Be in control of your waterborne decorative coatings with our TEGO® Viscoplus rheology modifiers

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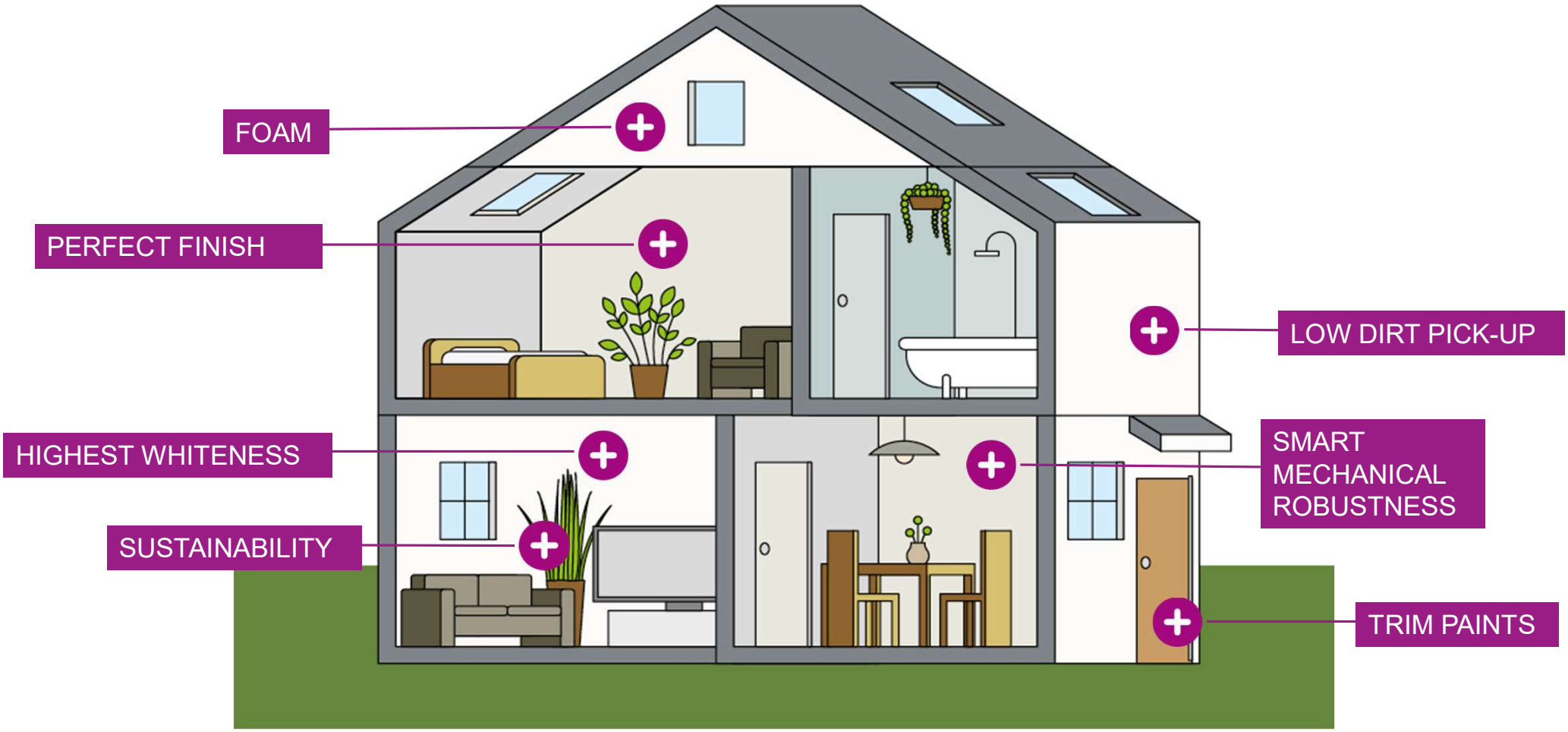
Today‘s Agenda

- Theoretical background
- Different thickeners for different requirements
- Application examples
  - Pseudoplastic thickeners
  - Newtonian thickeners
- Summary



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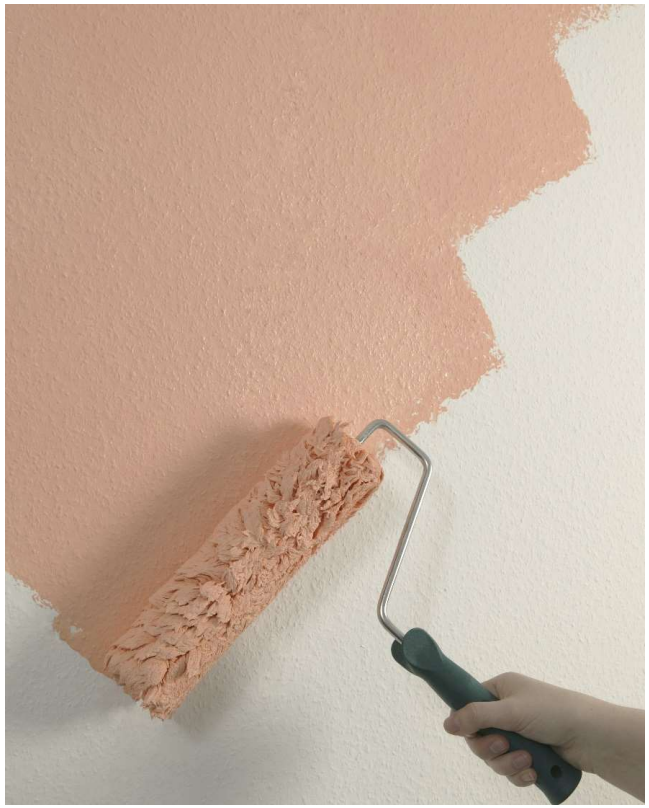
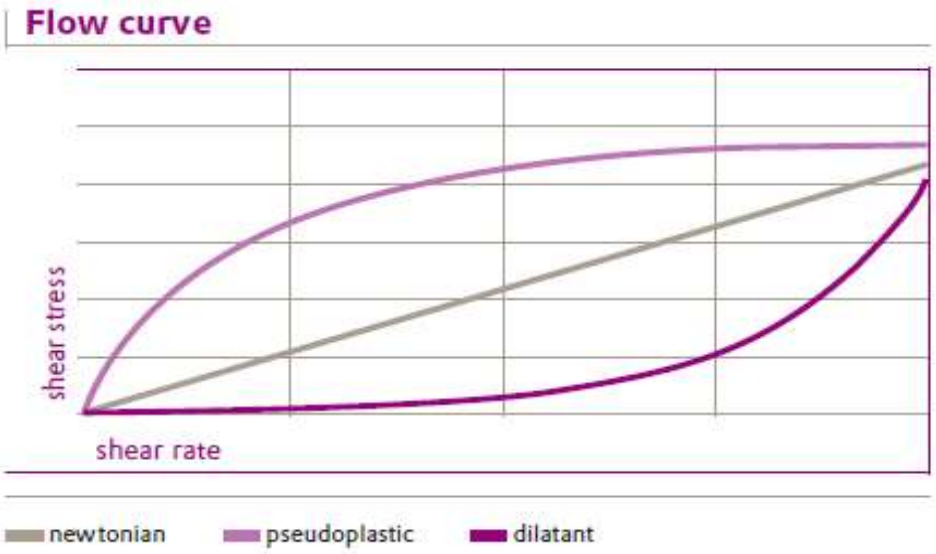
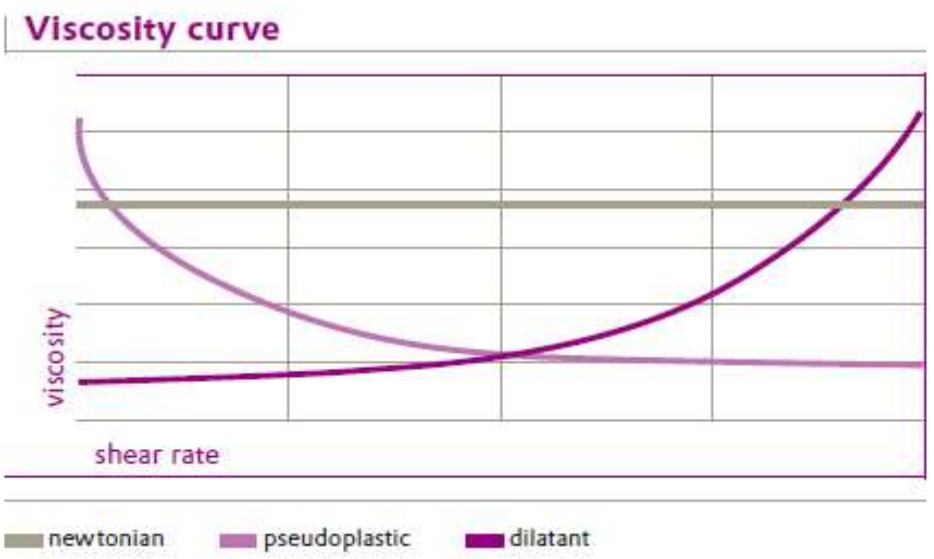
Perfect Finish

- Architectural Coatings are used in our everyday life to provide a decorative finish to our homes and protective properties against mechanical and chemical influences.
- The huge range of architectural coatings consists of various binder technologies, gloss levels, and paint qualities for the DIY and professional segment.
- Independent from the applicator, the final finish should be perfect and, therefore, the rheological profile of the paint needs to be managed.
- **TEGO® Viscoplus** as highly efficient thickener improves the storage stability, workability and final appearance of waterborne coatings

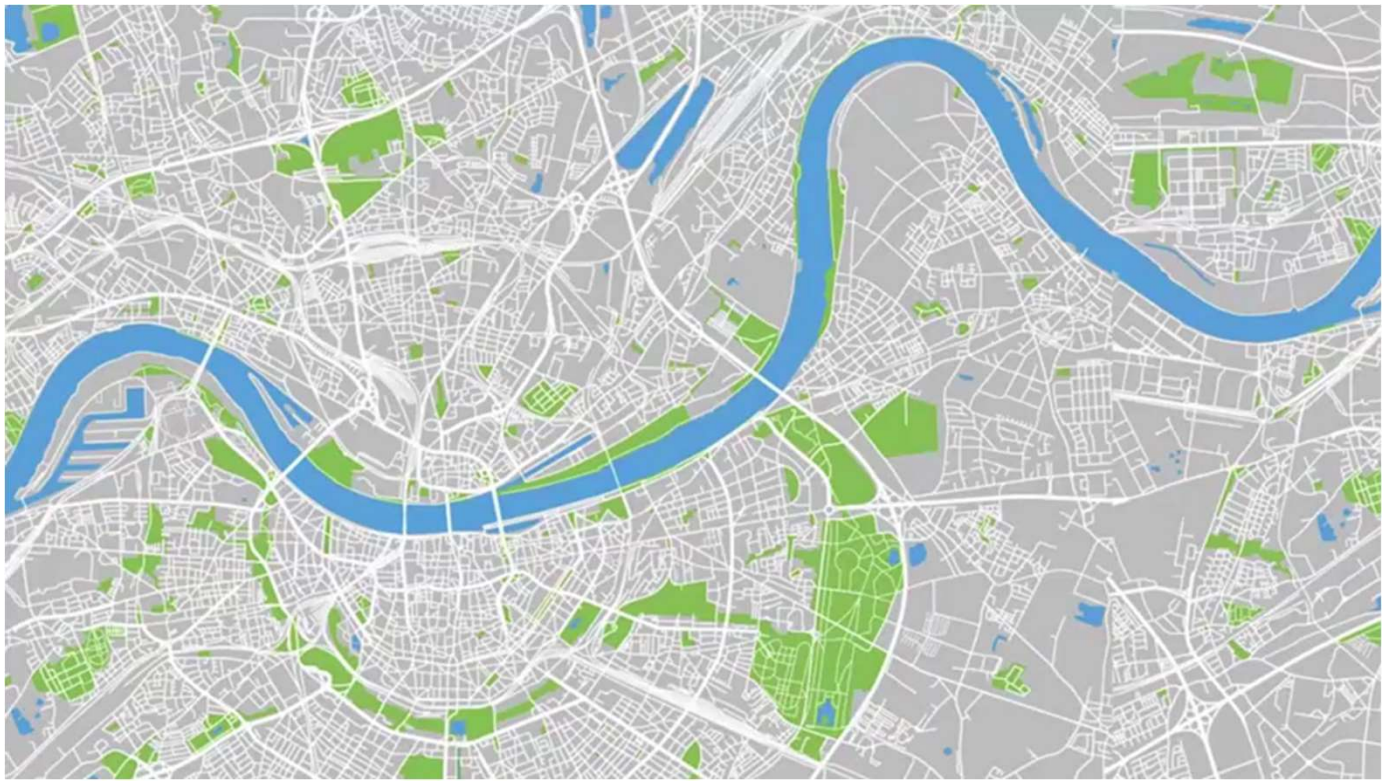


Viscosity Graphs

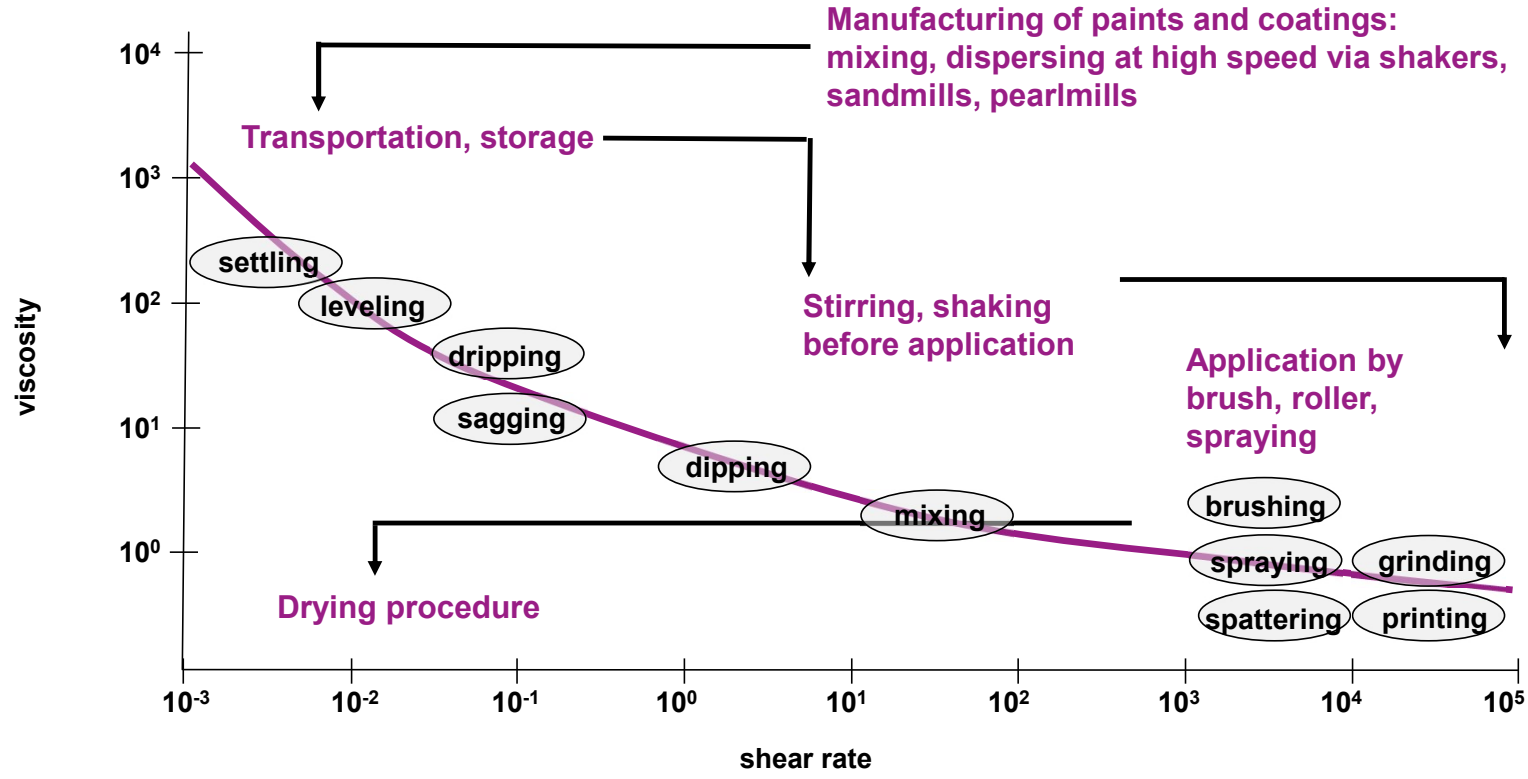




Throughout the lifetime of a coating, it is faced with different shear rates

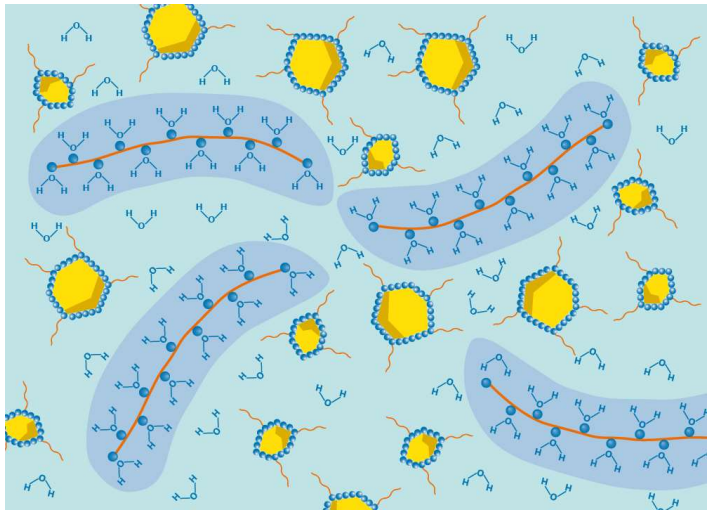


Different Stages of Coatings and Paints: Rheology



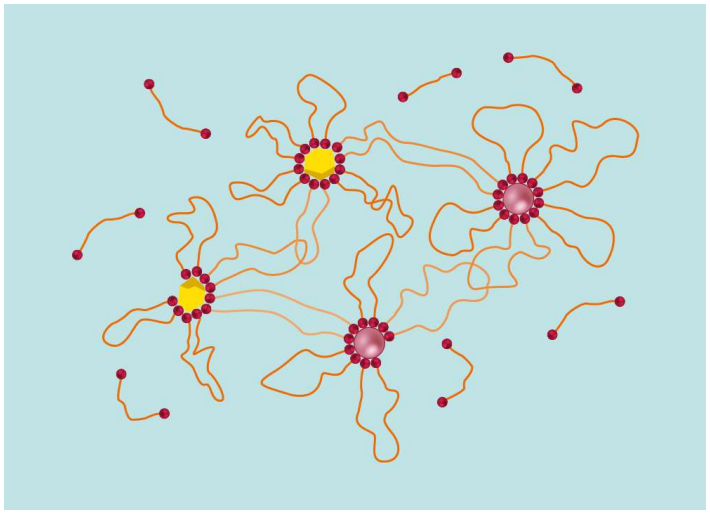
Non-Associative and Associative Thickening Effect

Non-Associative



- Chain entanglement
- Molecular weight
- Pseudoplastic rheology

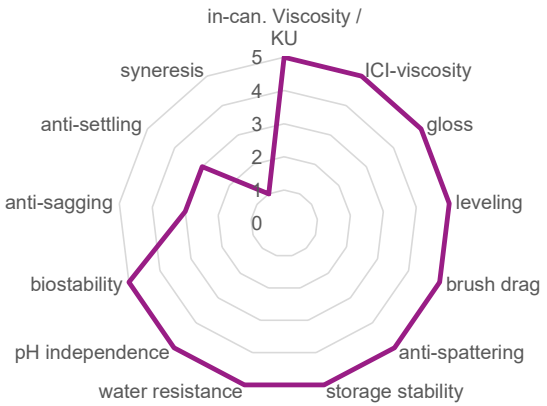
Associative



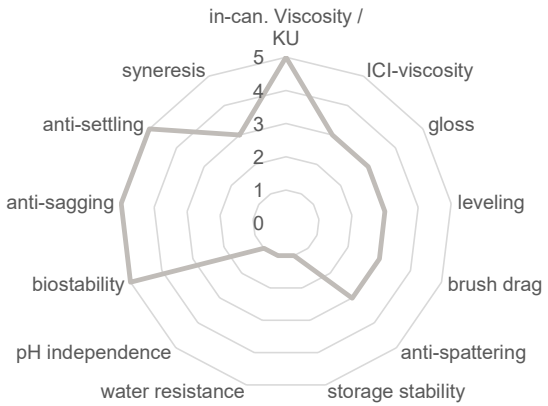
- Dynamic network
- Chain length and structure
- Newtonian and pseudoplastic rheology

Performance Comparison of Thickeners for WB Systems

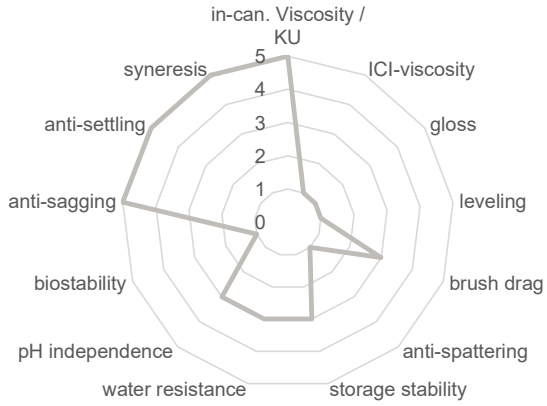
Polyurethane thickeners



Polyacrylic thickeners



Cellulosic ethers



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Rheology Modifier

WB

TEGO® Viscoplus 3000	TEGO® Viscoplus 3010	TEGO® Viscoplus 3030	TEGO® Viscoplus 3060
For Newtonian flow behavior	For Newtonian flow behavior especially for ICI viscosity	Very universal for pseudoplastic flow behavior	For strong pseudoplastic flow behavior
Approx. 25% active matter content	Approx. 60% active matter content	Approx. 60% active matter content	Approx. 60% active matter content

Solution

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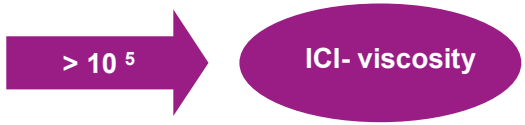
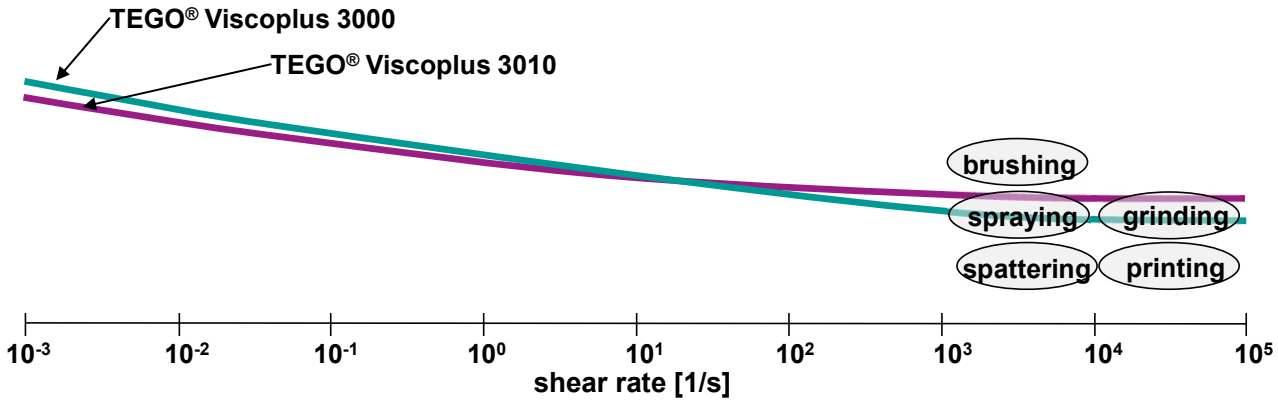
Newtonian High Shear Thickener – Rheology

TEGO® Viscoplus 3000 and 3010





Technical Background

- Newtonian, high-shear thickener
- Low contribution to low-shear viscosity
- Very high thickening effect at high shear-rates
- Control of application properties

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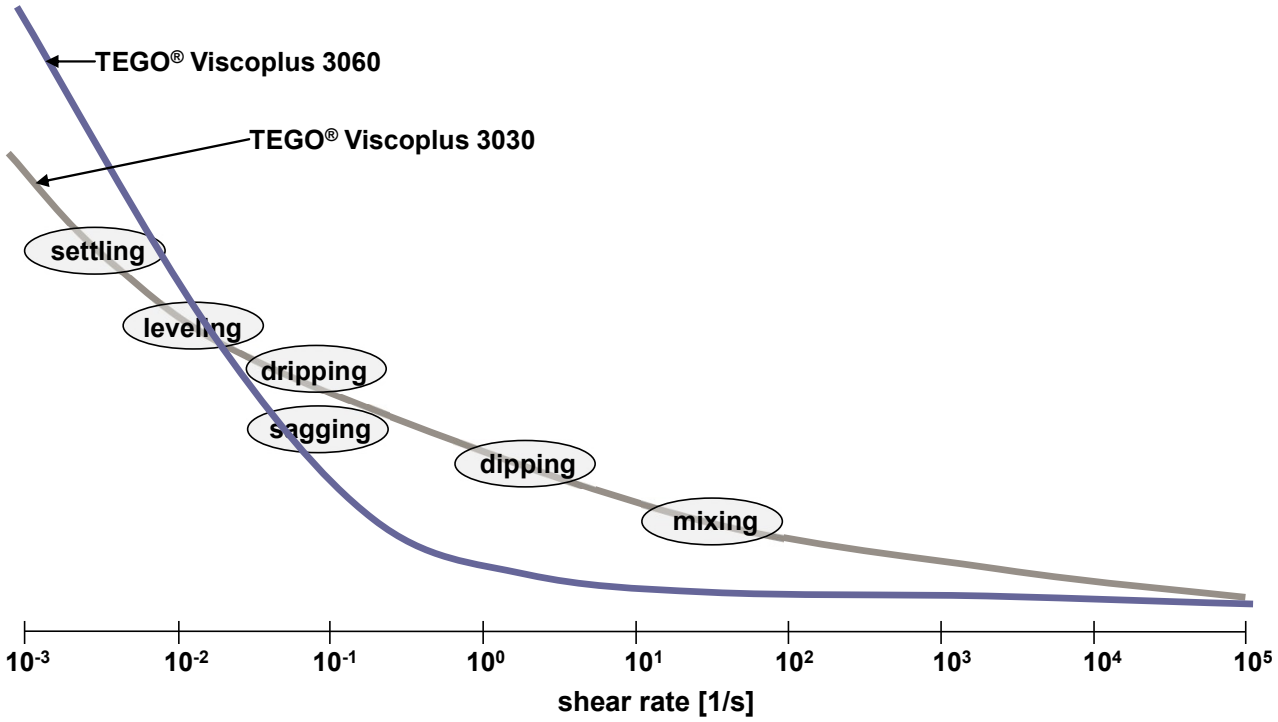
Pseudoplastic/Shear Thinning Thickener – Rheology

TEGO® Viscoplus 3030 and 3060



Technical Background

- Shear thinning flow behavior
- High thickening effect at low to mid-shear rates
- Very efficient with most binders
- Control of in can-viscosity and storage stability

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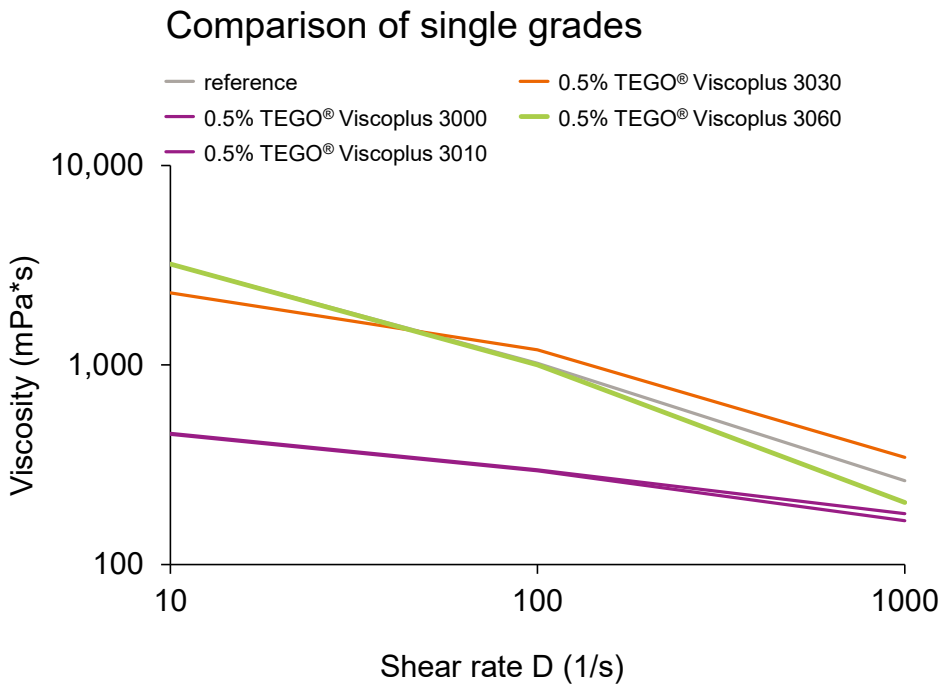
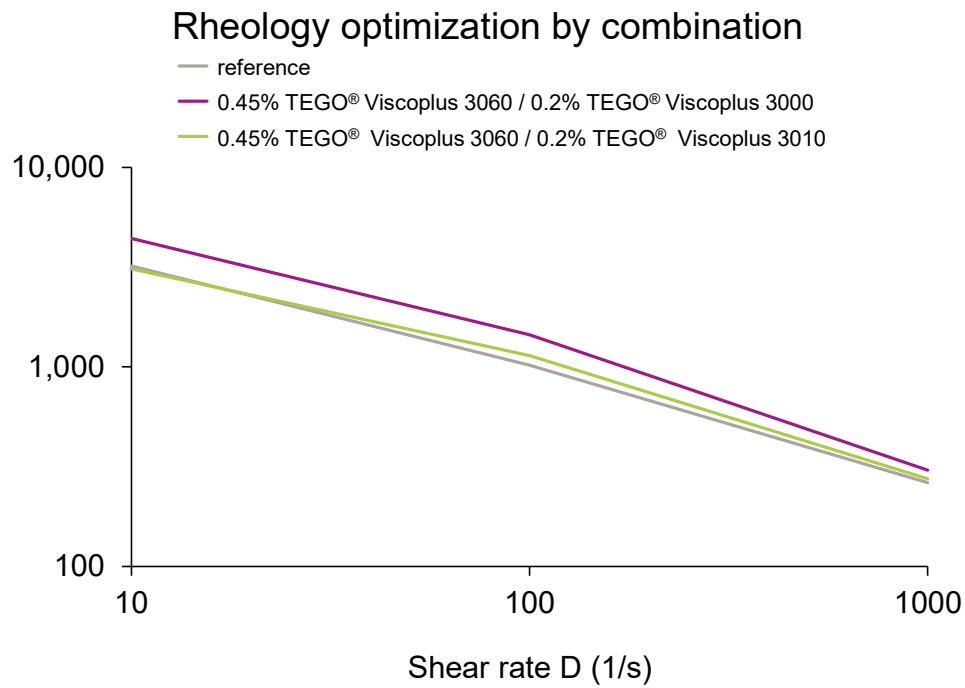
Rheology Profile Optimization

Rheology control of a waterborne acrylic trim paint





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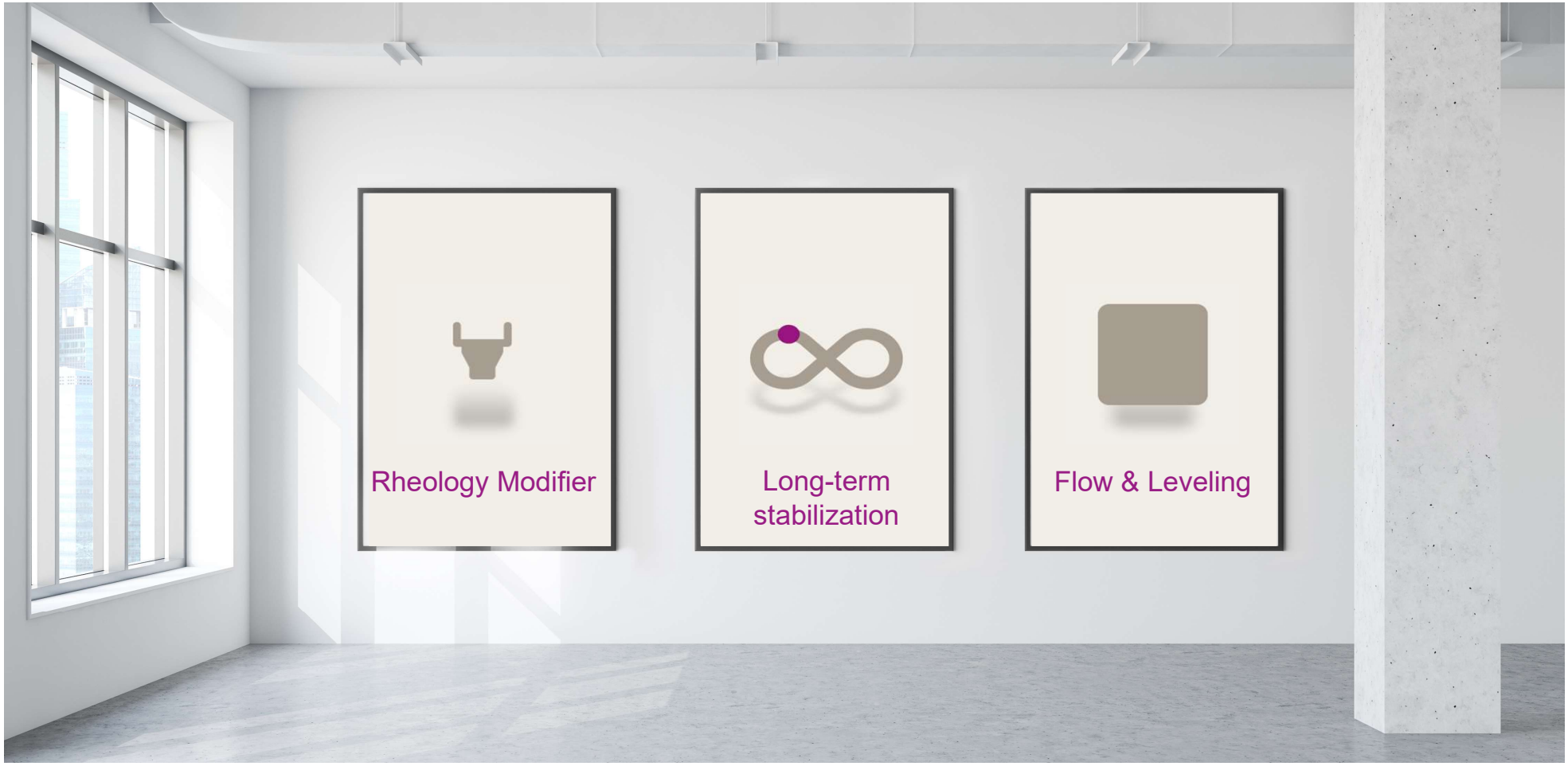
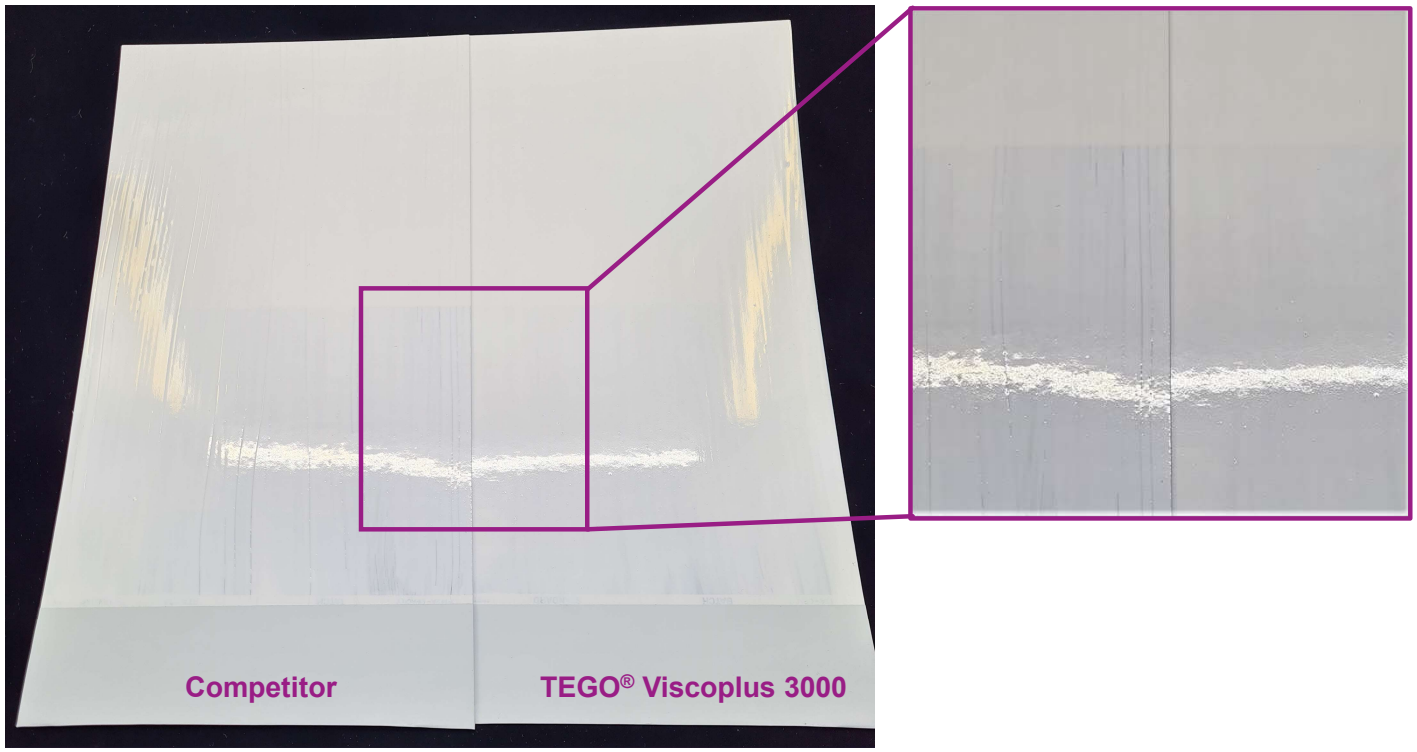


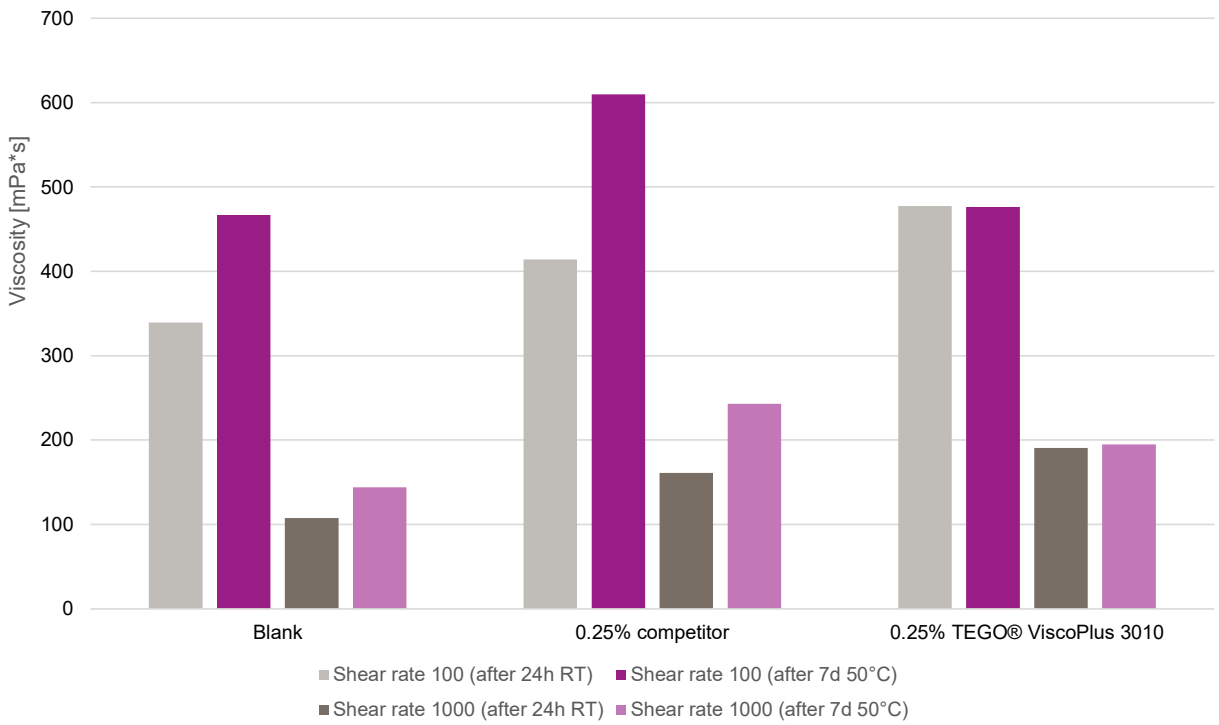
TEGO® Viscoplus 3000



Better leveling and higher gloss development

- TEGO® Viscoplus 3000 shows good leveling and cissing behavior
- PVC 18%
- High gloss emulsion paint
- Based on NeoCryl XK-98
- Applied with brush
- Addition level of 0.7%

TEGO® Viscoplus 3010 more stable viscosity during storage



Technical Background

- TEGO® Viscoplus 3010 more stable viscosity over time
- PVC 30%
- Glossy emulsion paint viscosity at different shear rates before and after storage

TEGO® Viscoplus 3030

Original

+0.5% TEGO® Viscoplus 3030

+1.0% TEGO® Viscoplus 3030

Anti-Spattering Effect in Architectural Paints

- Black leneta card is placed under a grid
- Paint is rolled over the grid with a paint roller
- Visual assessment of the spattering behaviour

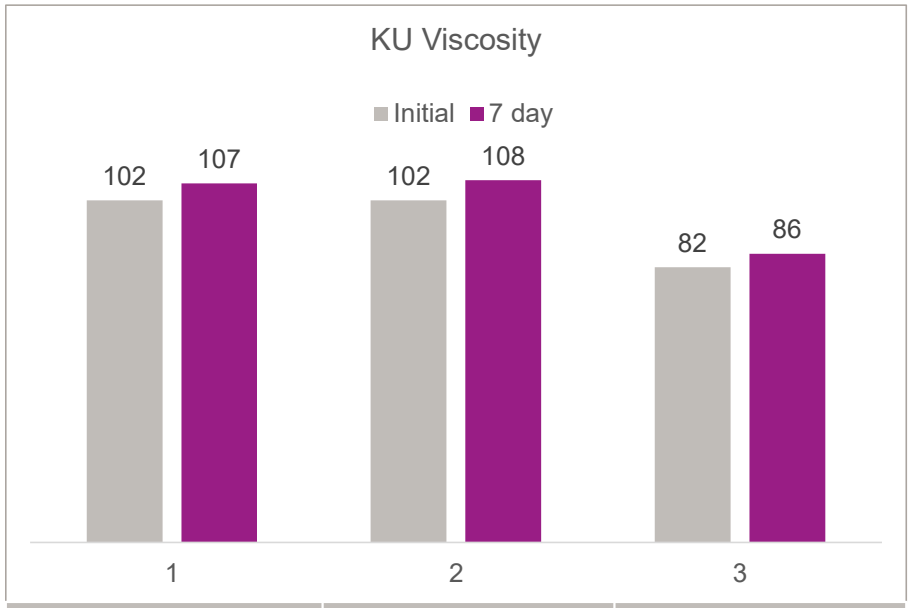
Semi-gloss emulsion paint
PVC: 29%
Solids content: 56%

TEGO® Viscoplus 3060 – Strongest Anti-Sagging Performance

Highly efficient

- TEGO® Viscoplus 3030/3060 shows good anti-sagging performance
- PVC 18%
- High gloss emulsion paint
- Based on NeoCryl® XK-90
- Addition level of 0.1%

40PVC – Paint Viscosity at Room Temperature

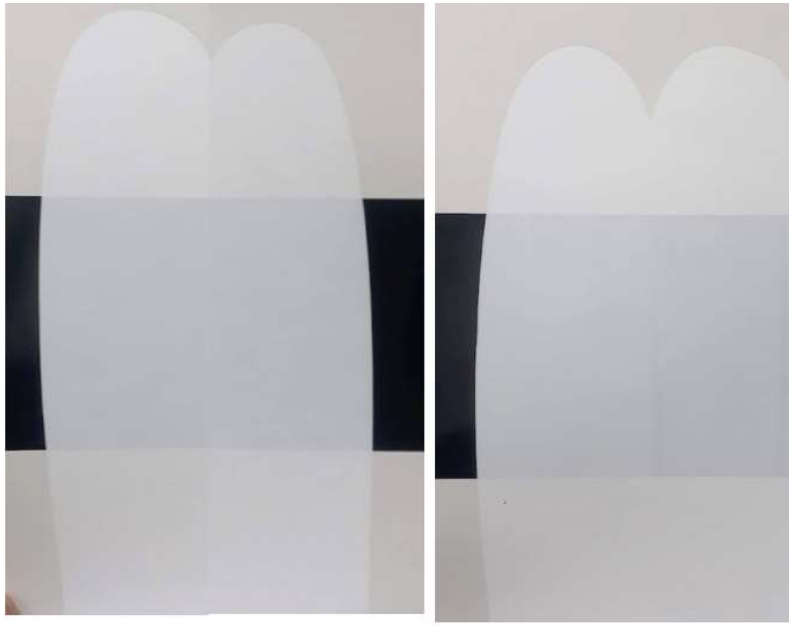


1% TEGO® Viscoplus 3030	1% Comp. 1	3% Comp. 2
0.25% TEGO® Viscoplus 3000	0.25% Comp. 4	0.25% Comp. 3

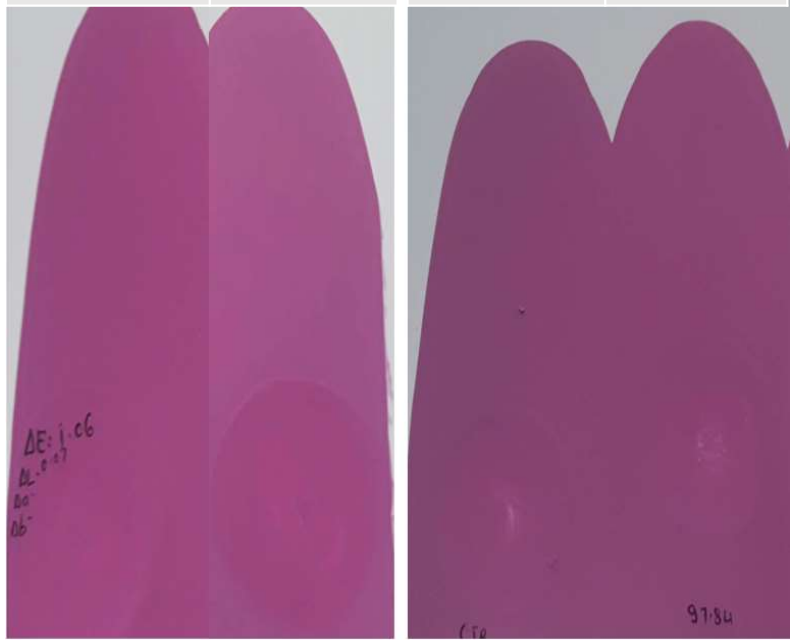
- KU Viscosity of 100-110 is desired for architectural coatings
- 1% TEGO® Viscoplus 3030 + 0.25% TEGO® Viscoplus 3000 combination has shown comparable KU viscosity to Comp. 1 and Comp. 4
- 3% Comp. 2 + 0.25% Comp. 3 formulation gives lowest KU viscosity in our formulation

40PVC Optical panels – White & 5% Tinted

1% TEGO® Viscoplus 3030	1% Comp. 1	1% TEGO® Viscoplus 3030	3% Comp. 2
0.25% TEGO® Viscoplus 3000	0.25% Comp. 4	0.25% TEGO® Viscoplus 3000	0.25% Comp. 3

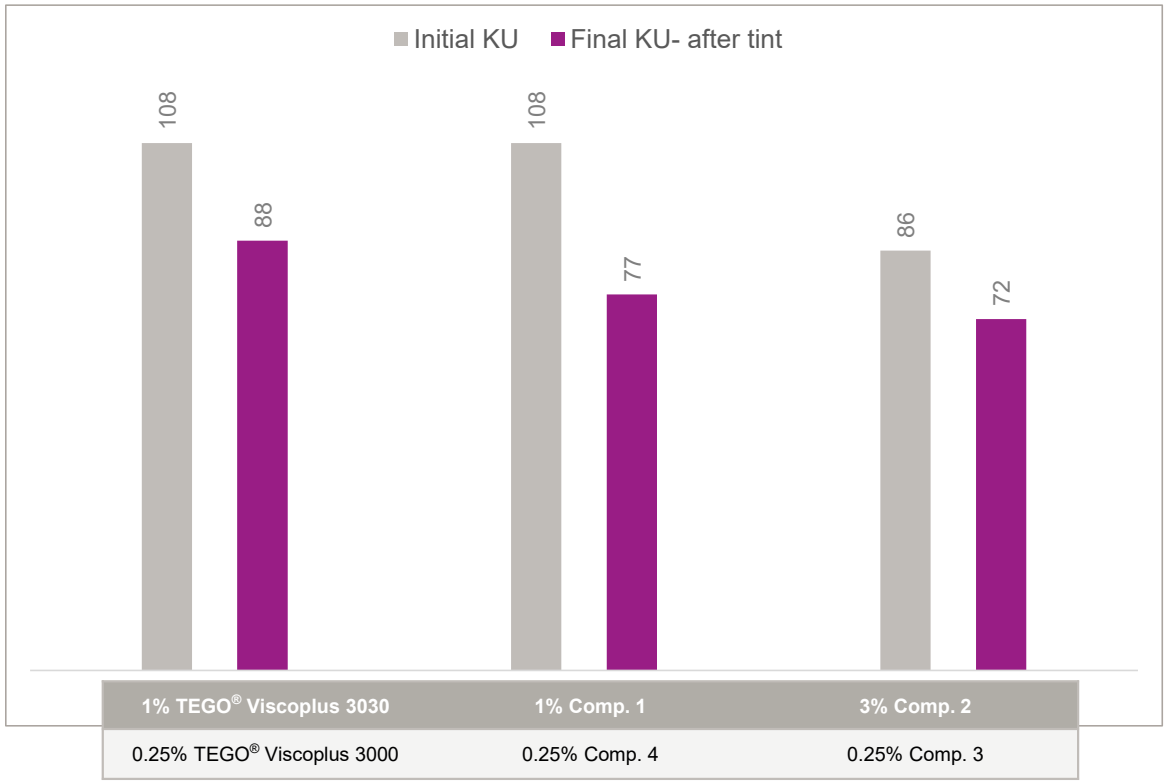


1% TEGO® Viscoplus 3030	1% Comp. 1	1% TEGO® Viscoplus 3030	3% Comp. 2
0.25% TEGO® Viscoplus 3000	0.25% Comp. 4	0.25% TEGO® Viscoplus 3000	0.25% Comp. 3



Viscosity drop after tinting with 5% colorant

40PVC



Technical Background

- 1% TEGO® Viscoplus 3030 & 0.25% TEGO® Viscoplus 3000 combinations have shown better viscosity drop control against 1% Comp. 1 + 0.25% Comp. 4
- 3% Comp. 2 + 0.25% Comp. 3 combination has shown lowest viscosity drop

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Oven stability (55° C @ 30 days) 40PVC

	1% TEGO® Viscoplus 3030	1% Comp. 1	3% Comp. 2
	0.25% TEGO® Viscoplus 3000	**0.25% Comp. 4**	**0.25% Comp. 3**
Initial ku	104	108	82
Final KU	104	108	90
KU -diff	0	0	**8**
Synerises	No	Yes(2-3 ml)	slight emulsion creamy layer on top

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Summary

TEGO® Viscoplus Unique Selling Proposition

- Liquid and high active matter content
- No added solvents
- Ultra-low VOC
- Free of tin organic substances
- NPE, APEO-free
- Low impact on gloss
- Excellent compatibility with tinting systems
- pH independent performance
- Good stability against microbial degradation


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