

CASE STUDY

Improve sag resistance in protective coatings with 30-50% less rheology modifier



Summary

Product type: Organic thixotropes

Application: Rheology modifiers in protective industrial and marine coatings

Key benefits: Withstands highly polar solvents | Wide temperature and easy processing

The Challenge

Formulators of **protective industrial and marine coatings** face both performance and application challenges when using standard rheology modifiers of diamide wax based organic thixotropes. The high loading levels required can lead to negative influence on secondary paint properties and their specific temperature activation do not allow for formulation flexibility. These standard rheology modifiers also lose thickening effectiveness when in contact with alcohols and other **highly polar solvents**.

The Solution

New THIXATROL® PM 8058 enables the formulation of protective coatings that **prevent sag** and **allow for thicker application** layers thanks to their ability to **withstand higher amounts of highly polar solvents**. THIXATROL® PM 8058 is a very efficient rheology modifier and outperforms other thickener classes in highly polar systems. This benefit, plus its **wide temperature and easy incorporation**, makes THIXATROL® PM 8058 an ideal rheology modifier for the **sustainable formulation** of industrial, marine and protective coatings.

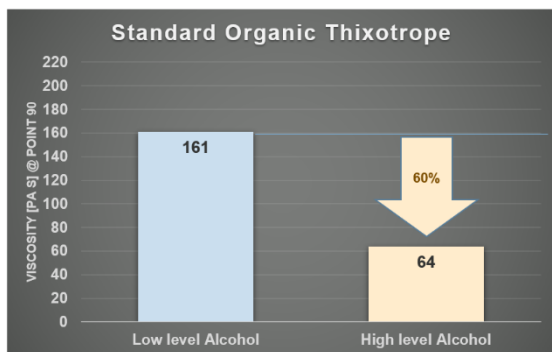
PROPERTIES	BENEFITS
Resistant to polar solvents like benzyl alcohol	Higher performance in sag resistance and cohesion
Higher efficiency	30-50% lower loading to reach same sag resistance
Low temperature activation	Time and energy savings and higher production output
Wider temperature activation window	Flexible, easier to incorporate into coatings

Resistance to polar solvents like benzyl alcohol

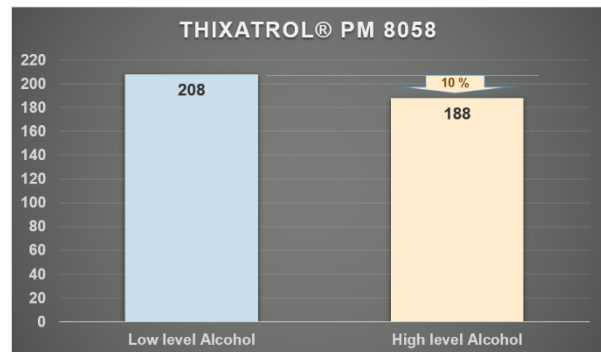
The challenge of losing thickening effectiveness in highly polar solvent compositions has been resolved with the introduction of THIXATROL® PM 8058. In this solvent segment, various types of alcohols such as Butanol and Benzyl alcohol must be used. These alcohols are formulated to enhance the adhesion to the substrate and to reduce the amount of aromatics. In most cases, the content cannot be reduced. The new **THIXATROL® PM 8058 displays the capability to withstand higher amounts of various alcohols** and other highly polar solvent components.

The figure below compares the viscosity behavior of a standard organic thixotrope with THIXATROL® PM 8058 in both low level and high level alcohol. The standard organic thixotrope demonstrates a significant 60% drop in viscosity performance in a high level alcohol while the **THIXATROL® PM 8058 shows only a 10% viscosity reduction in high level alcohol.**

VISCOSITY BEHAVIOR



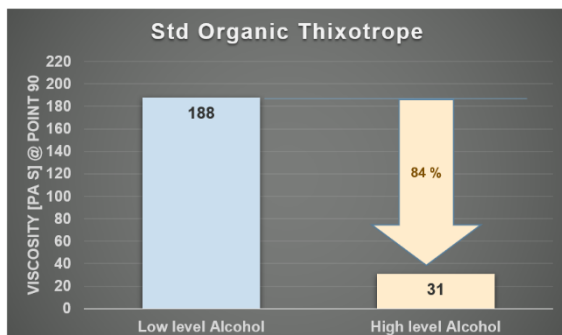
Significant drop (60%) in performance caused by high level of alcohol



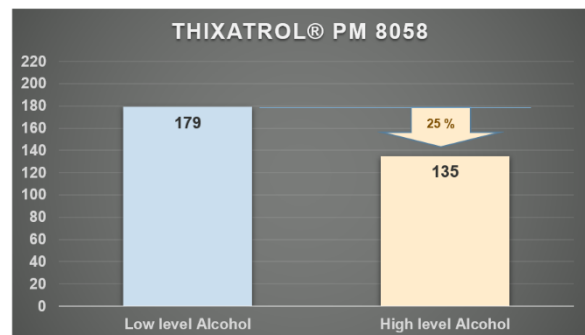
Only 10% drop in viscosity with THIXATROL PM 8058

The figure below compares the % change in viscosity of a standard organic thixotrope versus THIXATROL® PM 8058 in both low levels and high levels of alcohol. The standard organic thixotrope demonstrates an 84% loss in viscosity while the **THIXATROL® PM 8058 shows improved compatibility (only 25% loss) and higher stability after aging.**

VISCOSITY BEHAVIOR



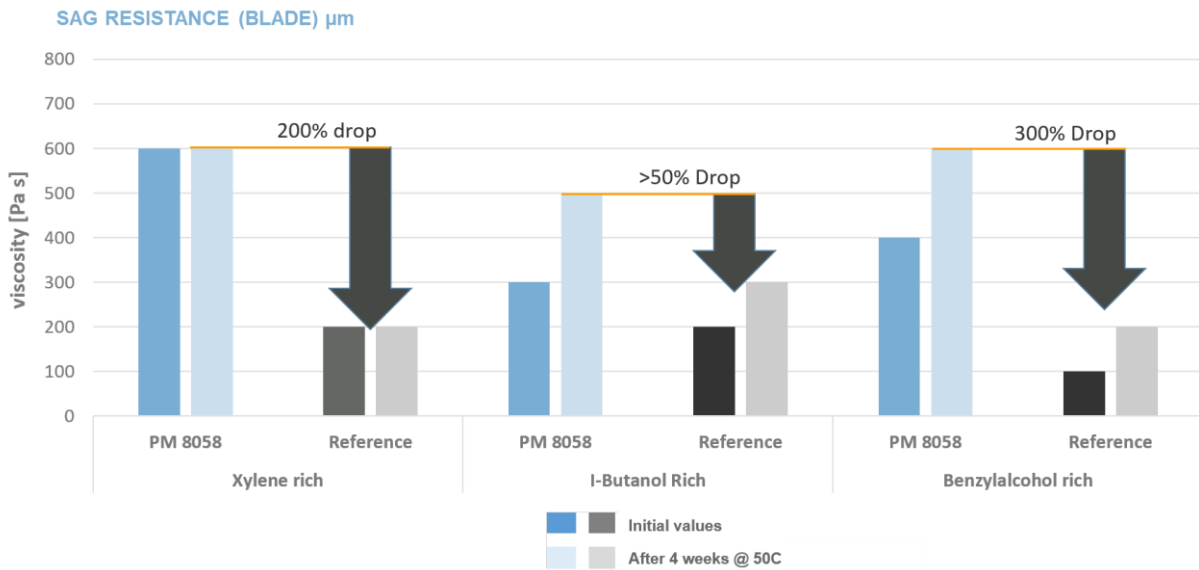
Significant drop (84%) in performance caused by high level of alcohol



Improved compatibility with high level of alcohol
Only 25% decrease = higher Stability after aging

Improved sag resistance versus standard rheology modifiers

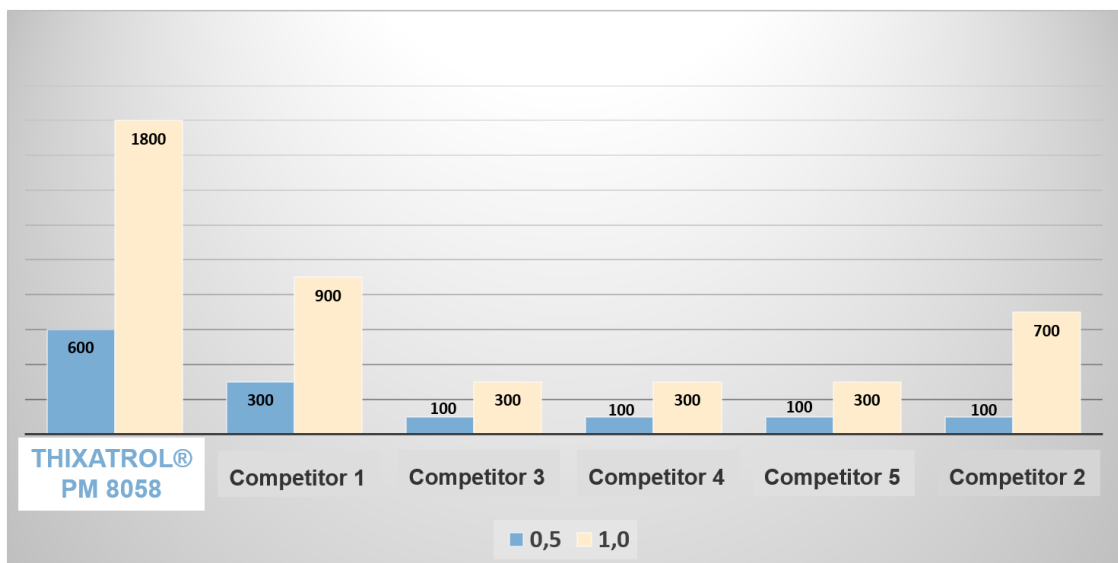
Sag resistance of THIXATROL® PM 8058 vs standard rheology modifier reference after four weeks of aging at 50C is shown in the bar chart below. Overall, THIXATROL PM 8058 shows much higher performance than the reference product in each alcohol type. Alcohols typically cause a post increase in viscosity. However, the THIXATROL PM 8058 xylene rich version shows **no change in viscosity even after the four weeks of aging**, providing the most stable performance in sag resistance.



THIXATROL® PM 8058 sag performance is significantly higher versus competitive rheology modifiers

SAG PERFORMANCE WITH 0.5 & 1.0 % THIXOTROPE

SAG VALUES DETERMINED AT ACTIVATION TEMPERATURE OF 66 °C AT 12 M/S



Key Takeaways

- THIXATROL® PM 8058 provides better compatibility when formulation contains high level of Iso-Butanol, n-Butanol or Benzyl alcohol
 - Performance is more stable
 - Improved paint storage stability at 50 °C
- THIXATROL® PM 8058 provides a wide activation window from 45 – 75 °C
 - Offers greater flexibility in paint production
 - Lower temperatures= energy savings
- Cost savings when replacing competition due to the higher efficiency
- Lower loading level has less pronounced influence on secondary properties (i.e., Adhesion)