Application Leaflet

RHEOLATE® 290

NiSAT Rheology Modifier

Superior Solvent Tolerance for Simpler, Faster Formulating.

Unique chemistry, sustainable solutions

Key Benefits

- **Excellent Co-solvent Tolerance:**
  Maintains stable thickening performance in formulations with high co-solvent content, eliminating viscosity drift.
- **Strong Low-Shear Thickening:**
  Delivers high viscosity efficiency under low-shear conditions, ensuring optimal sag control and film build.
- **Synergistic Rheology System:**
  Works seamlessly with THIXATROL® 5050W and other rheology modifiers to provide a comprehensive rheology solution for complex coating requirements, for example enhanced metallic pigment orientation.
- **Simplified Formulation Design and Speeding Up R&D Cycles:**
  Enables easy incorporation and ensures consistent behavior under heat storage and scale-up conditions, supporting reliable manufacturing, speeding up R&D cycles.

Chemical & Physical Properties

RHEOLATE® 290	
Composition	Polyether polyurethane dispersion in a mixture of water and diethylene glycol monobutyl ether
Appearance	Milky to creamy liquid
Active Content	ca. 20%
Density	ca.1.03g/m3
Brookfield viscosity	Ca. 5000cps, 6rpm
Solvent	Water / diethylene glycol monobutyl ether (64%/16%)

Introduction

With the shift from solvent-based to water-based industrial coatings driven by VOC regulations, manufacturers face challenges in formulation design, thickening efficiency, and production speed. **RHEOLATE® 290** is a new-generation NiSAT rheology modifier designed to deliver high low-shear viscosity, robust sag resistance, and minimal impact from co-solvents, making formulation easier and more reliable for formulators.

Features

- High efficiency on low shear viscosity build-up
- Imparts a strong shear thinning flow behaviour
- Excellent anti-sagging performance
- Minimal impact by co-solvents
- Easier formulation design
- Improved storage stability at low temperature
- New rheology combination solution
- Auxiliary effect on metallic pigment orientation
- APEO-free and Tin-free
- No negative impact on gloss
- pH independent

Target Application

- Automotive coatings
- General industrial coatings
- Wood coatings
- Architectural coatings
- Aqueous sealants

Incorporation and Levels of Use

RHEOLATE® 290 is a pourable liquid that can be added at any stage of most formulations, typically post-added for convenience.
Add slowly with sufficient mixing; pH adjustment or dilution is usually unnecessary.
For sensitive systems or low shear mixing, dilute with a 1:1 mix of cosolvent and water for easier incorporation.
Recommended dosage: 0.1–1.5% (as delivered) by total formulation weight.

Products tested

An extensive evaluation was conducted to benchmark RHEOLATE® 290 against both standard RHEOLATE® grades and leading market references. The study assessed the performance of RHEOLATE® 290 across a variety of waterborne coating formulations, with a focus on industrial and architectural applications.

Test Methodology

- **Formulation Diversity:** RHEOLATE® 290 was tested in multiple systems, including acrylic-amino baking paints, 1K self-crosslinking acrylics, 2K epoxies, PUD clear coats, alkyd-amino baking paints, and waterborne alkyds. Formulations varied in PVC (pigment volume concentration) and binder chemistry to reflect real-world application needs.
- **Additive Loading:** The same active content of RHEOLATE® 290, standard RHEOLATE® grades, and competitor thickeners was used in each formulation to ensure a fair comparison. The actual loading was adjusted based on the specific requirements of each system.

Performance Tests Conducted
The following performance parameters were systematically evaluated for each formulation:

FIGURE 1: 0.25% by solid%; Acrylic / Amino baking

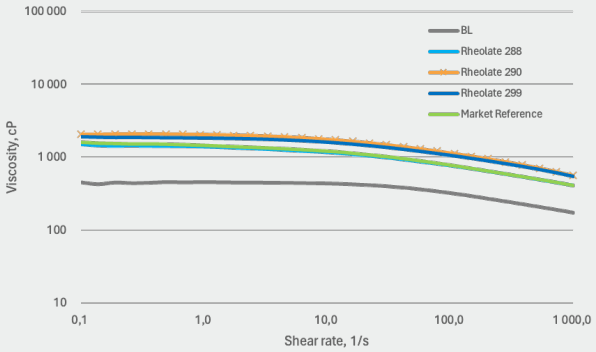


FIGURE 2: 0.20% by solid%; 1K Wood coating

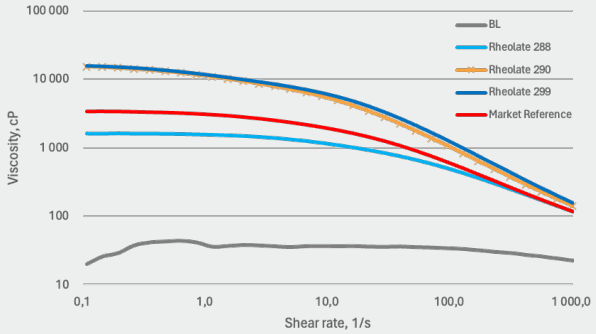
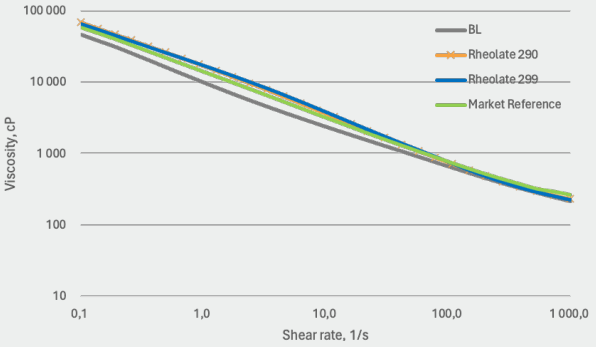


FIGURE 3: 0.10% by solid%; 2K Epoxy



- **Rheological Profile:** Viscosity was measured using Stormer (KU), ICI, and Brookfield viscometers at multiple shear rates (10, 20, 50, and 100 rpm), as well as full flow curves from low to high shear.
- **Sagging and Levelling:** Sag resistance and levelling were assessed visually and numerically to determine film build and application smoothness.
- **Gloss:** Gloss measurements were taken to confirm that RHEOLATE® 290 does not negatively impact final film appearance.
- **Co-solvent Tolerance:** Viscosity stability was tested in the presence of various co-solvents to confirm robust performance under demanding formulation conditions.

Why Choose RHEOLATE® 290?

Beyond claims, real-world data tells the story. The following pages present conclusive evidence of how RHEOLATE® 290 delivers superior sag resistance, robust thickening in high co-solvent systems, and uncompromised gloss—enabling you to formulate with greater confidence, efficiency, and reliability.

Thickening Efficiency: Thickening efficiency was evaluated in multiple formulations. **Figures 1 to 3** present the viscosity profiles of RHEOLATE® 290 in different coating systems. It shows strong low-shear viscosity build, comparable to RHEOLATE® 299, and superior to RHEOLATE® 288 and market references.

Figure 1. Thickening Efficiency in Acrylic/Amino Baking Paint (0.25% by solid)
This figure compares the low-shear viscosity build of RHEOLATE® 290 with other rheology modifiers in an acrylic/amino baking paint system. RHEOLATE® 290 demonstrates strong thickening efficiency, matching or surpassing market references.

Figure 2. Thickening Efficiency in 1K Wood Coating (0.20% by solid)
The chart illustrates viscosity performance in a 1K wood coating formulation. RHEOLATE® 290 delivers robust low-shear viscosity, supporting high film build and superior sag resistance compared to competitor product.

Figure 3. Thickening Efficiency in 2K Epoxy (0.10% by solid)
This figure presents the viscosity profile for 2K epoxy systems. RHEOLATE® 290 maintains effective thickening, providing reliable rheology control even at lower dosages.

FIGURE 4: Sag, Acrylic/Amino baking- 0.25% in solid

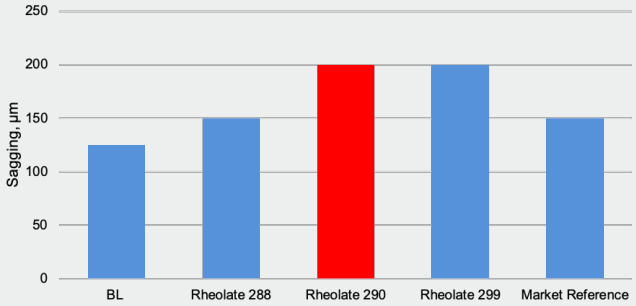


FIGURE 5: Sag, 1K Wood coating- 0.2% in solid

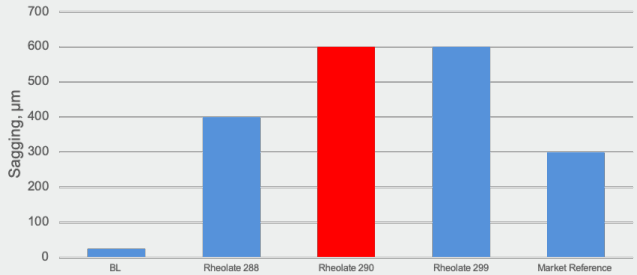
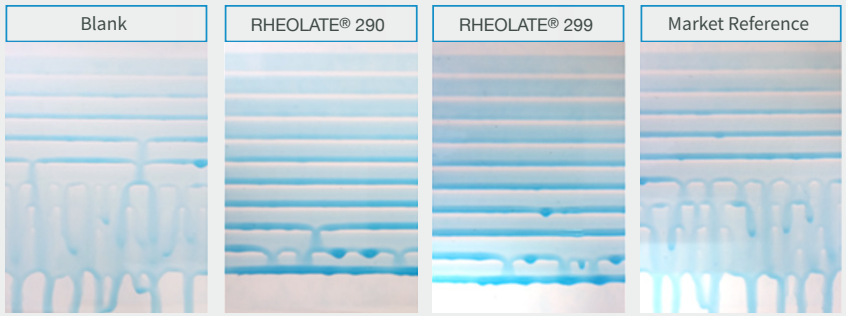


FIGURE 6: Sag, PUD clear coat



Technical Proof Points

Sag Resistance: Sag resistance is a critical property for high-performance coatings. **Figures 4 to 6** highlight the superior sag control provided by RHEOLATE® 290 in various systems. It delivers outstanding sag resistance in both acrylic/amino baking and 1K wood coating systems. It enables higher film thickness without sagging, matching or exceeding the performance of leading market references and other RHEOLATE® products. This makes RHEOLATE® 290 an excellent choice for applications where high film build and superior sag control are required.

Figure 4. Sag Resistance in Acrylic/Amino Baking Paint (0.25% by solid)
The bar graph shows sag resistance results for acrylic/amino baking paint. RHEOLATE® 290 enables higher film thickness without sagging, outperforming the market reference.

Figure 5. Sag Resistance in 1K Wood Coating (0.20% by solid)
This chart demonstrates sag control in 1K wood coating systems. RHEOLATE® 290 provides excellent sag resistance, supporting superior application properties.

Figure 6. Sag Resistance in PUD Clear Coat
The images and data highlight the sag resistance of RHEOLATE® 290 in PUD clear coat formulations, confirming its effectiveness in maintaining good anti-sagging performance.

FIGURE 7: Gloss on iron panel, Acrylic/Amino baking

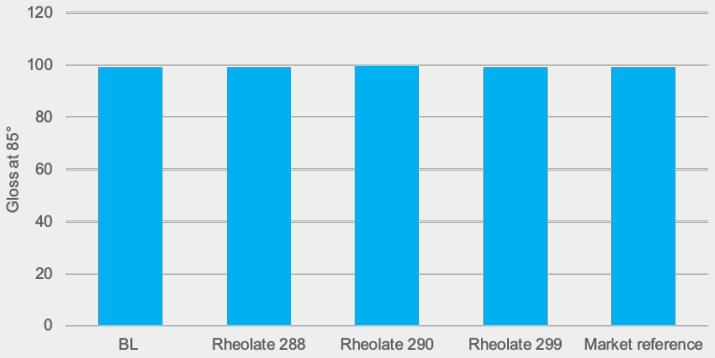
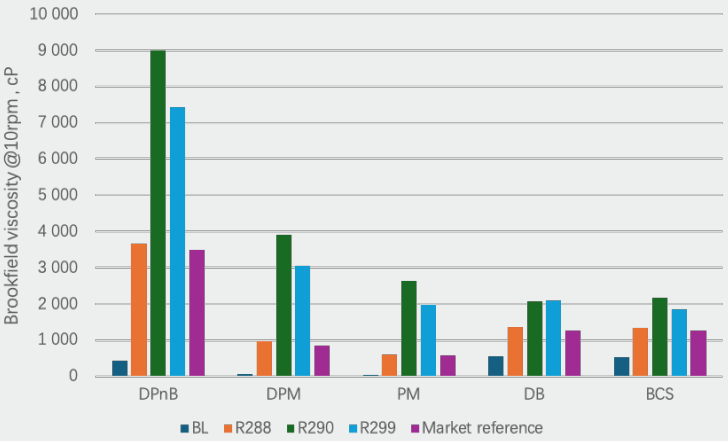


FIGURE 8: Acrylic/amino baking clear coat, 0.25% by active (10% co-solvents in formula)



Technical Proof Points

Figure 7. Gloss Performance on Iron Panel (Acrylic/Amino Baking)
The bar graph displays gloss measurements for various NiSAT rheology modifiers. All tested products, including RHEOLATE® 290, deliver high gloss with no negative impact on final film appearance.

Excellent Co-solvent Tolerance: Co-solvent tolerance was evaluated to ensure comprehensive performance. As summarized in **Figure 8**, RHEOLATE® 290 maintains its thickening efficiency across a variety of co-solvents, demonstrating particularly strong performance in systems containing hydrophobic types such as DPnB.

RHEOLATE® 290 demonstrates excellent co-solvent tolerance, maintaining strong thickening performance regardless of the co-solvent type used in the formulation. This makes it a reliable choice for formulators seeking consistent viscosity and application properties in waterborne coatings containing high volume co-solvents.

Conclusion

RHEOLATE® 290 empowers waterborne paint formulators to achieve reliable low-shear thickening with minimal impact from co-solvents. Unlike conventional rheology additives, it simplifies formulation and delivers consistent performance across diverse waterborne systems.

Appendix

Test systems		
System	**Binder(s)**	**Additive active load(s) (%)**
Wood coatings/ acrylic-amino baking paint	Co-solvent affect on viscosity	0.2%/0.25%
Acrylic-amino baking paint	ETERWAT 11732 + Cymel® 325	0.25%
1K self-crosslinking acrylic	NeoCryl® XK-12	0.20%
2K epoxy	EPIKOTE™ 6526-WH-56A + EPIKURE™ 6870-W-53	0.10%
PUD clear coat	Liopur PFL 2366 + Liocryl AM 907	0.125% / 0.175%
Alkyd-amino baking paint	Worleesol 85 A + Cymel® 303 LF + Cymel® 327	0.375% / 0.625%
WB air dry alkyd	WAK 001	0.10%

NOTE:

The information herein is currently believed to be accurate. We do not guarantee its accuracy. Purchasers shall not rely on statements herein when purchasing any products. Purchasers should make their own investigations to determine if such products are suitable for a particular use. The products discussed are sold without warranty, express or implied, including a warranty of merchantability and fitness for use. Purchasers will be subject to a separate agreement which will not incorporate this document.

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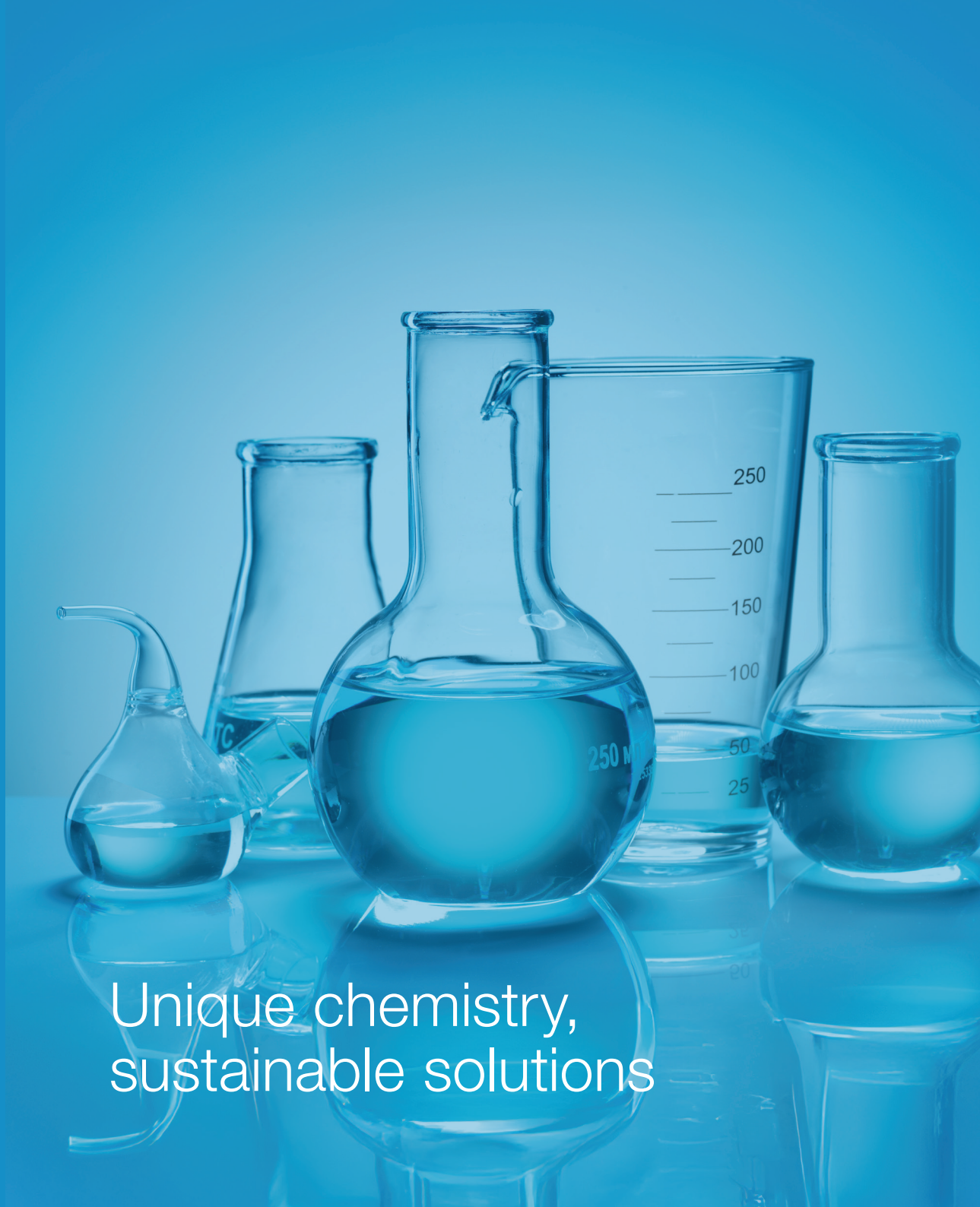

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