

Tire, Rubber and Adhesives Applications



Resonance™ HF90-300 Series of Tackifier Resins



The new Resonance HF90-300 series of tackifier resins for improved stability and performance in tire, rubber and adhesive applications expands the already comprehensive Hexion portfolio for this market.

Regulatory entities such as the Environmental Protection Agency (EPA) and the European Chemicals Agency (ECHA) put constant pressure on manufacturers to minimize environmental impact.

Even so, rubber products and formulations still typically contain <0.1 to 4% alkylphenol monomers.

As a remedy, Hexion has developed the Resonance HF90-300 series of tackifiers to proactively reduce and eliminate alkylphenol monomer levels—without compromising performance. Resonance HF90-300 series tackifiers offer improved tack, elongation, and tear and tensile strength compared with current market benchmarks.

Key Features of Resonance HF90-300 Series Tackifier Resins:

- Free from butyl, octyl and nonylphenol monomers
- Options include no-added-formaldehyde (NAF) resin technology
- Excellent tack and bond strength on the rubber compound's surface, and better performance
- Effortless implementation to improve processing in current and future applications
- Enhanced rolling resistance, grip and wear resistance
- Tested and verified by an independent, ISO 17025 certified third party

Performance Benefits of Resonance HF90-300 Series Tackifier Resins:

- A wide variety of softening points are available
- Alkylphenol-free options do not contain any EU listed substances of very high concern (SVHC)
- Adhere to natural or synthetic rubber
- Meet and exceed final performance requirements for tack when compared with traditional tackifiers
- Exhibit higher tensile and elongation moduli than standard alkylphenol tackifiers
- Lower tan delta values at 60 °C mean improved rolling resistance

Third-Party Performance Test Results

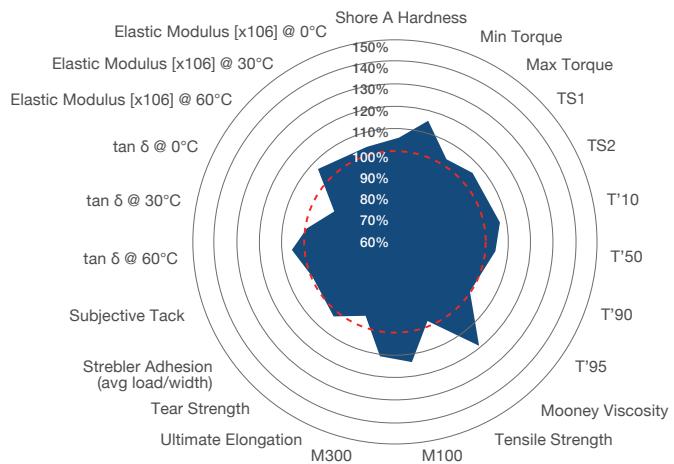
We at Hexion understand today's competitive tire, rubber and adhesives markets. High-performing raw materials are key for achieving the desired grip, wear and rolling resistance. That's why we had our new Resonance HF90-300 series of tackifier resins extensively tested by an independent third party testing laboratory, according to ASTM standards.

This credible data demonstrates the performance of tire formulations incorporating our Resonance HF90-300 series tackifiers, as well as that of an industry standard resin for comparison.

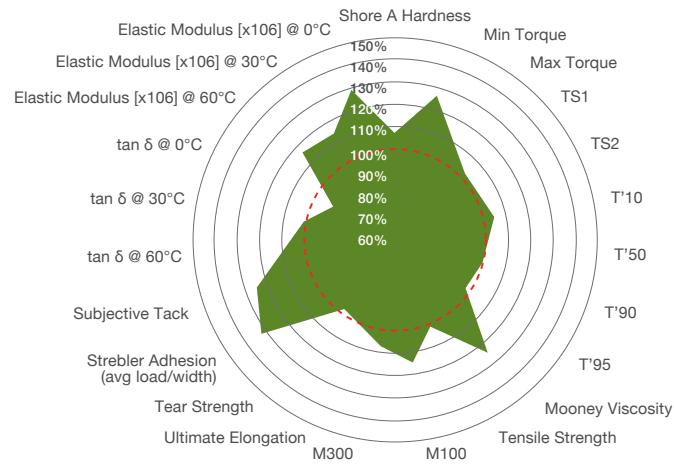
Our new alkylphenol-free tackifier resins exhibit similar or superior tack performance compared with the currently available industry standard alkylphenol tackifier. This enhanced performance over the benchmark occurs with both natural and synthetic rubber.

Performance of tire formulations made with various Resonance tackifier resins

Resonance™ HF90-303



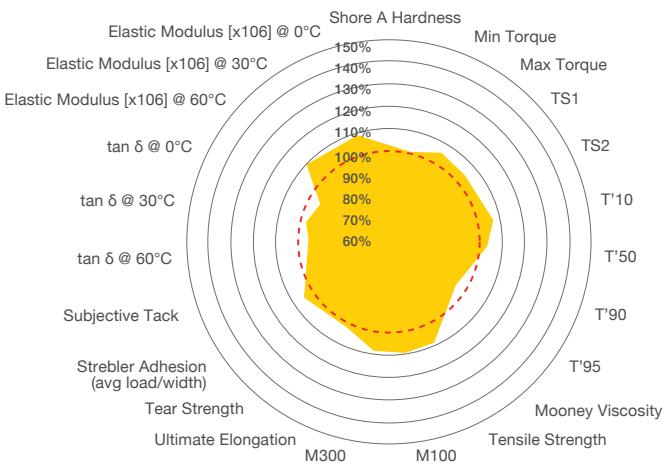
Resonance™ HF90-304



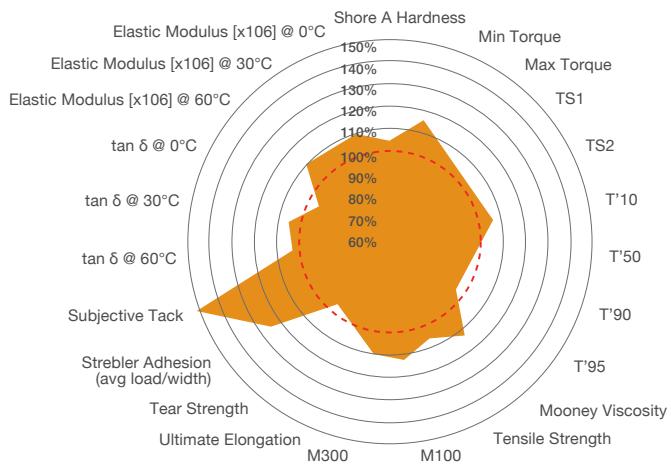
----- Industry Standard Resin

Third-Party Performance Test Results (cont.)

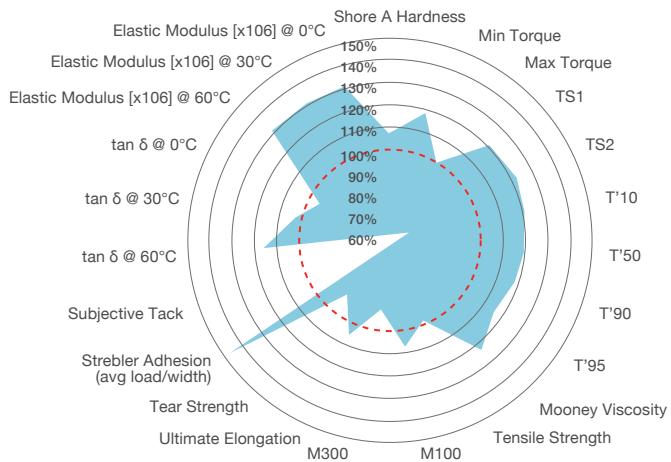
Resonance™ HF90-305



Resonance™ HF90-306



Resonance™ HF90-307



--- Industry Standard Resin

Analysis of tire formulations made with Resonance HF90-300 series tackifiers. All testing completed at an independent, ISO 17025 certified third party testing laboratory. Specific data sets are available on request, including results at 2phr and 6phr.

Product Portfolio

Resonance HF90-300 series tackifier resins have been designed for practical use in real-live processes. These resins are available with a range of softening points and are supplied in flake, solid, or (coming soon) pastille form.

Tackifier Resins	Physical Form	Free Alkyphenol (%)	Free Phenol (%)	Softening Point Typical (°C)	Performance Properties
Resonance™ HF90-307	Flake	N/A	< 0.99%	90	Good tack, increased scorch resistance, elongation and elastic modulus
Resonance™ HF90-306	Flake	N/A	< 0.99%	75	Good tack, higher modulus under stress
Resonance™ HF90-305	Flake	N/A	< 0.99%	70	Increased tack and tear, higher modulus under stress
Resonance™ HF90-304	Flake / Solid	N/A	< 0.99%	80	Increased tack and tear resistance, good hardness, high tensile and higher modulus under stress
Resonance™ HF90-303	Flake / Solid	N/A	< 0.99%	65	Good tack and hardness, lower processing torque, extended elongation, and higher modulus under stress

Expertise and Knowledge

Since the invention of Bakelite® phenolic resins in 1907, our company has been at the forefront of thermoset technology. The Bakelite® infinity symbol, suggesting the almost infinite number of modifications and products the material enables, has stood for the finest phenolic resins and molding compounds for over a hundred years. Our new Resonance brand will carry this legacy into the future with outstanding performance, reliable quality and groundbreaking product solutions.

Global Supply—and Support

Hexion is your global partner, wherever you are in the world. We have factories in Europe, North America and Asia, with a global team of technical experts to assist you in finding the best solution for your processes. Our global production capability provides you with a secure supply of consistent raw materials.

Contact Information

For more information on our resins for tire, rubber and adhesives applications, please contact us at 4information@hexion.com

Hexion: Helping you make it in today's world.

Our global team produces the best in specialty chemicals and performance materials and provides the technical expertise to customize them to your exact needs. The result? Specific solutions, not generic products, leading to thousands of breakthroughs that improve bottom lines and enhance lives.

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