

From nature to roof: Valida boosts Surface Strength and Flow in Elastomeric Roof Coatings

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Cool Roof Conference 08/10/2025

Sappi serves the world through headquarters in four key regions:

- Europe
- North America
- Southern Africa, and
- Asia.

We are powered by
the expertise of

11,235

people worldwide.



Product portfolio

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We are a diversified, innovative and trusted leader that unlocks the power of renewable resources for use in:

Pulp



Graphic papers



Packaging papers



Speciality papers



Timber products



Biomaterials



Valida Fibrillated Cellulose: Functional additive

Produced from woodfibers, no chemicals addition

Applications:

- ❖ **Paints and coatings**
- ❖ Pigments and inks
- ❖ Adhesives
- ❖ Packaging
- ❖ Personal care & HC
- ❖ Concrete admixtures
- ❖ Agrochemicals



Valida delivers consistent performance

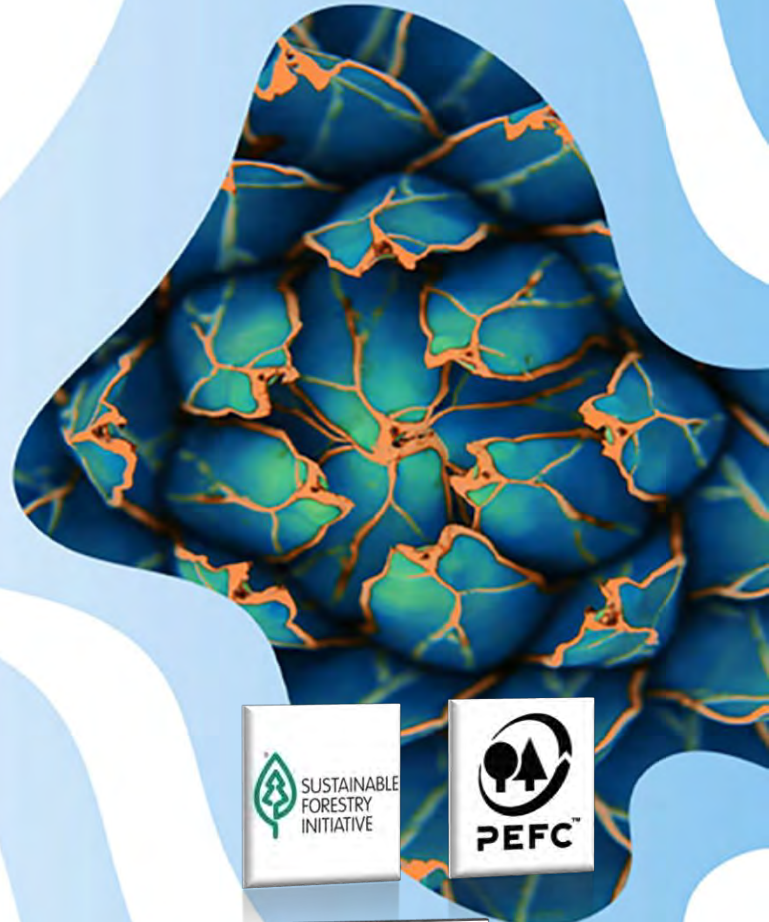
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- Natural
- Robust towards electrolytes
- Stable in pH 1-13
- Temperature stable

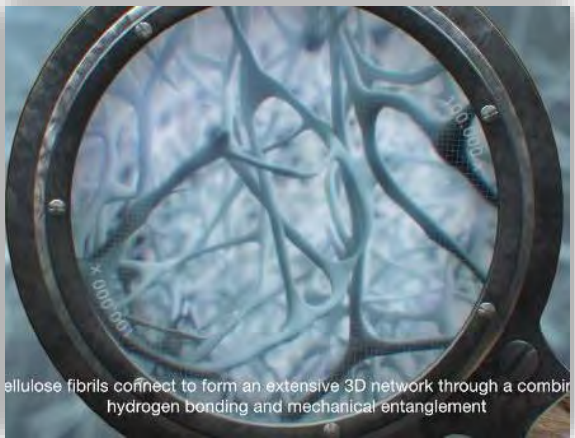


- Physical reinforcement
- Barrier
- Rheology control



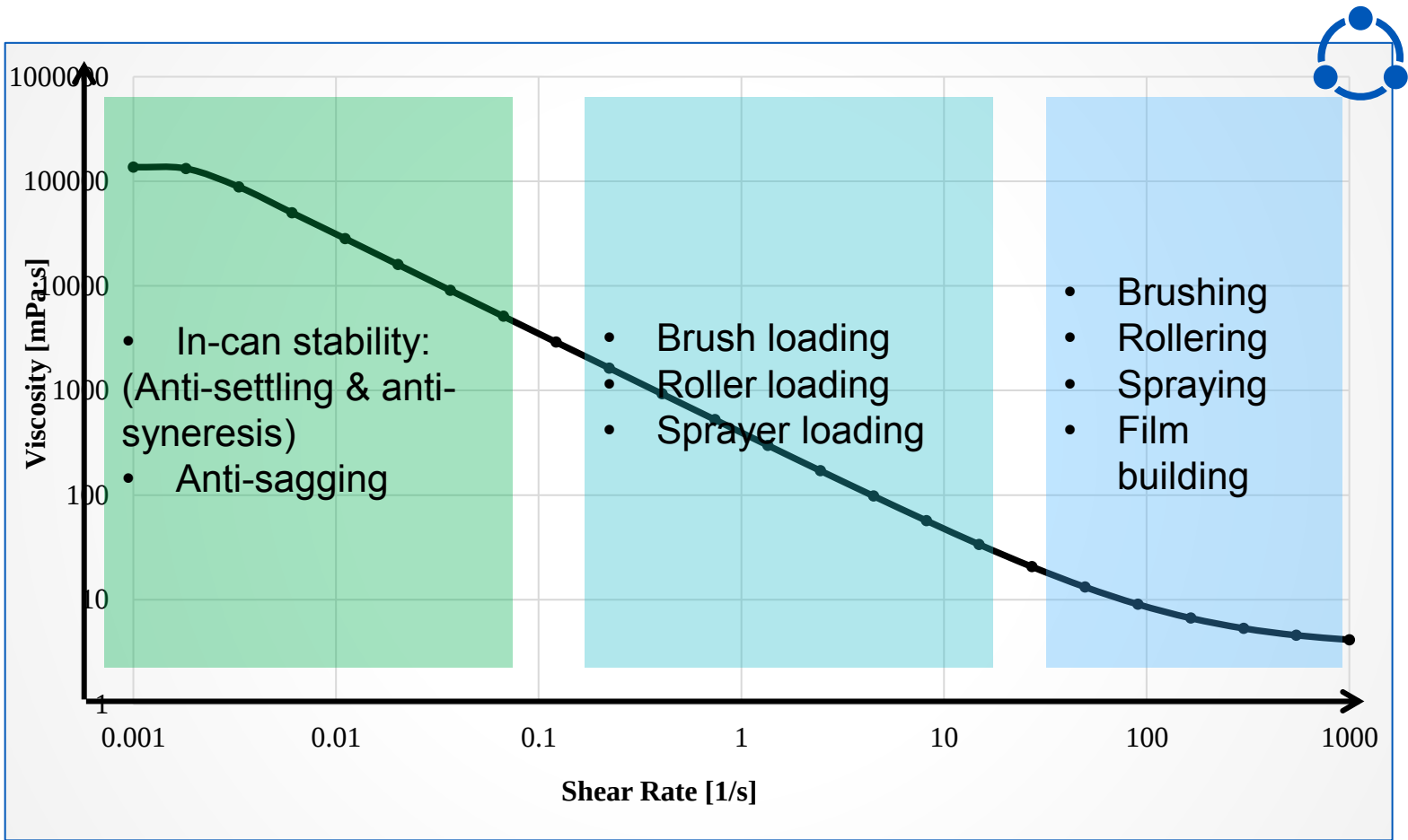
Shear thinning, sprayable, synergize with conventional thickeners

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cellulose fibrils connect to form an extensive 3D network through a combination of hydrogen bonding and mechanical entanglement

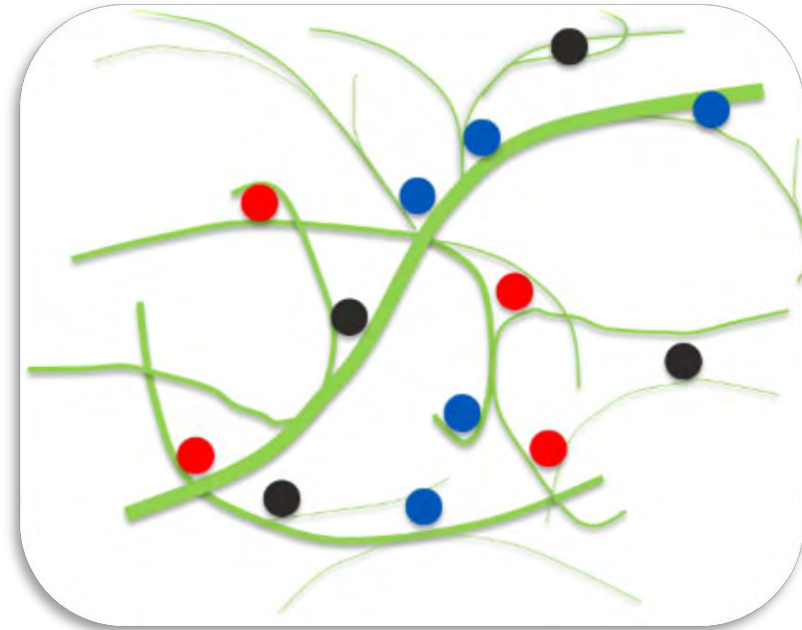
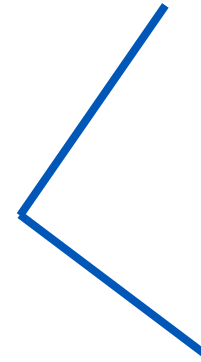
Valida forms a 3D network



Valida's network improves anti-settling

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- Testing conditions: 1 month stability test under 52°C (ASTM D1849)



Reference:
Heur + 2.5% Precipitated Silica

Anti-settling bvenefits in Fillers' Slurrys

- Enhancing Slurry and Suspension concentrate stability



Reference



Valida based

A Case Study: Valida in Elastomeric Roof Coating



Industry Challenges – Roof Coating

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Surface properties

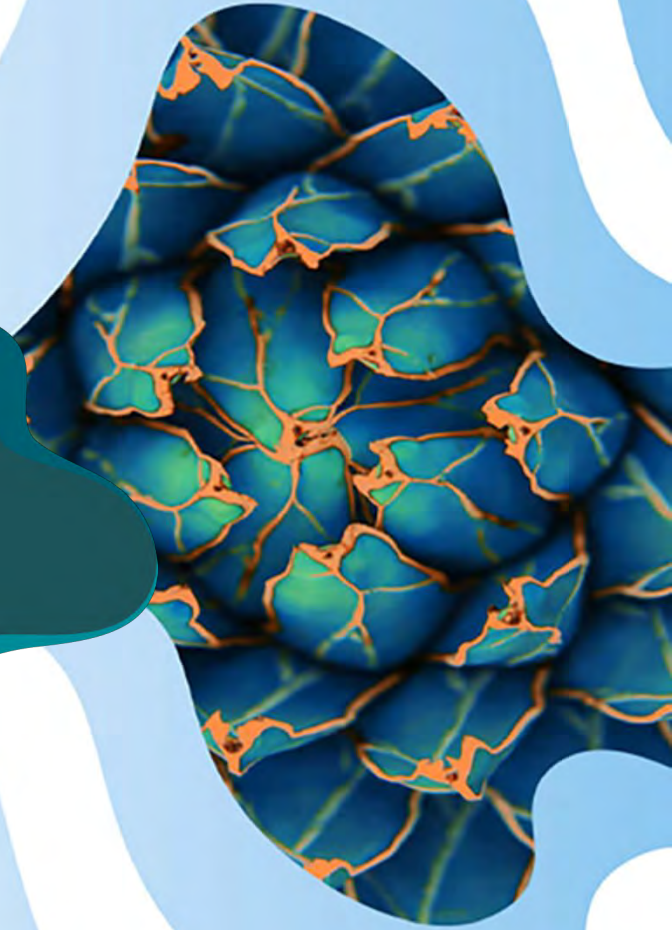
- ❖ White appearance
- ❖ Defect Free Surface
- ❖ Water sensitivity

Mechanical Properties

- ❖ Tensile strength
- ❖ Adhesion on substrate
- ❖ Elongation

Rheology and Flow control

- ❖ Workability
- ❖ Spray Ability
- ❖ Application of thick layers



Elastomeric Roof Coating Formulation

Formulation Features

- **PVC= 44%**
- **Solid content: 65% wt**
- **Binder dosage: 42% as received**

❖ How to add Valida?

1. Preparation of **Premix** to add in the grinding or post addition
2. **Direct addition** to the grinding stage

Raw Material	Form. 1	Form. 2	Form. 3	Form. 4	Form. 5
	Dosage* (wt.%)				
Valida (dosage based on active)	0.4	-	-	0.22	0.24
HEC	-	0.44	-	0.22	-
HEUR	-	-	0.3	-	0.15
Demineralized water	10.3				
Calcium carbonate + magnesium carbonate	35.4				
TiO ₂	8.0				
Pure Acrylic	42.0				

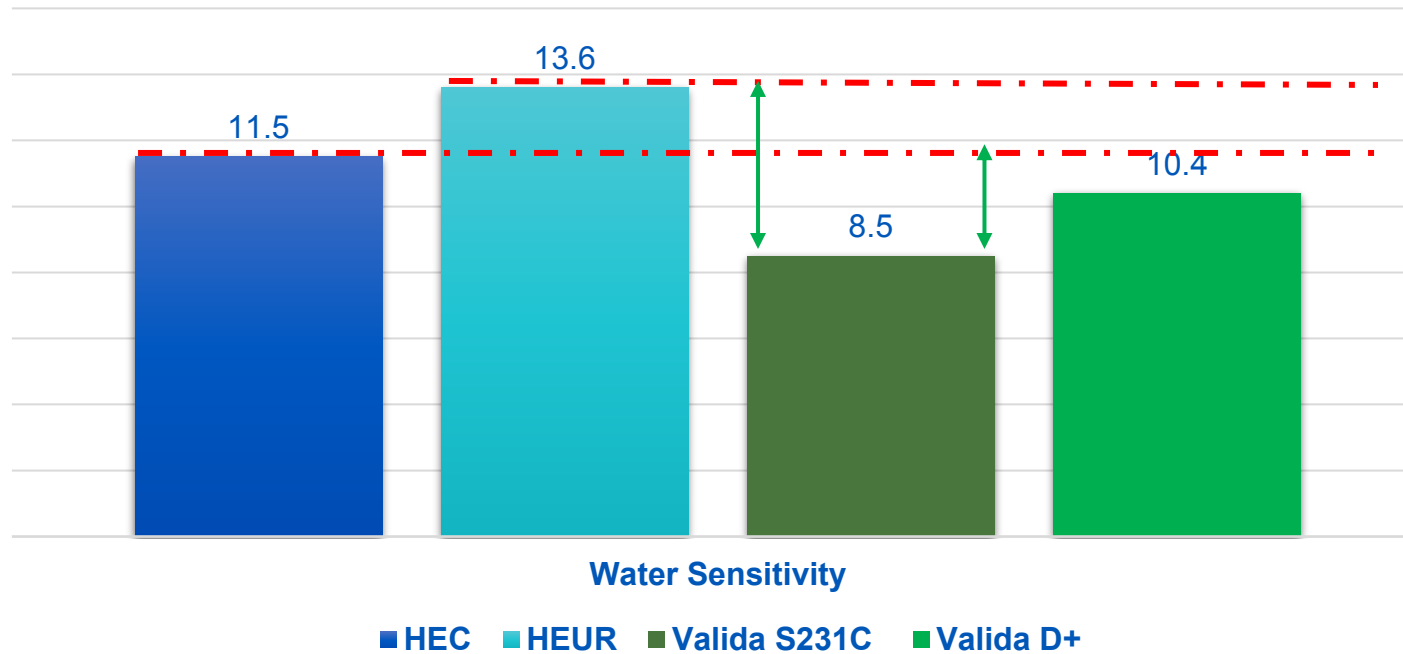


50% reduction

Surface properties

Elastomeric Roof Coating – Surface properties

- The insolubility of Valida's fibrils reduced water sensitivity of the coating



Formula	Water Sensitivity
Valida S231C vs HEC	- 13%
Valida S231C vs HEUR	- 38%
Valida D+ vs HEC	- 10%
Valida D+ vs HEUR	- 24%

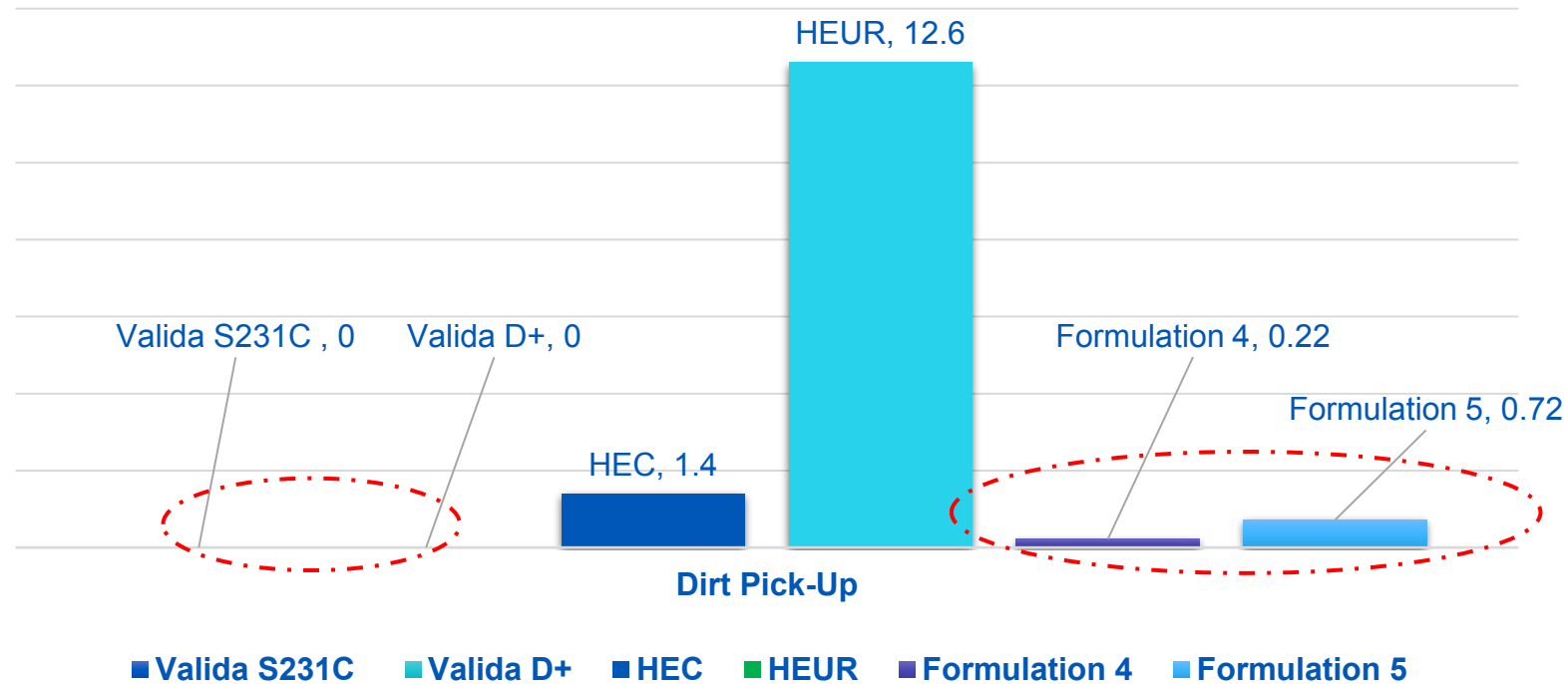
➤ Water Uptake test: ASTM D6083

Elastomeric Roof Coating – Surface properties

Valida fibrils enhance dirt pick-up resistance.

Pure Acrylic

MFFT= 0 C



Formula	Dosage
Formulation 4	0.22wt% HEC + 0.2 wt. Valida
Formulation 5	0.15wt% HEUR + 0.24 wt. Valida

➤ Dirt Pick Up test: UNI 10792

Valida decreased dirt pick-up after aging

Sample	HEC	HEUR	Valida @0.4%	Valida @ 0.6%
DPUR Δ L before UV	0.07	4.31	0.20	0.86
DPUR Δ L after UV	0.54	0.13	0.15	0.02

→ **HEUR** increased tendency to dirt pick-up before exposure, lower after exposure.

Important: The coatings that got dirty before leaching, will remain dirty!

→ **HEC** increased tendency to dirt pick-up after exposure, which may predict further progression

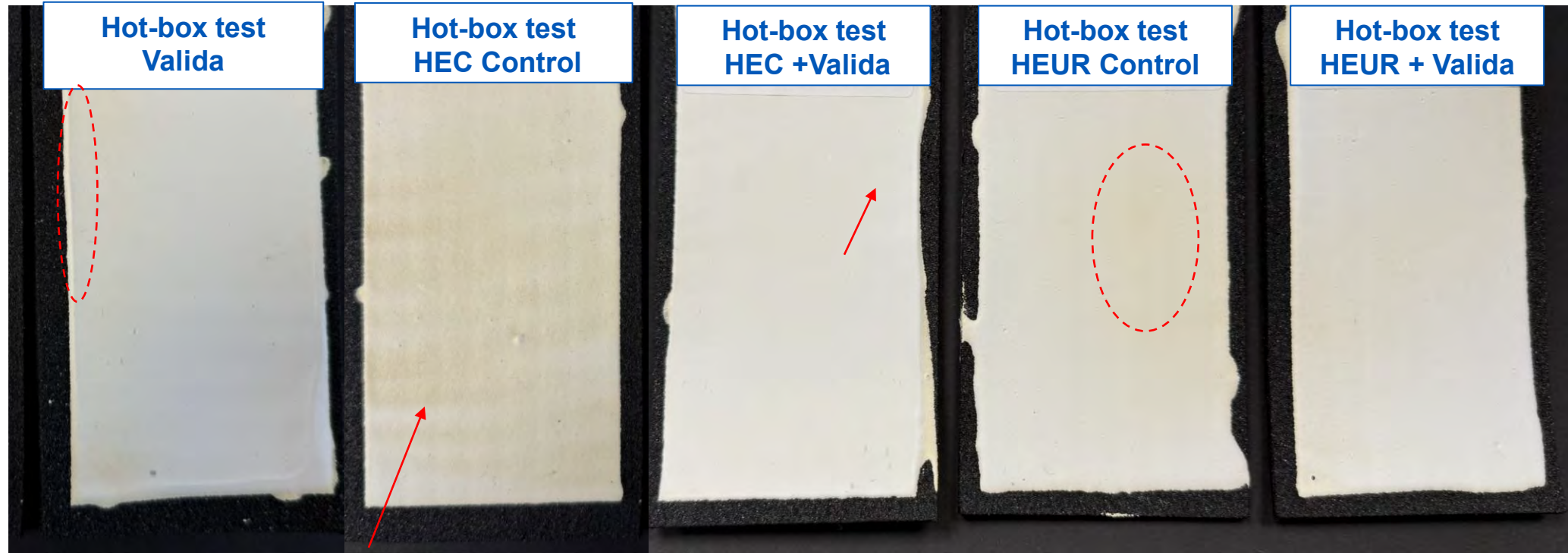
→ Both **Valida based formulations** decreased dirt pick-up tendency after exposure

Exposure Conditions: ASTM G154

- 8 h UV radiation 1.55 W/m² @ 340 nm
- T= 60 C (UVA 340 Lamps)
- 0.25 h water spray 7 L/m² (< 5 µS/cm)
- 3.75 h condensation at T 50 C

Valida reduced asphalt bleeding effect

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Valida's fibrils formed an internal barrier which reduced the oil bleeding from the substrate to the surface.

Parameters	Valida	HEC Control	HEC + Valida	HEUR Control	HEUR + Valida
DE* _{ab}	3.25	13.0	5.22	9.36	8.90

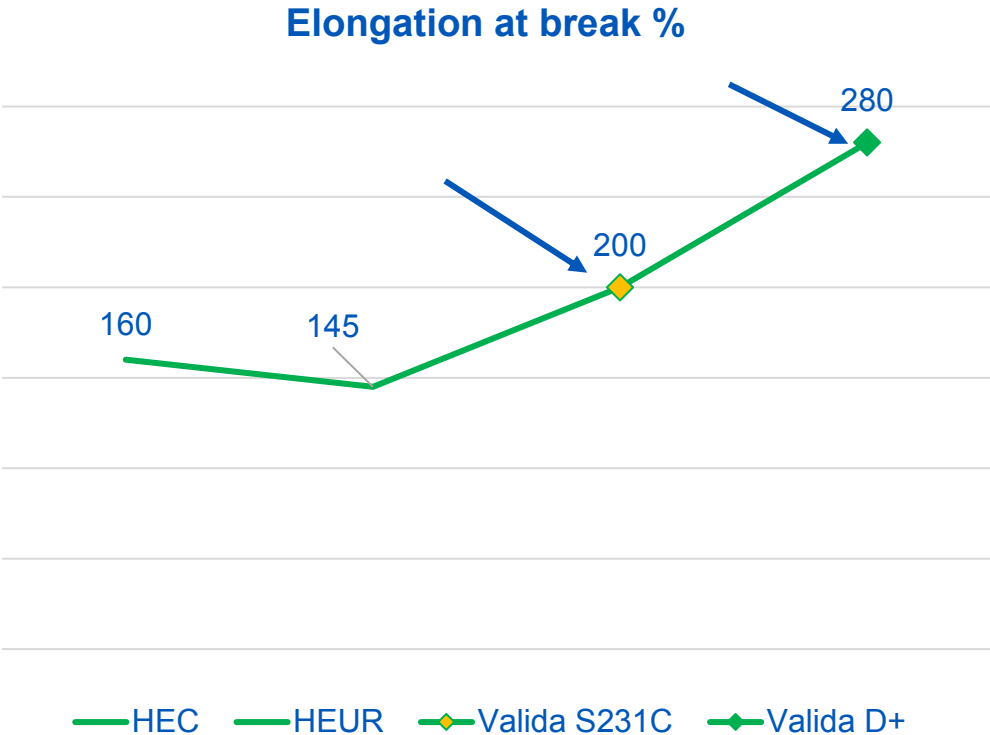
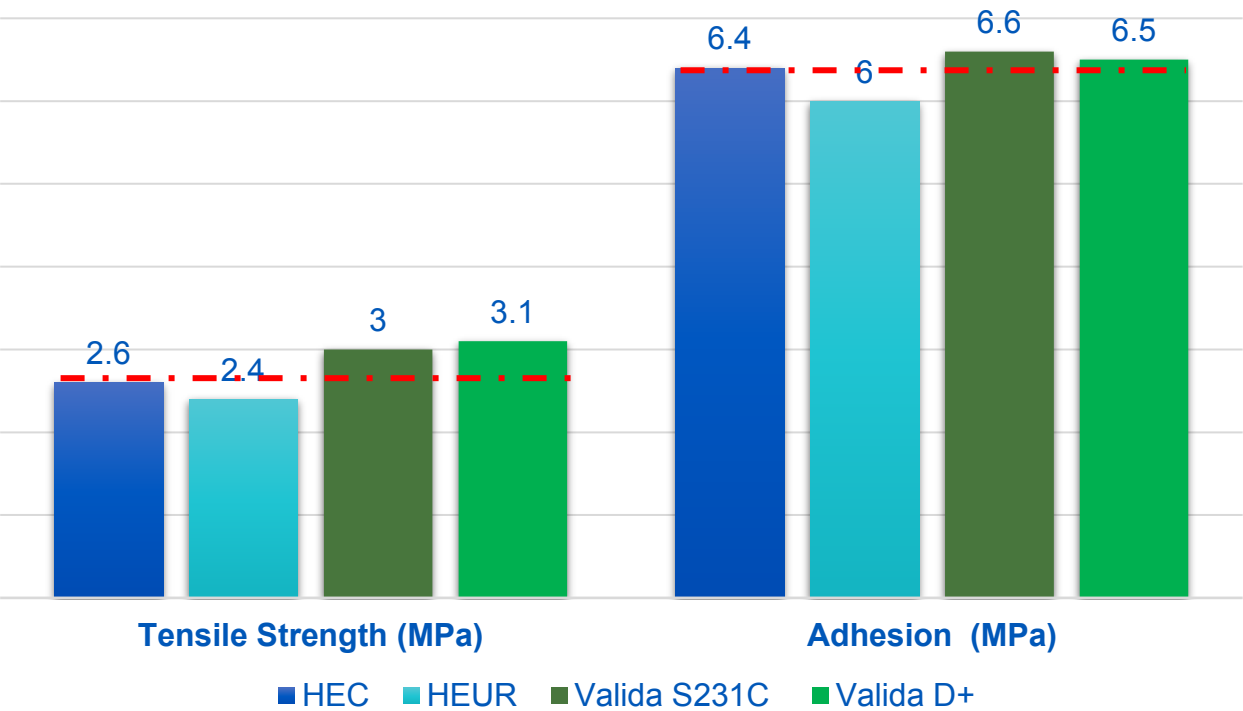
➤ Bituminous bleed-through test

Mechanical Properties

Mechanical properties: 1-on-1 replacement

Valida cellulose fibrils boosts both: tensile strength and elongation at break

Pure Acrylic
MFFT= 0 C



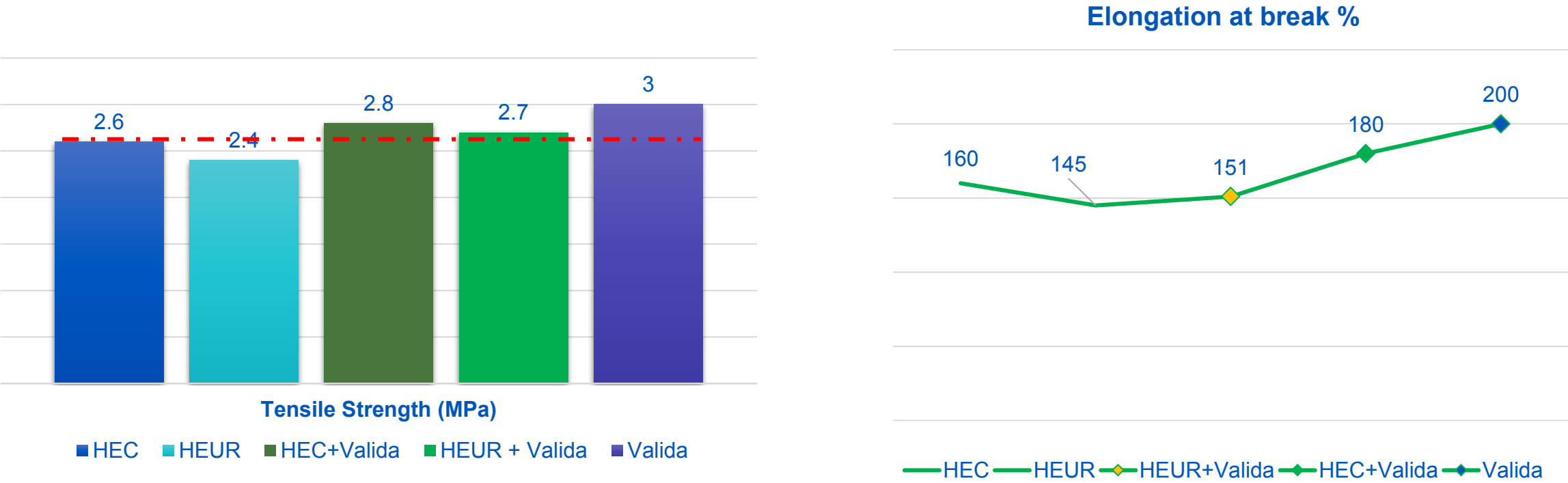
Formula	Tensile strength
Valida S231C vs HEC	+ 13%
Valida S231C vs HEUR	+ 25%
Valida D+ vs HEC	+ 19%
Valida D+ vs HEUR	+ 29%

- Tensile strength: ASTM D2370
- Adhesion: ASTM D7234

Mechanical Properties: Synergistic effect

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Synergy of Valida (reduced dosage) with conventional thickeners **enhances** physical properties



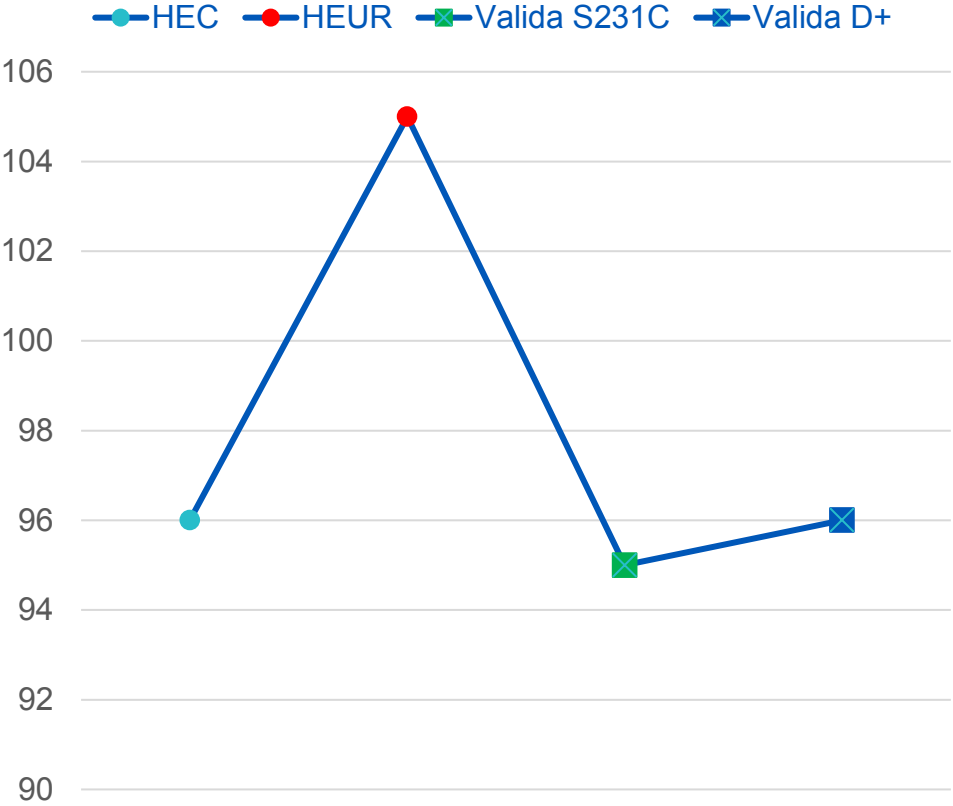
Set-up	Dosage	Tensile strength	Elongation
Formulation 1	50% reduced HEC + Valida	7% ↑	12.5% ↑
Formulation 2	50% reduced HEUR + Valida ↓	12.5% ↑	4% ↑

- Tensile strength: ASTM D2370
- Adhesion: ASTM D7234

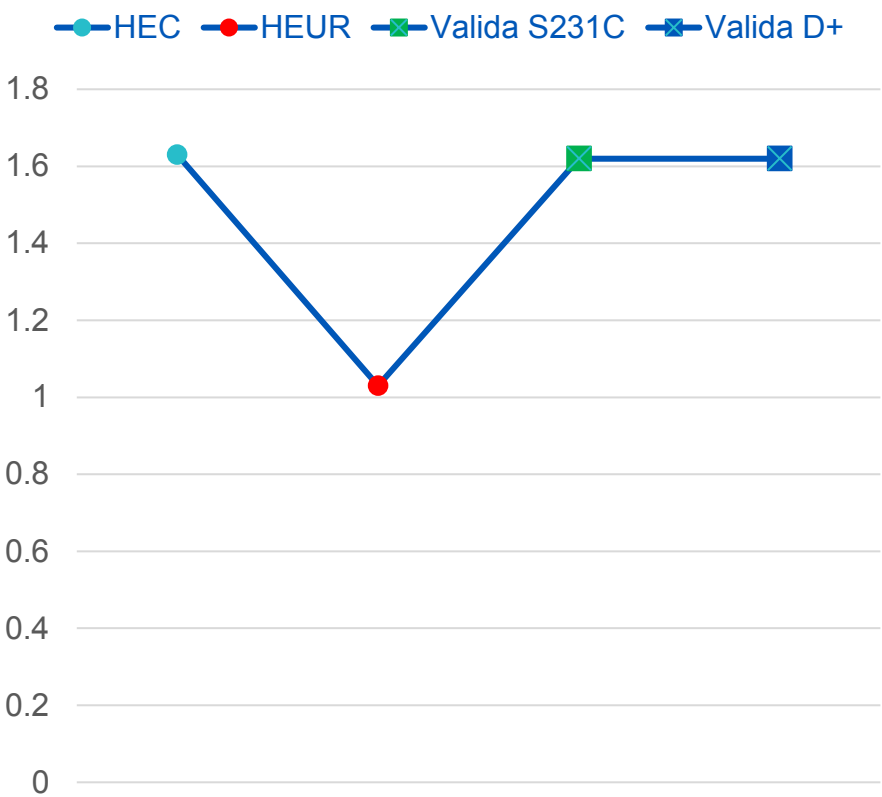
Flow control

KU and ICI Viscosity: 1-on-1 replacement

KU Viscosity



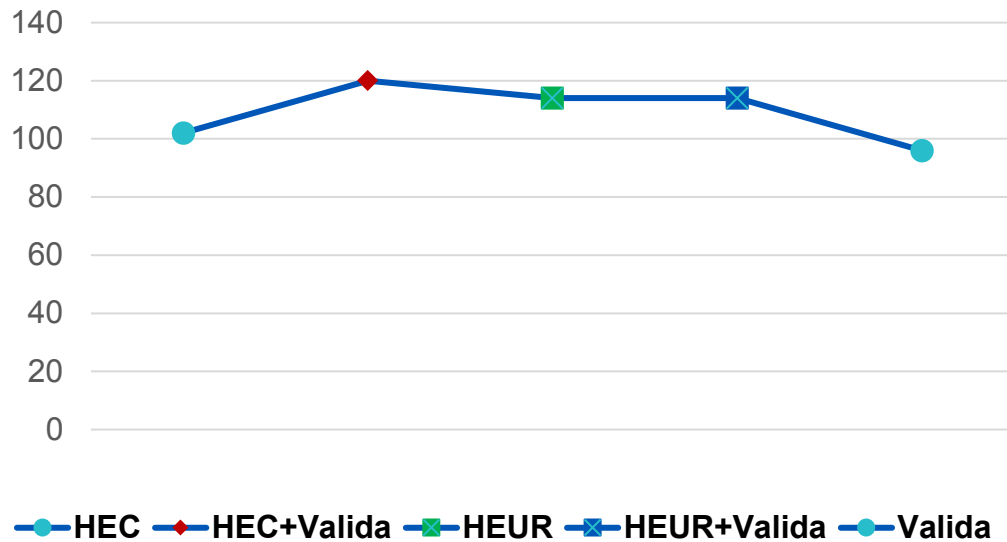
ICI Viscosity



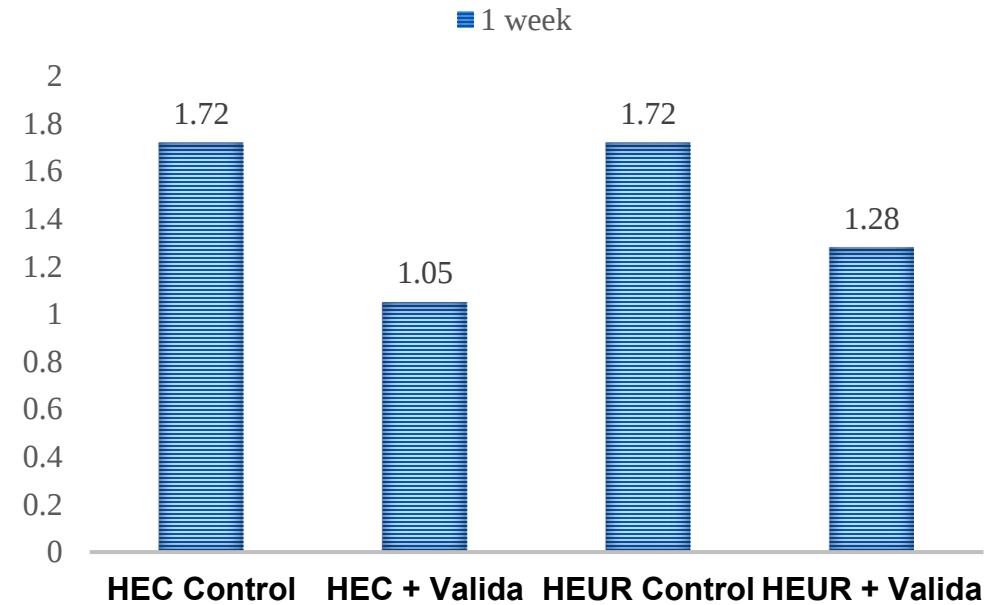
KU and ICI Viscosity: Synergistic effect

Valida and conventional rheology modifiers synergize to ensure rheology control and ease of application.

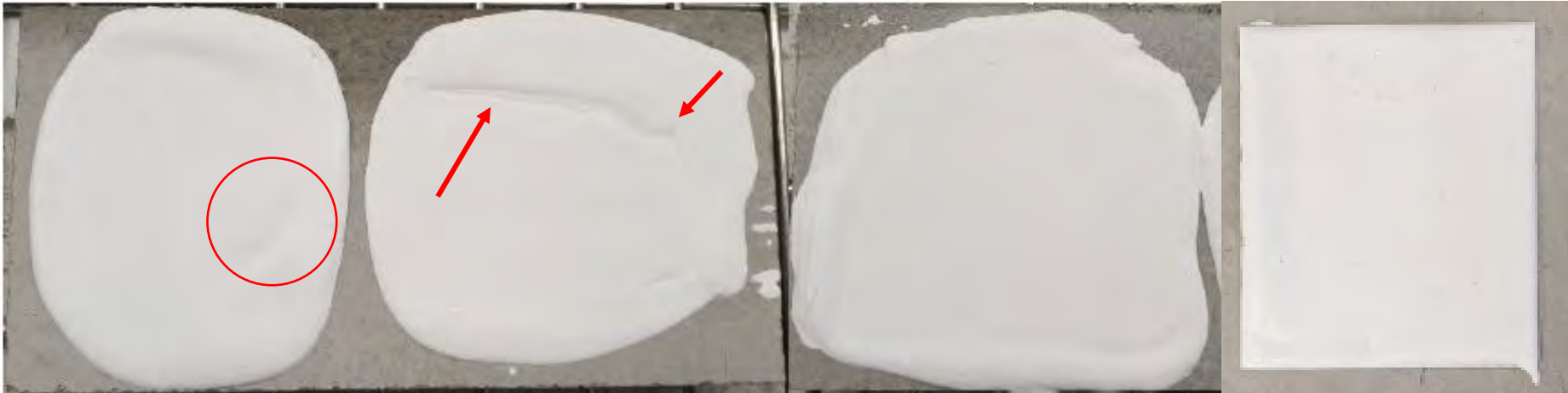
KU Viscosity



ICI VISCOSITY



Valida eliminated mud cracking after aging test



HEC	HEUR	Valida S231C	Valida D+
Sligh Cracking	Significant Cracking	No Cracking	No Cracking

Thickness: 5-8 mm wet layer at 50 °C

➤ Valida samples after aging: **No cracks**



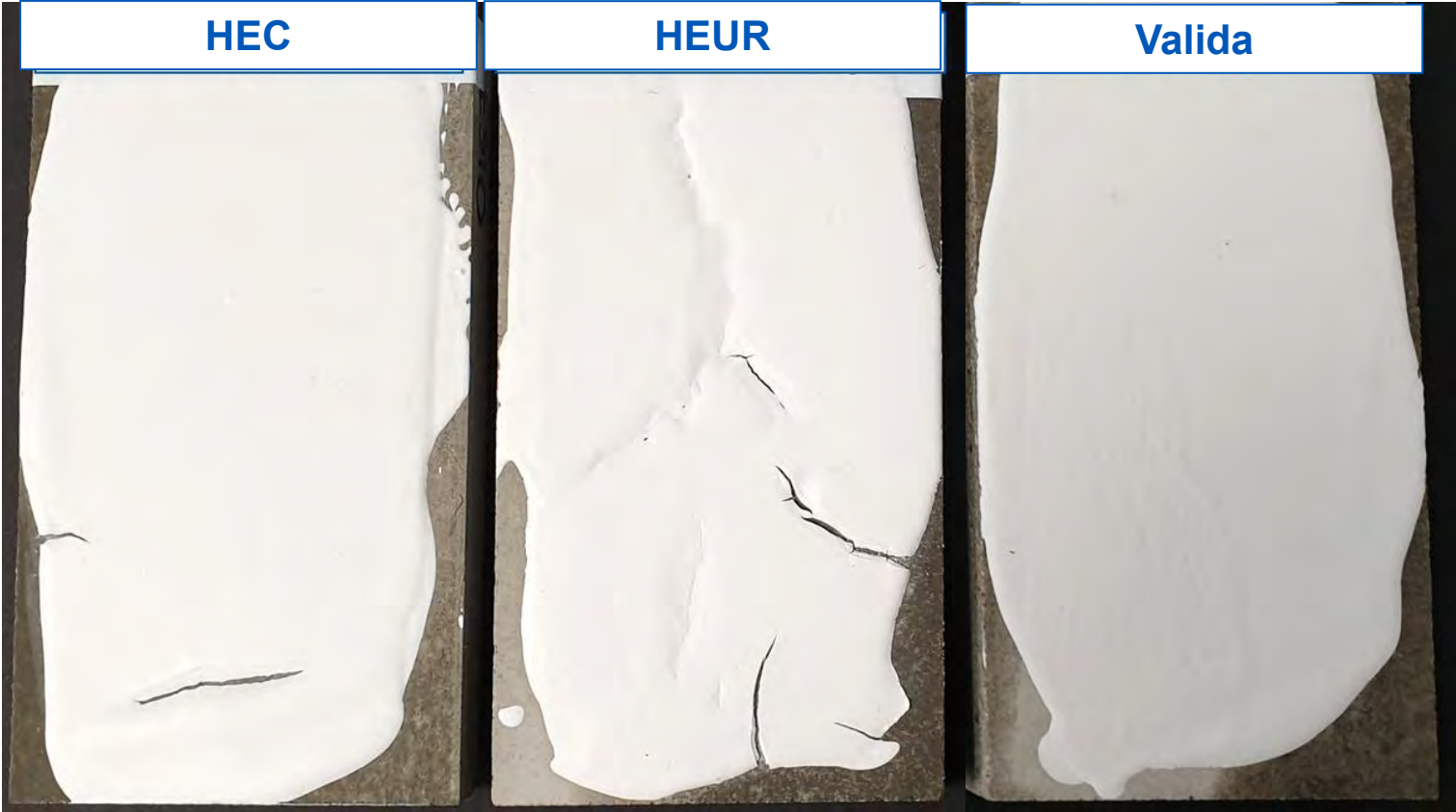
Highly shear thinning - Film Building

Exposure Conditions: ASTM G154

- 8 h UV radiation 1.55 W/m2 @ 340 nm
- T= 60 C (UVA 340 Lamps)
- 0.25 h water spray 7 L/,om (< 5 µS/cm)
- 3.75 h condensation at T 50 C

Valida eliminates mud cracking

Reference Paint:	Mud cracking
Valida	None
HEC	Edge Cracking and checking
HEUR	Significant cracking and checking



Valida: Highly Shear thinning and Sprayable

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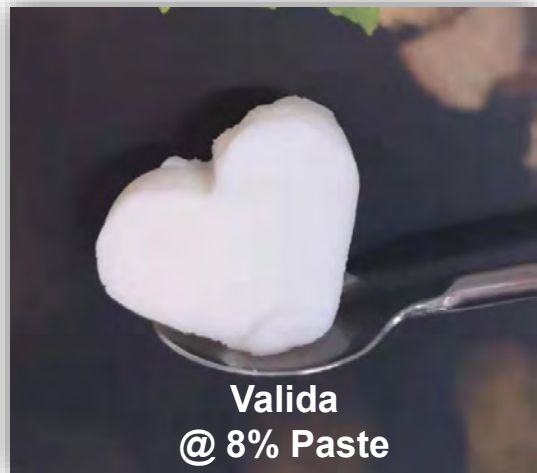
Ref.— spray pattern



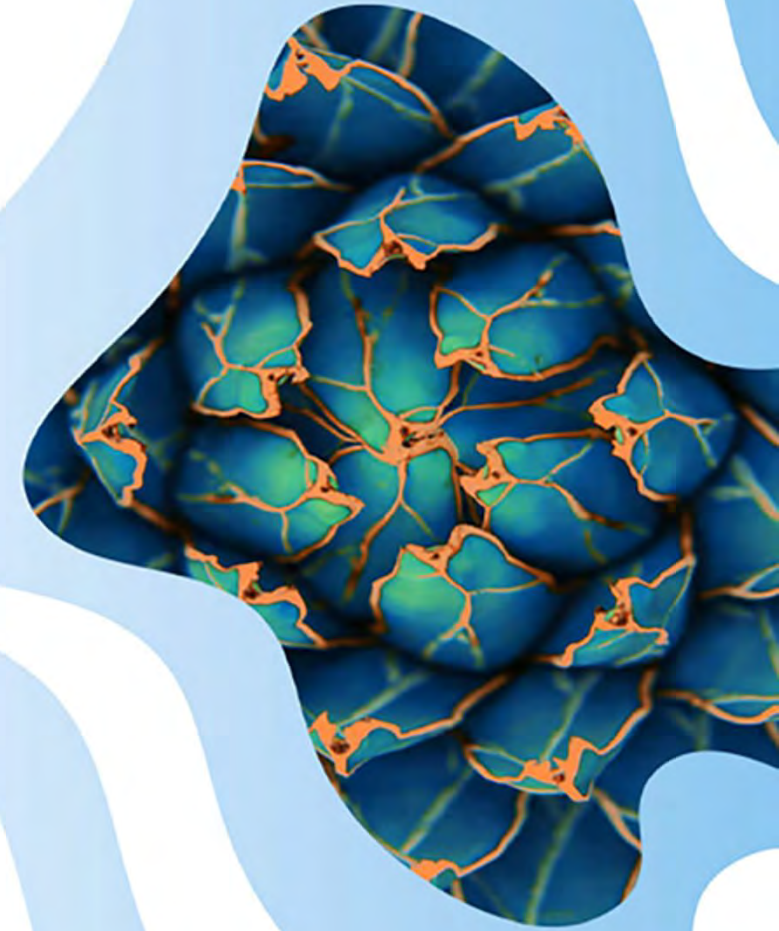
Valida - spray pattern

Valida commercial products

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Valida free-flowing powder



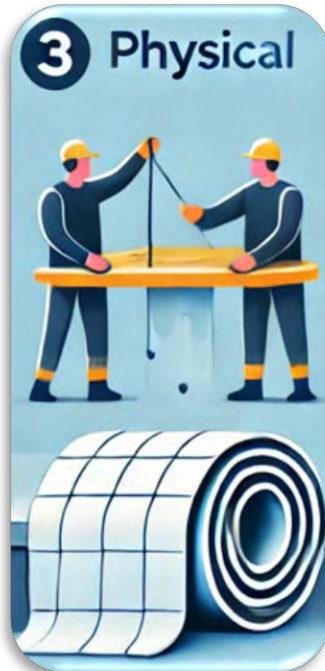
Key takeaways: What Valida will bring

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1 Surface

- ✓ Reduced Water Sensitivity
- ✓ Reduced Dirt Pick-Up
- ✓ No cracking of thick layers during drying



3 Physical

- ✓ Adhesion,
- ✓ Enhanced Tensile Strength
- ✓ Good Elongation



3 Rheology

- ✓ Easier and faster application of thick layers
- ✓ Enhanced thixotropy
- ✓ Anti-sag and Anti-settling

*Case study formulation also available for Styrene acrylic binder

Thank you!

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