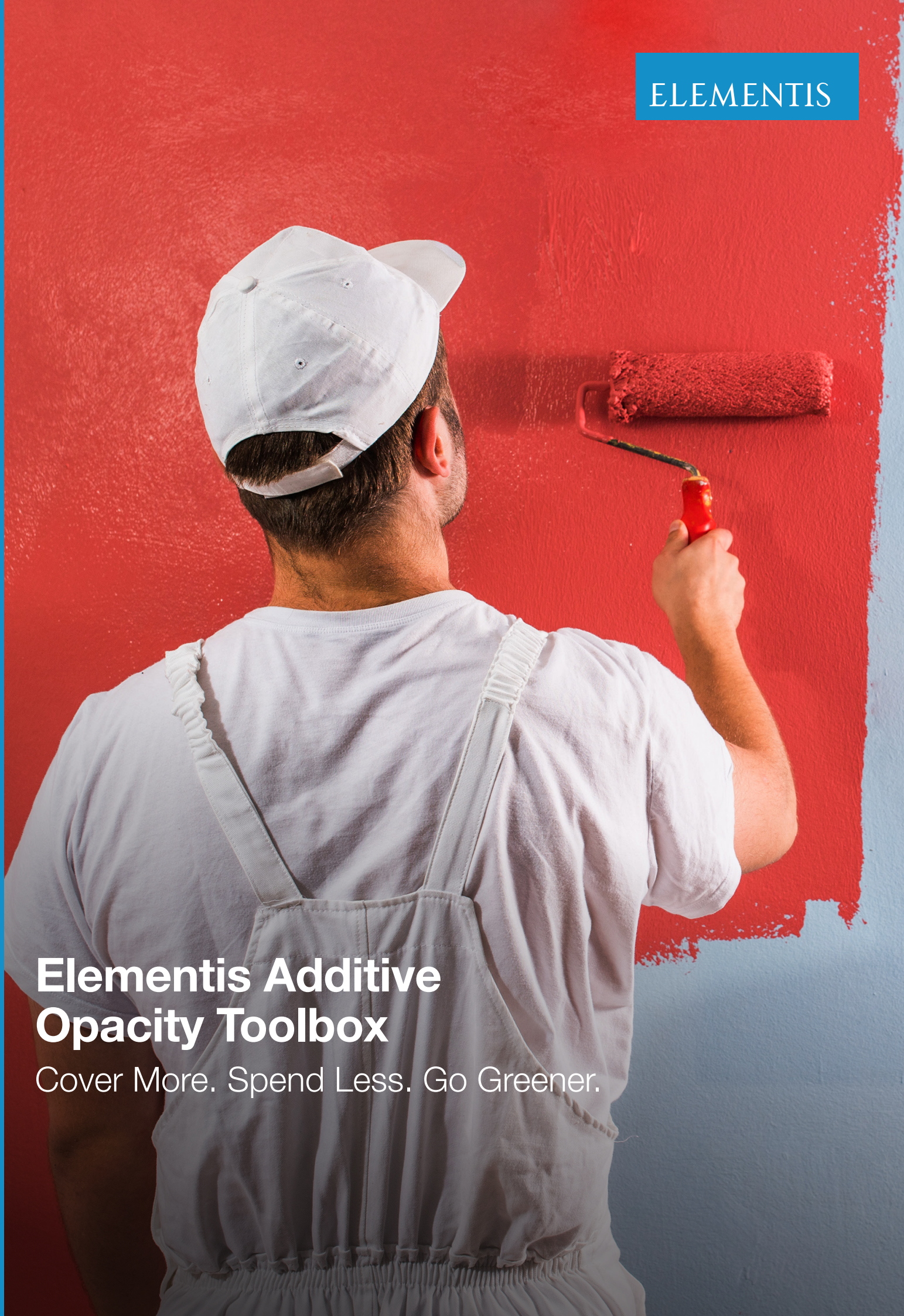
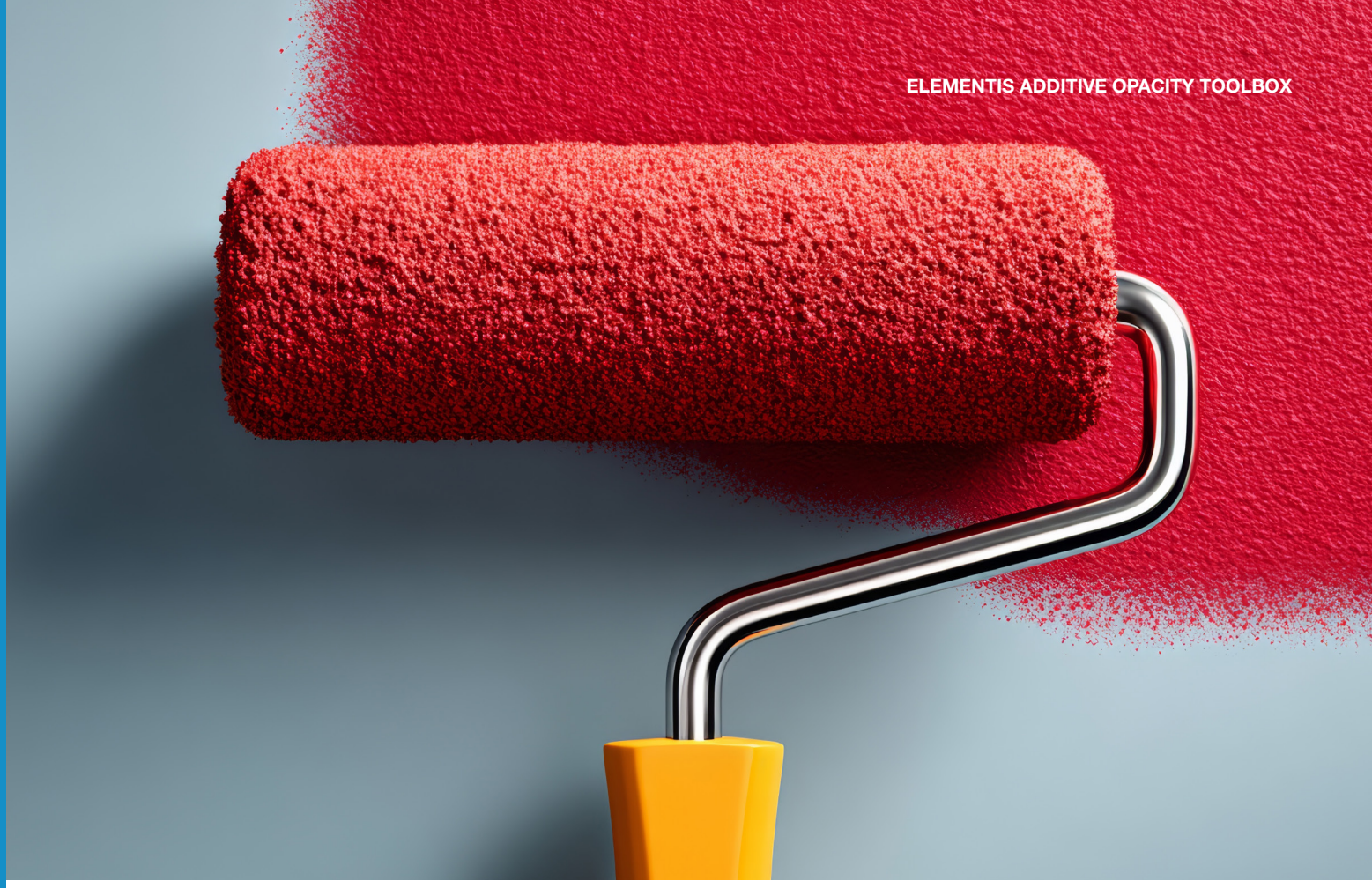


ELEMENTIS

Elementis Additive Opacity Toolbox

Cover More. Spend Less. Go Greener.



The Opacity Challenge

In today's competitive coatings landscape, formulators are under mounting pressure to deliver products that meet increasingly complex demands: cost-efficiency, regulatory compliance, sustainability, and high performance. At the same time, labor shortages and rising productivity expectations are accelerating the need for coatings that offer faster application and greater surface coverage.

A key performance driver in this equation is hiding power. Titanium Dioxide (TiO_2), the industry's go-to pigment for opacity, remains both costly and environmentally intensive. As a result, the need for more efficient, sustainable alternatives is growing rapidly.

Painters and consumers alike expect better coverage, smoother application, and fewer coats. Meeting these expectations—while reducing TiO_2 dependency—requires advanced additive technologies that optimize pigment dispersion, enhance film formation, and unlock superior opacity through smarter formulation strategies.

Top-ranked Innovation Priority: What Painters and Consumers Say

Painter Insight:
"What innovations would help you work faster and more efficiently?"
Top answer: Better coverage with fewer coats.

What improvements or innovations in paint products would help you work more efficiently?	Total	BE	FR	DE	IT	NL	PL	ES	UK
Better one-coat coverage	21%	24%	10%	44%	30%	2%	20%	14%	21%
Faster drying formulas	17%	20%	34%	8%	24%	32%	6%	8%	2%
Easier application (e.g., smoother flow, less dripping)	9%	8%	15%	18%	6%	4%	2%	4%	11%

Source: USP, European Painter Insight Monitor September 2025.

Consumer Insight:
Based on 875,000 reviews of commercial paint products (A-brands), we identified the most common complaints, with a regional breakdown:

- Americas 51%
- EMEA 39%
- Asia 10%

Top complaint: Paint requires too many coats and provides poor coverage.

Source: Elementis, Architectural Review Webscraper, 875.000 reviews on paint products

The Science of Pigment Spacing and Paint Transfer from Roller to Wall

Achieving optimal opacity in coatings is the result of a complex interplay of formulation variables. From the choice of application tool—roller, brush, or spray gun—to surface preparation, rheology profile, TiO_2 content, dispersant and wetting agent packages, volume solids, dry film thickness, and the selection of extenders and binders, every component influences final performance.

Among these, additives play a pivotal role. The dispersion and spacing of TiO_2 particles are especially critical to maximizing light scattering and, therefore, hiding power. Poor dispersion leads to pigment crowding, which diminishes efficiency and opacity. Likewise, linear rheology systems often fail to deliver the desired application properties, limiting paint transfer and uniform coverage.

By adopting branched NiSAT rheology modifiers and hydrophobic dispersant technologies, formulators can achieve more uniform pigment spacing and significantly enhance paint transfer from roller to wall. The result: improved opacity, superior hiding power, and a more efficient, cost-effective coating process.

We got you covered!

The Elementis Opacity Toolbox is a modular set of additives designed to enhance hiding power, reduce up to 15% TiO_2 usage, and improve sustainability profile: “Cover More. Spend Less. Go Greener.”

It includes rheology modifiers and dispersants that work synergistically to deliver one-coat hide, better wall transfer, and up to 25% increased spread rate.

Toolbox Components

RHEOLATE® HX 6025: VOC- Surfactant free branched NiSAT thickener for high ICI build-up and improved wall transfer.

RHEOLATE® 666 IF: Low-medium shear NiSAT thickener, Isothiazoline (MIT/BIT) free for smooth application and coverage.

NUOSPERSE® HIDE 1000: Hydrophobic copolymer dispersant for high-performance coatings.

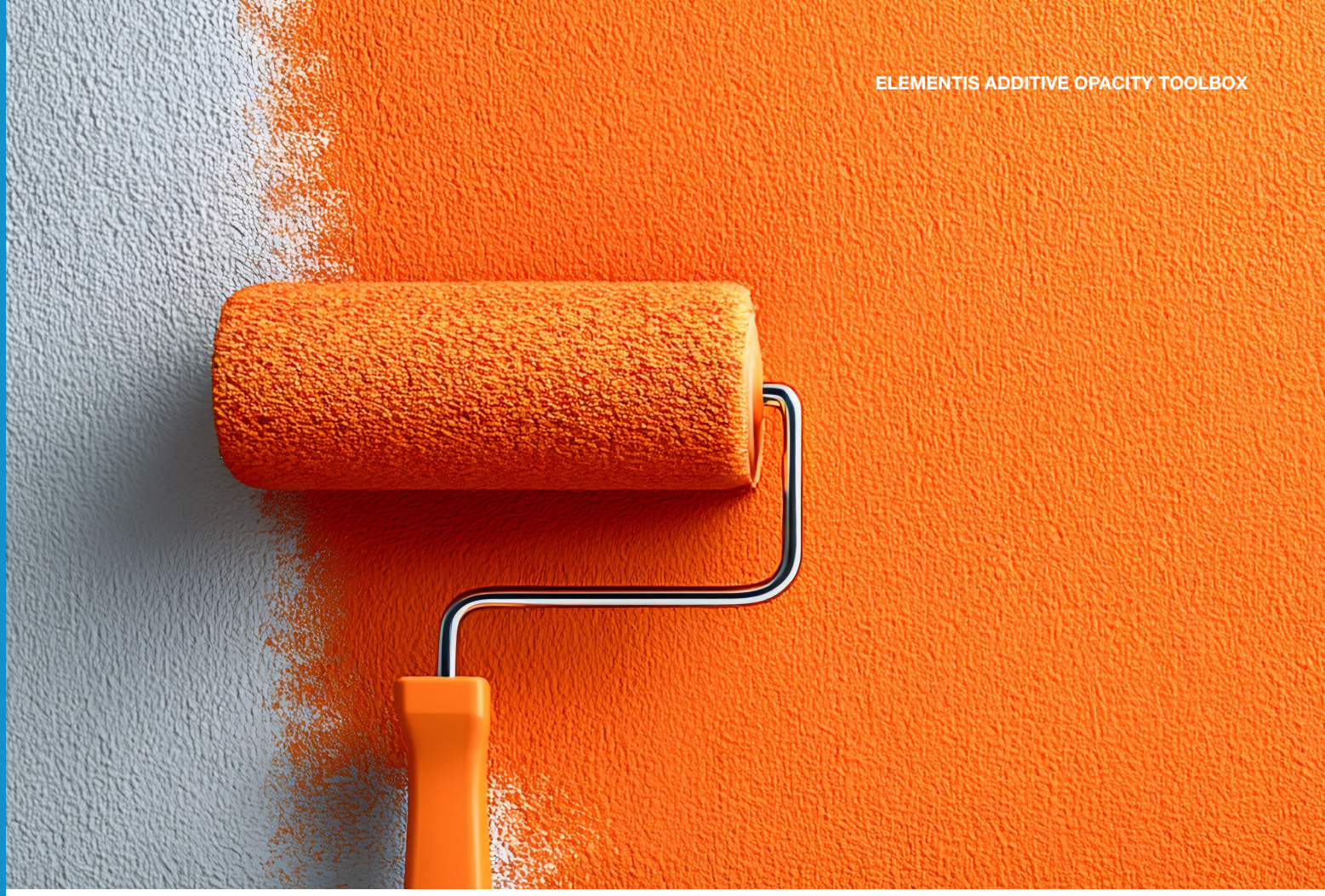
NUOSPERSE® HIDE 1100: NUOSPERSE® HIDE 1100: Hydrophobic polymeric dispersant with superior TiO_2 spacing and spread rate.

Performance benefits at a glance

- Improve hiding power up to One Coat Hide
- Optimizing dispersion and spacing of TiO_2 and Increase 25% spread rate
- Reduce up to 15% TiO_2 in formulation with optimized additive package
- Improve sustainability and lower product CO_2 footprint

Why Choose the Opacity Toolbox

- One-coat hide capability
- Up to 25% increase in spread rate
- Enhanced wall transfer and roller pattern
- Up to 15% TiO_2 reduction
- Lower CO_2 footprint
- VOC-free additives
- Improved rheology control
- Compatible with various binder systems



Proven performance

Delivering high-performance coatings goes beyond selecting the right ingredients; it requires formulation precision and strategic additive design. The Elementis Opacity Toolbox showcases how targeted technologies translate into measurable application benefits, including enhanced hiding power, improved paint transfer, and increased spread rate.

Improving spreading rate with dispersants

- Optimized dispersion and spacing of TiO_2 particles for better utilization and cost efficiency
- Balanced ionic and steric stabilization to prevent pigment flocculation during storage and drying
- Enhanced opacity and tinting strength

	Market Reference #1 P.A. Ammonium	**Market Reference #2** P.A. Sodium	**Market Reference #3** P.A. Sodium	**Market Reference #4** P.M. Potassium	**NUOSPERSE® HIDE 1000** P.A. Ammonium	**NUOSPERSE® HIDE 1100** P.M. Ammonium
Spread Rate 98% Opacity m²/L ISO EN 13300, ISO 6504-03	2,61	2,69	2,76	2,89	3,23	3,28
Spread Rate 98% Opacity sq.ft. per gallon ISO EN 13300, ISO 6504-03	106,35	109,61	112,46	117,76	131,61	133,65
Increase	100%	103%	106%	111%	**124%**	**126%**

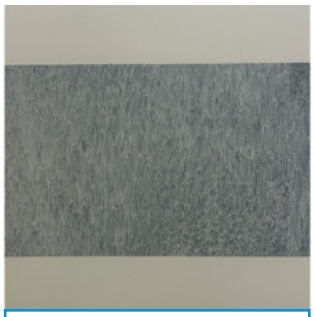
The table strongly illustrates the influence of dispersant selection on spreading rate. Transitioning from a polyacrylic ammonium dispersant to a more hydrophobic polymer dispersant results in a marked improvement in performance. With NUOSPERSE® HIDE 1100, it is possible to achieve up to 26% higher spreading rate while maintaining 98% opacity. Its hydrophobic polymeric structure promotes optimal TiO_2 particle spacing, thereby enhancing coverage and overall formulation efficiency.

Improving hiding power with rheology

- Branched RHEOLATE® HX technology delivers higher efficiency versus linear systems.
- Increased paint uptake and transfer to the wall
- Optimized roller pattern with improved flow and leveling

	Loading %	KU Units	ICI Poise	Effectivity	Loading %	KU Units	ICI Poise	Effectivity	Loading %	KU Units	ICI Poise	Effectivity
L. Market Reference #1 KU L. Market Reference #1 ICI	0,90 1,00	102	0,8	- -	0,90 1,60	111	1,0		0,90 2,80	115	1,4	
B. Market Reference #2 KU/ICI (2-1 NiSAT)	1,00	69	0,8	-	1,40	81	1,0		1,50	87	1,4	
B. Market Reference #3 KU B. Market Reference #3 ICI	0,94 0,94	109	0,8	4% -6%	0,94 1,20	112	1,0	+4% -25%	0,94 1,60	120	1,4	+4% -43%
RHEOLATE® 666 IF RHEOLATE® HX 6025	0,90 0,70	107	0,8	0% -30%	0,90 0,90	114	1,0	0% -44%	0,90 1,40	118	1,4	0% -50%

Linear Market reference #1

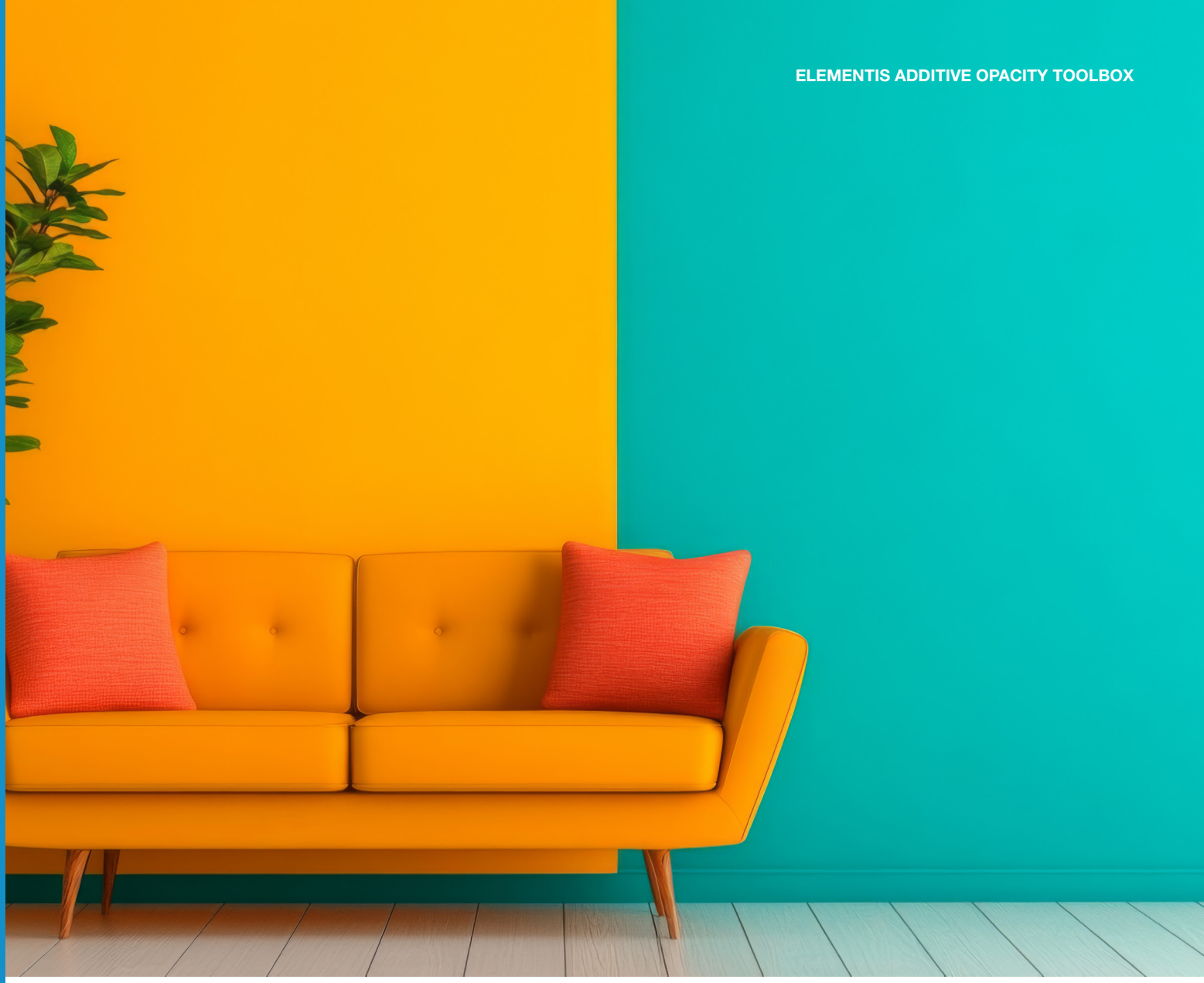


Market reference (2-1 NiSAT) #2

Branched Market reference #3

RHEOLATE® 666 IF RHEOLATE® HX 6025

The data presented in the table and opacity chart indicate a clear correlation: increased opacity is associated with the use of more hydrophobic branched polymers in RHEOLATE® HX 6025. Its surfactant-free branched architecture enables rapid ICI build-up and delivers 44% greater efficiency compared to linear polymers. When combined with RHEOLATE® 666 IF as a low-to-medium shear thickener, this synergistic effect enhances paint uptake and wall transfer, while optimizing roller pattern, flow, and leveling—ultimately resulting in improved opacity and superior application performance.



Environmental & Regulatory Advantages

Meeting Regulations, Exceeding Expectations

All toolbox components are designed to support VOC reduction and sustainability goals. RHEOLATE® HX 6025 is VOC-free and PFAS-free, helping formulators meet stringent environmental regulations without compromising performance.

Compatibility and long-term performance: Seamless integration across systems

Toolbox additives are compatible with a wide range of binder systems and pigment packages. They offer excellent cratering resistance, viscosity stability, and long-term performance — even in systems overdosed with defoamers.

Ideal for

- Architectural coatings
- Water-based systems
- Interior wall paints (matte, semi-gloss, eggshell)
- Formulations targeting one-coat hide and high spread rate

Chemical & Physical Properties

RHEOLATE® HX 6025	
Composition	Branched polyether polyurethane associative thickener (HEUR)
Appearance	Clear liquid
Active Solids	20%
Total Solids	20%
Viscosity	< 3,000 (Brookfield RVT, spindle 4, 20 rpm, 25°C)
Recommended Use Level	0.5% to 3.5% on total system weight
Solvent	Water
Storage	Above 4 °C, table under standard conditions.
Notes	More efficient with smaller latex particle sizes due to increased surface area.

RHEOLATE® 666 IF	
Composition	Polyether urea polyurethane associative thickener (HEUR)
Appearance	Cloudy off-white to white liquid
Active Solids	20%
Total Solids	28,5%
Viscosity	<8,000 cP (Brookfield RVT, spindle 4, 20 rpm, 25 °C)
Recommended Use Level	0.5% to 3.5% on total system weight
Solvent	Water
Storage	Above 4 °C, table under standard conditions.
Notes	VOC-free, MIT/BIT/CIT-free, compatible with other rheology modifiers.

NUOSPERSE® HIDE 1000	
Composition	Polymeric hydrophobic copolymer (ammonium salt)
Appearance	Clear to slightly yellow, slightly hazy liquid
Active Content	35%
Density	1.1 g/cm³
Viscosity	2000-12000 cP (Brookfield)
Solvent	40/60 propylene glycol / water
pH Value	9.3–9.8
Storage	2 years shelf life
Notes	Enhances opacity and spread rate, compatible with all gloss latex resin systems and NiSAT modifiers.

NUOSPERSE® HIDE 1100	
Composition	Polymeric hydrophobic copolymer (ammonium salt)
Appearance	Clear to slightly yellow, slightly hazy liquid
Active Content	22%
Density	1.1 g/cm³
Viscosity	<1,500 cP (Brookfield)
Solvent	Water
pH Value	8.5-9.0
Storage	2 years shelf life
Notes	Optimizes TiO_2 spacing, enhances opacity and spread rate, compatible with all latex resin systems and NiSAT modifiers.

Cover More. Spend Less. Go Greener.

Innovation for Maximum Coverage

The Elementis Additive Opacity Toolbox delivers measurable improvements in hiding power, sustainability, and cost-efficiency, empowering formulators to meet the demands of next-generation architectural coatings.

From lab to wall — we got you covered.

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Unique chemistry, sustainable solutions