



Consumer Solutions

DOWSIL™ 3 Additive for Solvent Based Paints, Coatings and Inks



Prevents Flooding and Floating at Low Addition Levels, Even in White, Pastel and Gray Formulations



Improve Paint Stability and Color Consistency

Ensuring that base and tint paints stay mixed homogeneously over time is a real challenge for formulators of solventborne paints, coatings and inks, particularly for whites (titanium dioxide-based), grays and pastel shades. Flooding and floating – concentration and separation of the pigments – are indicators of paint instability and also lead to inconsistent color performance during application.

At very low concentrations, DOWSIL™ 3 Additive, a silanol functional silicone resin, effectively prevents the flooding and floating of solvent based formulations containing titanium dioxide (TiO₂) and colored pigments. It can be used as the sole dispersant for titanium dioxide in white base paints and/or added during the let-down stage in color-pigmented systems as an effective anti-floating agent, affording real formulation flexibility.

In addition, because DOWSIL™ 3 Additive is a multi functional silicone resin dispersion, it is compatible with epoxy, polyurethane, polyester, alkyd and acrylic binder systems. As well as being a dispersant, it also can improve leveling, enabling simpler formulations. Its low viscosity means DOWSIL™ 3 Additive is easy to incorporate.

Furthermore, DOWSIL™ 3 Additive is effective at use levels as low as 0.2-1 weight percent in the total formulation if added during grinding as a dispersant, and that equals good cost-in-use. It typically only contributes <0.01 g/l VOCs when added at the recommended use levels.

Targeted applications and markets include producers of wood coatings, protective coatings, industrial coatings, automotive OEM and refinish paints, printing inks, and pigment pastes.

Advantages of DOWSIL™ 3 Additive:

- Prevents flooding and floating for improved color consistency
- Can be used in a wide range of pastel and gray solvent based resin systems
- Highly effective at low concentrations for good cost-in-use versus the competition
- Multi functional additive that also improves leveling for simplified formulation
- Can be added in pigment grind or during let-down for formulating flexibility
- Low viscosity for easy incorporation
- Low VOC content at the recommended use levels (typically <0.01 g/l)

Table 1: Properties of DOWSIL™ 3 Additive

Property	DOWSIL™ 3 Additive
Description	Silanol functional silicone resin in solvent
Non-volatile content, %	10
Solvent	Toluene
Specific Gravity at 25°C (77°F)	0.9
Flash Point (closed cup), °C (°F)	4 (39)
Viscosity at 25°C (77°F)	0.7–1.4

Improved Flooding and Floating Prevention

DOWSIL™ 3 Additive is most effectively used in the grind phase when dispersing TiO_2 in white base paints. When this white base paint is used to prepare pastels and grays, DOWSIL™ 3 Additive prevents flooding and floating.

It also can be used as a co-dispersant along with other wetting and dispersing additives during the “co-grind” of titanium dioxide.

A silanol functional silicone resin, DOWSIL™ 3 Additive offers an alternative chemistry to market for dispersant technology and has been shown to be highly effective versus existing market solutions.

Figure 1 demonstrates the effectiveness of DOWSIL™ 3 Additive in a gray 2K solventborne polyurethane wood coating versus two competitive dispersant technologies. When added at the same weight percent into the total formulation (during the grind phase), DOWSIL™ 3 Additive outperforms the competition in preventing floating (measured by in-can observation) and flooding (lower DE value after rub-out).

High Efficiency and Low Cost-in-Use in Grinding

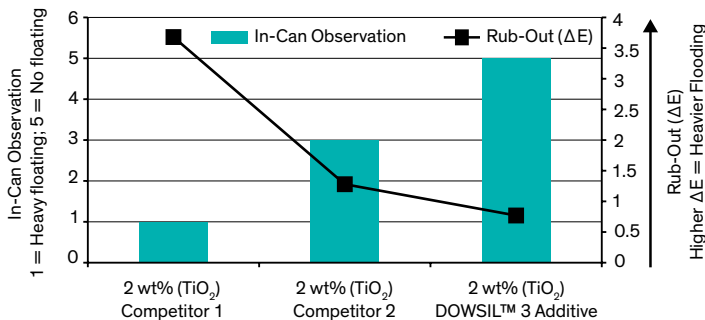
In Figure 1, we saw the performance of DOWSIL™ 3 Additive and competitor solutions at 2 percent by weight of TiO_2 (or 0.22 percent by weight in the total formulation). The unique chemistry and high efficiency of DOWSIL™ 3 Additive mean it can be used at even lower addition levels and still perform well. When the addition level of DOWSIL™ 3 Additive is reduced to less than half its original dosage (0.8 percent by weight of TiO_2) in the same formulation, its effectiveness at preventing floating is still superior to competitive solutions (Figure 2).

The recommended dosage of DOWSIL™ 3 Additive is 2-10 weight percent of the titanium dioxide used when dispersing TiO_2 in white base paints (or 0.2-1 weight percent of a total formulation containing 10 percent TiO_2). Concentrations ranging from .05-0.5 weight percent based on the total formulation are effective when DOWSIL™ 3 Additive is used in the “co-grind” of titanium dioxide.

It is important to note that the amount required is formulation dependent. Characteristics may vary when used with different systems and formulations. Thorough preproduction testing is necessary to ensure expected performance.



Figure 1: Floating (in-can observation) and flooding (rub-out results) with DOWSIL™ 3 Additive versus competitor dispersants in a solvent based 2K PU gray wood coating. All additives added during grinding of base white coating.

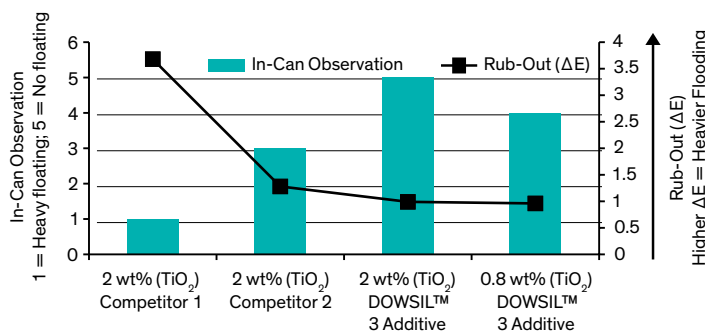


Competitor 1: 50 percent actives modified polyurethane
 Competitor 2: 50 percent actives unsaturated polycarboxylic acid polymer + polysiloxane copolymer
 (DE): the color difference between the rubbed and unrubbed surfaces of a freshly applied film on a LENETA chart

Floating by in-can observation under same dosage (2 percent by weight of TiO_2 or 0.22 percent by weight in the total formulation).

Competitor 1 – Rating 1	Competitor 2 – Rating 3	DOWSIL™ 3 Additive – Rating 5
Heavy floating	Slight floating	No floating

Figure 2: Floating (in-can observation) and flooding (rub-out results) in a solvent based 2K PU gray wood coating. DOWSIL™ 3 Additive is compared to competitor dispersants at lower addition levels in grind.



Effective in Post-Addition

Although most effective in the grind stage, DOWSIL™ 3 Additive also can be post-added at levels as low as 0.03 percent by weight in the total formulation to improve flooding and floating beyond traditional dispersants on the market today.

Where DOWSIL™ 3 Additive cannot be used in the grind phase, post-addition is possible to improve flooding and floating. Figure 3 demonstrates how adding DOWSIL™ 3 Additive at levels as low as 0.03 percent by weight in the total formulation can be effective.

Performance Summary

With its unique silanol functional silicone resin chemistry, DOWSIL™ 3 Additive effectively improves the stability and color consistency of solventborne paints, coatings and inks. DOWSIL™ 3 Additive gives excellent anti-flooding and anti-floating performance and good cost-in-use performance compared to competitor additives due to its high efficiency at very low addition levels. The ability to use DOWSIL™ 3 Additive in the pigment grind or in a post-addition step in a wide variety of solvent based resin systems also provides formulation flexibility.

Figure 3: Floating (in-can observation) and flooding (rub-out results) in a solvent based 2K PU gray wood coating. Improvements are demonstrated by post-adding DOWSIL™ 3 Additive and Competitor 2 at the addition levels indicated.

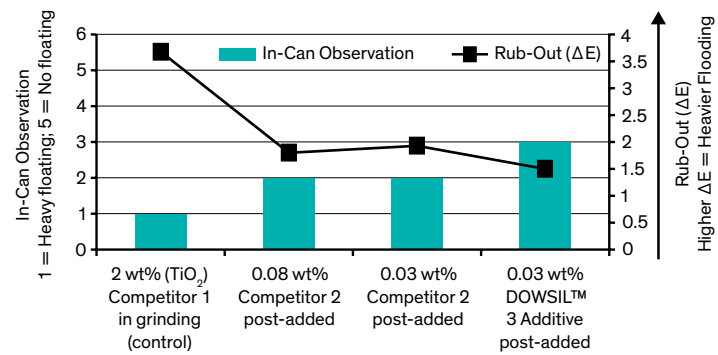


Table 2: Differentiated performance of DOWSIL™ 3 Additive for prevention of flooding and floating.

Property	DOWSIL™ 3 Additive	Competitor 1	Competitor 2
Anti-Floating	● ● ●	●	● ●
Anti-Flooding	● ● ●	●	● ●
Efficiency	● ● ●	●	● ●
Cost in Use	● ● ●	●	●
Formulation Flexibility	● ● ●	●	● ● ●



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