody>
</table>
Your solution – Koresin®
The tackifier to meet YOUR expectations

**YOUR Tackifier**
in high performance rubber applications.

**YOUR Solution**
when overall performance is key.

**YOUR Satisfaction**
sustainability and reliability included.