Valida

Elastomeric roof coatings, from chemical to natural

sappi

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Across the industrial applications, consumers are seeking more natural ingredients that are capable of increasing the sustainability of the final formula, while keeping or improving performances when compared to synthetic incumbents. Although the demand is clear, companies still struggle to find a suitable replacement that provides unique rheology and other benefits associated with artificial compounds. That's where Valida comes in. Valida is a renewable material that delivers multiple functionalities to coatings applications, from rheology to stability and surface properties, as well as supporting a more sustainable lifecycle.

Valida is natural cellulose, the most abundant organic material on earth.

The power of cellulose. Enhanced by Sappi.

Sappi is a global diversified woodfibre group, focused on dissolving pulp, paper-based solutions and high-quality functional biomaterials.

Manufacturing operations can be found on 3 continents with sales in over 150 countries. We are using our global leadership position and significant investment in Research and Development in coated graphics papers, speciality packaging grades, dissolving pulp and biorefinery processes, to respond to the growing global demand for high-quality functional biomaterials.

CELLULOSE IS THE SOURCE OF OUR INSPIRATION

As we focus on creating value for our shareholders from relevant, sustainable woodfibre products, we take cognisance of our impact on the planet and our stakeholders to ensure that all benefit in the long term. Our commitment to sustainability is based on being a trusted, transparent, and innovative partner in building a bio-based circular economy. Sustainability is entrenched in the way we manage our daily business activities, mitigate risk, leverage opportunities, and plan for the future. We hold ourselves accountable for global sustainability and best practice standards by transparently measuring, monitoring, and communicating our economic, social, and environmental performance. We further use innovative technology to contribute to a thriving world through reliable and relevant solutions by extracting more value from each tree.

Sustainability and collaboration

At Sappi, we believe that building a thriving, sustainable world is a moral and business imperative, affecting each and every decision we make.

We are known for our challenge-driven innovation in natural solutions and are continuously looking for strategic partnerships in the quest for a sustainable future.

Minimise energy consumption.

Maximise bio-based circular economy.

Adherence to the highest quality standards.

Natural, biodegradable.

Valida in elastomeric roof coatings – natural performance

Elastomeric roof coating is applied to a variety of roof types to protect and seal the underlying roofing material and limit future weathering. These types of coatings are designed to "move" with your roof and maintain a good elasticity, to ensure long term durability. Elastomeric roof coatings have to show a good adhesion to the substrate, since they can be applied to several types of roofs, such as metal roofs, concrete roofs, bitumen and other substrates.

In elastomeric roof coating formulations, elongation, and tensile strength are very important to ensure longevity. Rheology plays a crucial role to provide good workability, ease of application and the potential to apply a thicker layer (more effective) via spraying or roller application with a reduced amount of time and defects (mud cracking). Lower dust/dirt capturing is key to ensure a prolonged efficiency and a maintained white surface colour, which reflects heat. This aspect is measured by Dirt Pick-Up.

HOW CAN VALIDA HELP?

Valida acts as a stabiliser due to its insoluble 3D network and high surface area. When cellulose fibres are torn down into their smallest components, cellulose fibrils, the surface area dramatically increases. When suspended in water, the fibrils form a 3D network due to physical entanglements and hydrogen bonding. This strong connection between them facilitates stabilisation at low viscosity while providing shear thinning and thixotropic properties.

Valida is produced from natural cellulose, which is sourced from sustainably managed forests and is TUV certified for biodegradability in soil and marine.

Valida is fabricated by mechanically processing cellulose fibres to cellulose fibrils.

Table 1: Key features and benefits of Valida

Product	Benefits	Solid content	Features
Valida	• Improved rheology – ease of application • Enhanced in-can stability and anti-settling • Thixotropic properties • Improved tensile strength with maintained elongation • Reduced Dirt Pick-Up • Robust vs pH and electrolytes	3% Gel	Pre-hydrated, readily dispersible
		8% Paste	Higher active fibre content, usable in formulations with lower water content

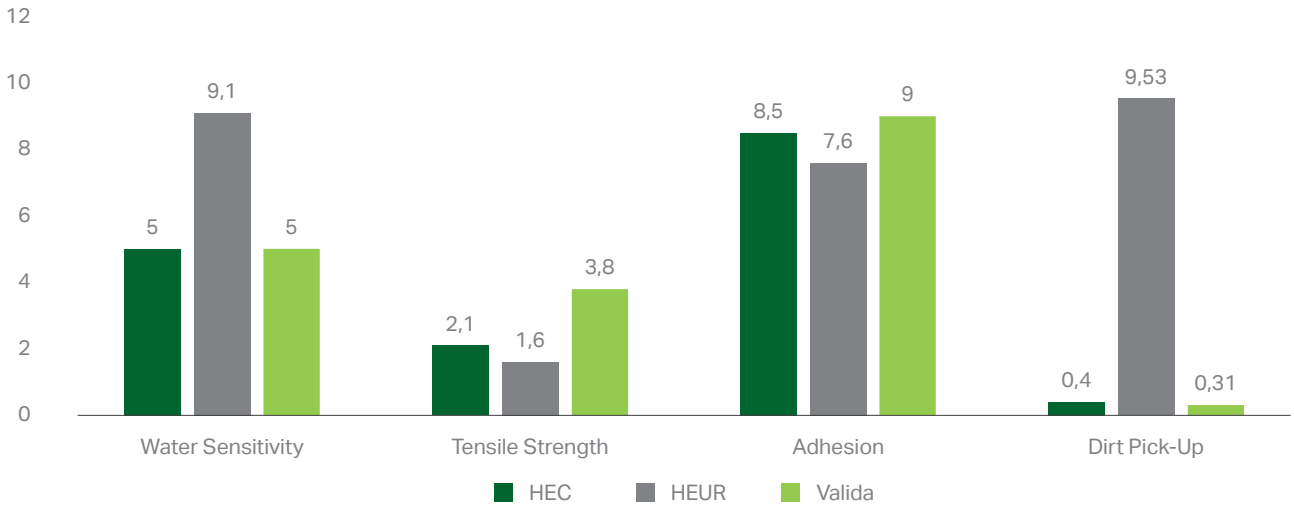
ELASTOMERIC ROOF COATING FORMULATION - STYRENE ACRYLIC BINDER FORMULATION

Table 2: Valida based formulation was benchmarked versus both, HEUR based formulation and HEC based formulation, available on your request. Valida consists of 8% active fibres suspended in 92% water

Raw Material	Functionalities	Dosage wt.%
Demineralised water	Solvent	5.3
Propylene glycol	Solvent	1.8
Solution of sodium polymethacrylate	Dispersing agent	0.4
BIT & Zinc Pyrithione	Biocide	0.3
Mixture of foam-destroying polysiloxanes and hydrophobic solids in polyglycol	Defoamer	0.2
Valida	**Biobased multifunctional stabiliser**	**5**
Calcium carbonate + magnesium carbonate	Fillers	35.4
TiO_2	TiO_2	8.0
Styrene acrylic	Binder	42.0
Mixture of foam-destroying polysiloxanes and hydrophobic solids in polyglycol	Defoamer	0.1
Ester Alcohol	Coalescent agent	0.5
OIT, Zinc Pyrithione & Terbutryn	Biocide	1.0
Total		100%

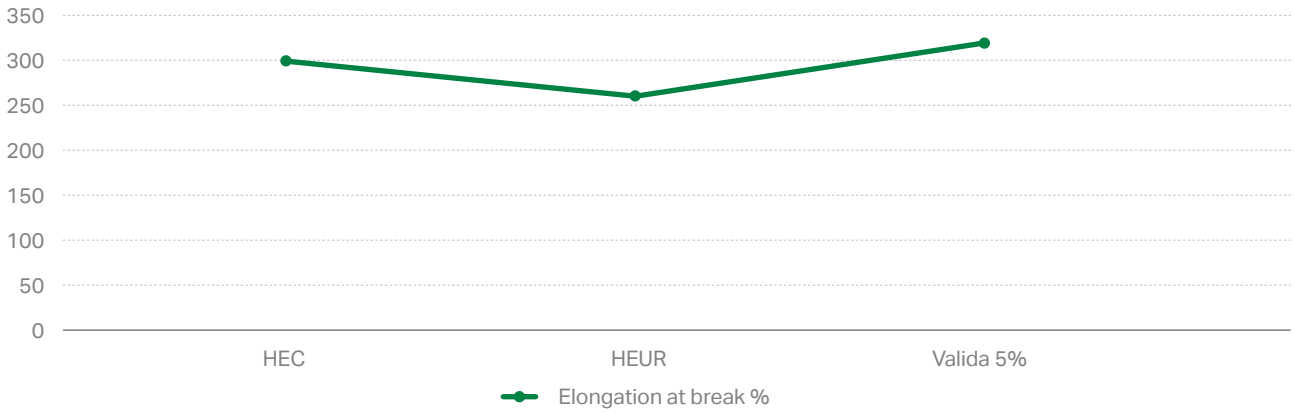
SUMMARY

Graph 1: Roof coating features



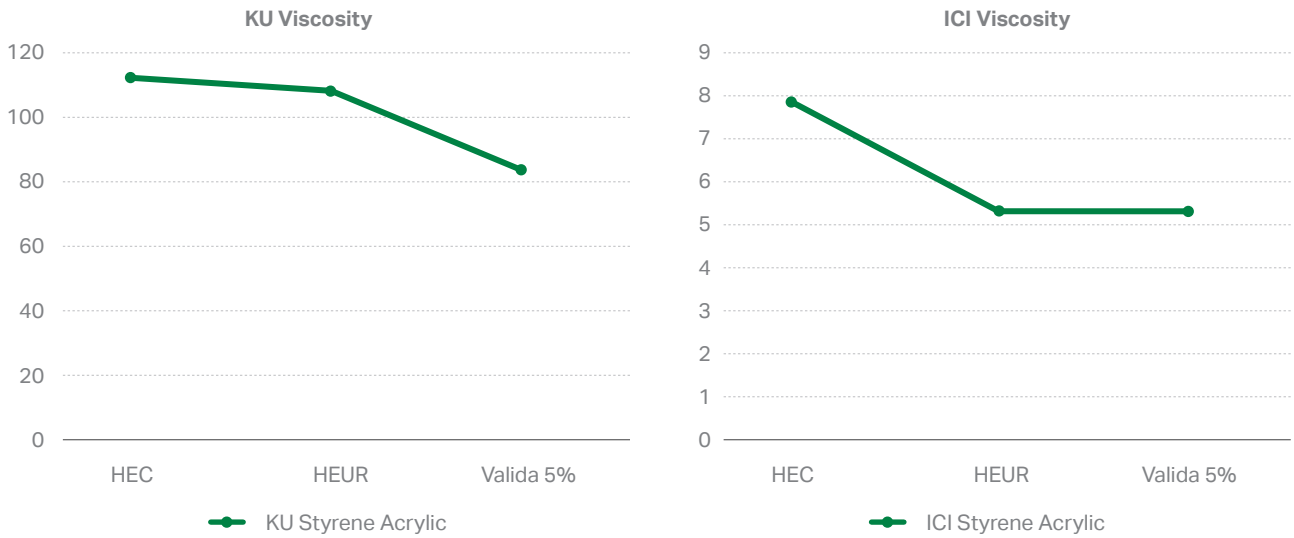
Valida @ 5% = 0.4% active fibre content

Graph 2: Elongation at break %



VISCOSITY: STABILISING WITH MINIMAL THICKENING, IMPROVING SPRAY-ABILITY

Graph 3: KU and ICI viscosity: While Valida based formulation shows slightly lower viscosity than incumbents, anti-sag perfomance and anti-settling perfomance are enhanced by 3D - fiber network and thixotropic nature of Valida



ANTI MUD-CRACKING

Elastomeric roof coatings are applied at higher layer thickness compared to conventional coatings. To avoid cracks during drying, the coating is applied in multiple thinner layers. Water retention property, shear thinning profile and 3D fibre structure of Valida help in reducing the number of applications layer and the time needed to achieve the required thickness, while eliminating the cracking issue.

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

Valida @5% HEC HEUR

Layer Thickness: 5-8 mm wet layer at 50°C

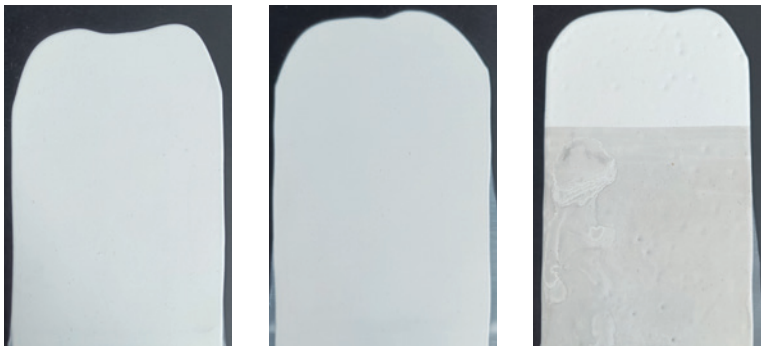
DIRT PICK-UP

Low Dirt Pick-Up is a key requirement for roof coatings in order to reflect the sun's heat away from the building.

The coating must retain a good whiteness, this will allow the minimal amount of heat absorption possible. When the coating gets darker as a result of Dirt Pick-Up (dust, dirt particles, particulate), this will result in less efficient insulating performance.

Reference Paint:	Dirt Pick-Up*, (7 days), ΔL
Valida	0.31 Very low
HEC	0.4 Very low
HEUR	9.53 Medium

Valida HEC HEUR



ELASTOMERIC ROOF COATING - PURE ACRYLIC BINDER FORMULATION

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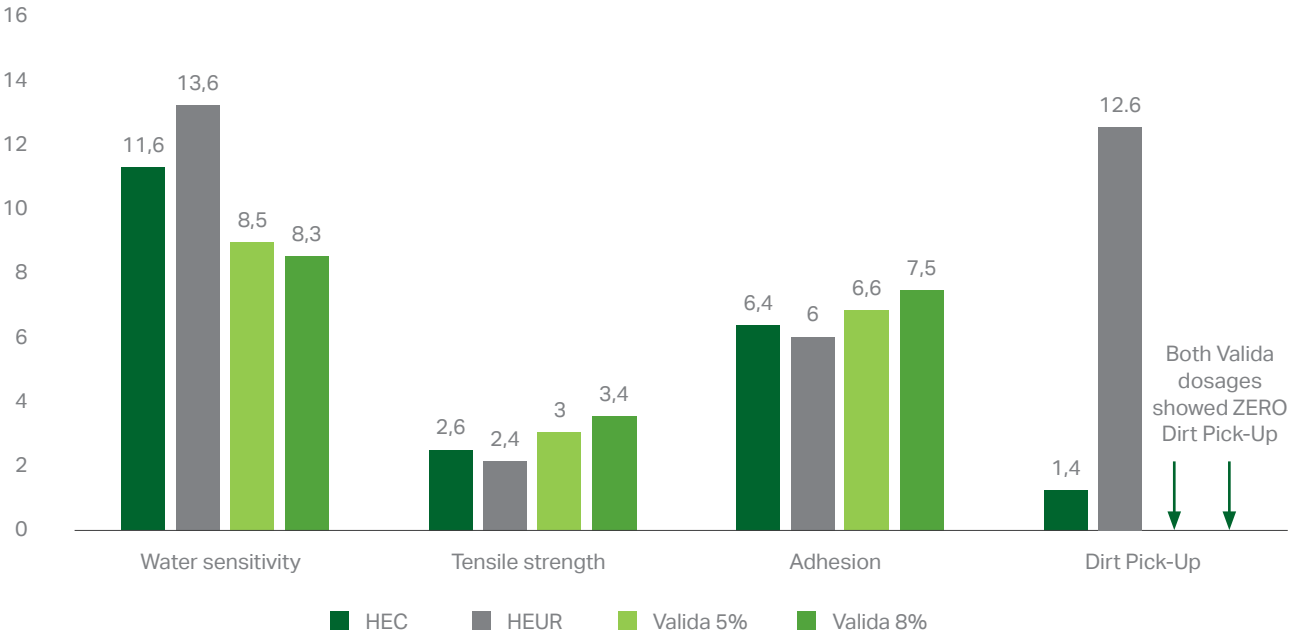
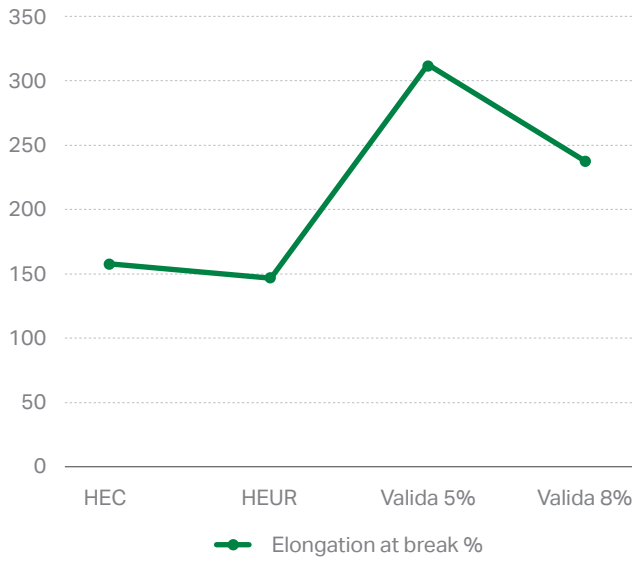
Graph 4: Roof coating features



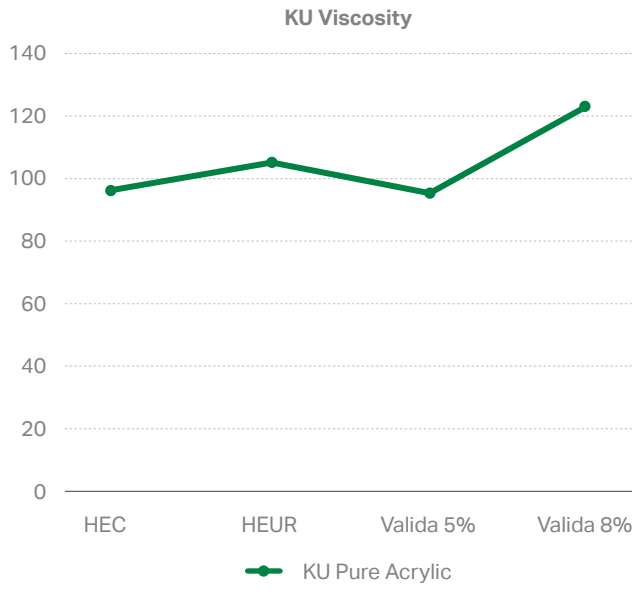
Formulations with Valida versus HEC based and HEUR based formulation show higher physical properties combined with significantly lower water sensitivity and Dirt Pick-Up.

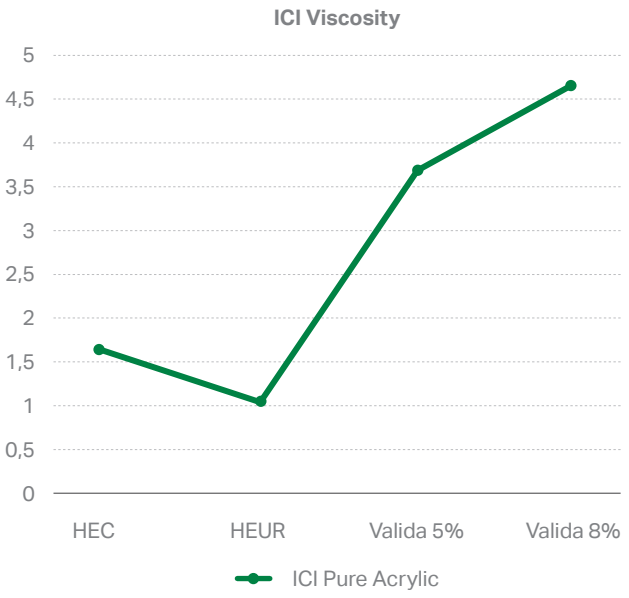
Graph 5: Elongation at break %



Valida's fibrils enhance a critical coating's feature as tensile strength, without sacrificing elongation at break which, on the contrary, also benefits from Valida.

Graph 6: Typical flow profile: KU and ICI viscosity





Valida's based formulations show similar viscosity development compared to the HEC based formulation and HEUR based formulation.

MUD CRACKING AFTER AGING TEST

HEC	HEUR	Valida @ 5%	Valida @ 8%
Slight cracking	Significant cracking	**No cracking**	**No cracking**

Layer Thickness: 5-8 mm wet layer at 50°C

DIRT PICK-UP AFTER AGING

Sample	HEC	HEUR	Valida @ 5%	Valida @ 8%
DPUR before aging	0.07	4.31	**0.20**	**0.86**
DPUR after aging	0.4	0.13	**0.15**	**0.02**

Valida Based formulations, enhance the resistance to Dirt Pick-Up over time compared to incumbents based formulations, in particular HEUR.

AGING TEST CONDITION

Exposure Conditions: ASTM G154

- 8 h UV radiation 1.55 W/m^2 @ 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

DPUR, ΔL – UNI 10792

Working together for sustainable impact

We believe the best ideas and innovations spring from diverse partnerships, so we invite you to help us accelerate meaningful change. We are committed to investing resources to develop applications which progress the commercial realisation of the unique benefits which Valida has to offer.

INTERESTED IN KNOWING MORE?

Sappi Biotech
sappi.com/valida-home
valida@sappi.com

For further product details please scan the QR code.

Sappi unlocks the power of trees to make every day more sustainable

Sappi is a leading global provider of powerful everyday materials made from woodfibre-based renewable resources. As a diversified, innovative and trusted leader focused on sustainable processes and products, we are building a more circular economy by making what we should, not just what we can.

Our raw material offerings (such as dissolving pulp, wood pulp and biomaterials) and end-use products (packaging and speciality papers, graphic papers, casting and release papers, and forestry products) are manufactured from sustainably-sourced production facilities powered with bio-energy. Together with our partners, Sappi will continue to build a thriving world by acting boldly in support of the planet, people and prosperity.

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Printed on Sappi Magno Plus Silk 250g/m² and 170g/m²