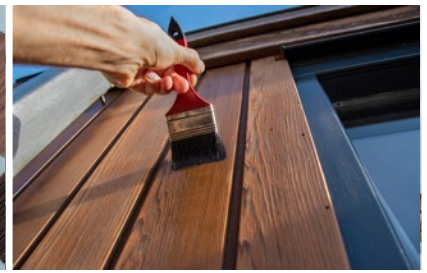
WATERBORNE WOODCARE AND DECKING PRODUCTS

Luc Sterckx, TSBD Representative Architectural EMEA
Tom Vanheertum, Marketing Manager LRA EMEA

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The Coating Resins Company

OUR SPEAKERS

Tom Vanheertum
Marketing Manager
Liquid Resins and Additives Business
EMEA

Luc Sterckx
Technical Service and Business Development Manager
Architectural
Liquid Resins and Additives Business
EMEA

AGENDA

- Intro to allnex and sustainability strategy
- Wood as a substrate
- Binders for woodcare and decking
- Exposure testing
- Formulation considerations and conclusion
- Q&A

ALLNEX AT A GLANCE –
THE WORLD'S LEADING COATING RESINS COMPANY

Our large global manufacturing network and vigorous presence in the world's most attractive markets puts us in the ideal spot for continued growth. With a highly dedicated staff, we focus on what we do best and are the best at doing.

TOTAL REVENUES
EUR 2.4 billion in 2021

4 BUSINESS AREAS

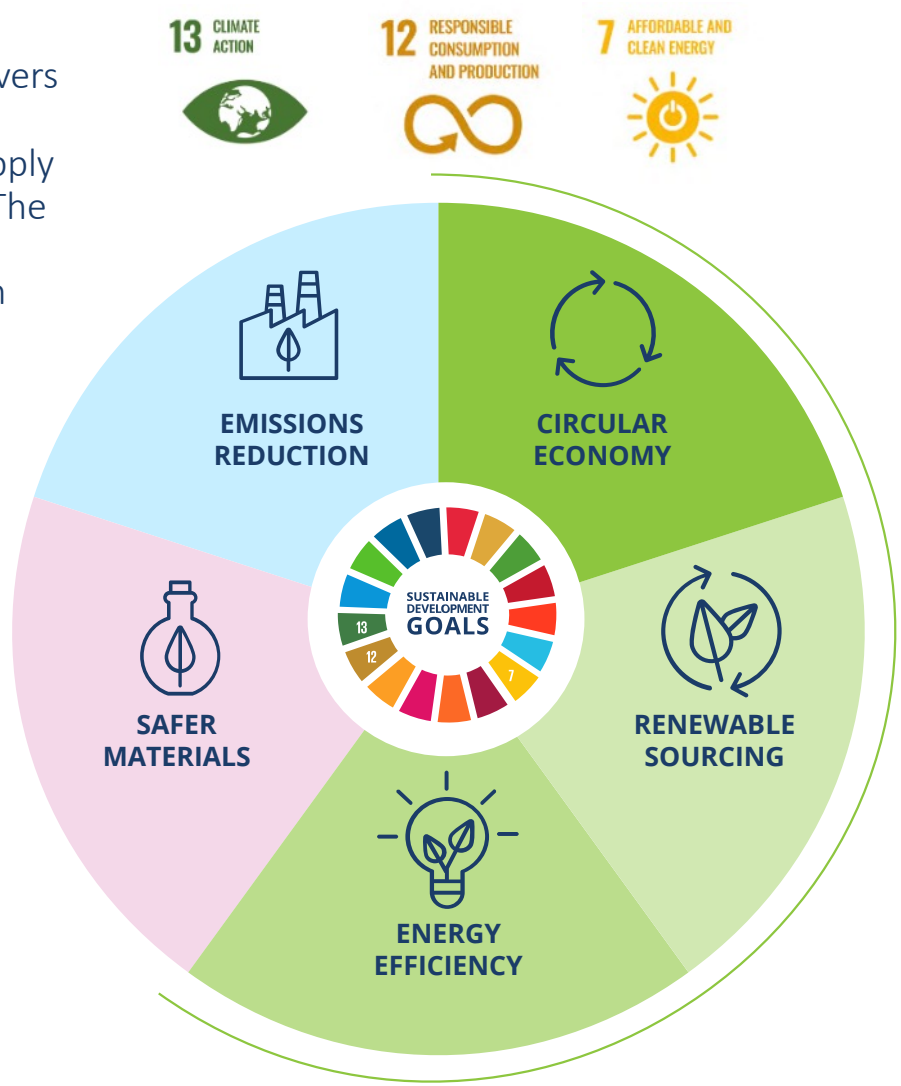
3.865 TOTAL STAFF
2021 (FTE)

33 MANUFACTURING SITES
worldwide

SALES PER REGION

A FIVEFOLD FOCUS FOR A NEW TOMORROW – THE PILLARS OF OUR SUSTAINABILITY PROGRAM

- These pillars form the basis of allnex's ambitious Sustainability Program, which covers all aspects from product development, raw material sourcing and manufacturing to supply chain management and customer service. The pillars stand for the circularity that is at the core of all our considerations, defining both how we plan and execute our activities.



EMISSIONS REDUCTION
We work to reduce the emissions of volatile organic solvents across the product lifecycle to protect people and the environment.

SAFER MATERIALS
We are committed to making the substitution of potentially harmful chemicals by safer options one of our guiding considerations.

CIRCULAR ECONOMY
We diligently explore options to limit the consumption of resources, keep them in use as long as possible, and eventually recover and recycle them at the end of service life.

RENEWABLE SOURCING
We aim at minimal use of finite resources and strive to reduce climate impacts by looking at renewable alternatives for raw materials and the energy we use.

ENERGY EFFICIENCY
We design our product and manufacturing process in a way that enables maximum efficiency in energy utilization across the product lifecycle.

A WISE CHOICE FOR THE ECO-FRIENDLY – OUR ECOWISE PRODUCTS

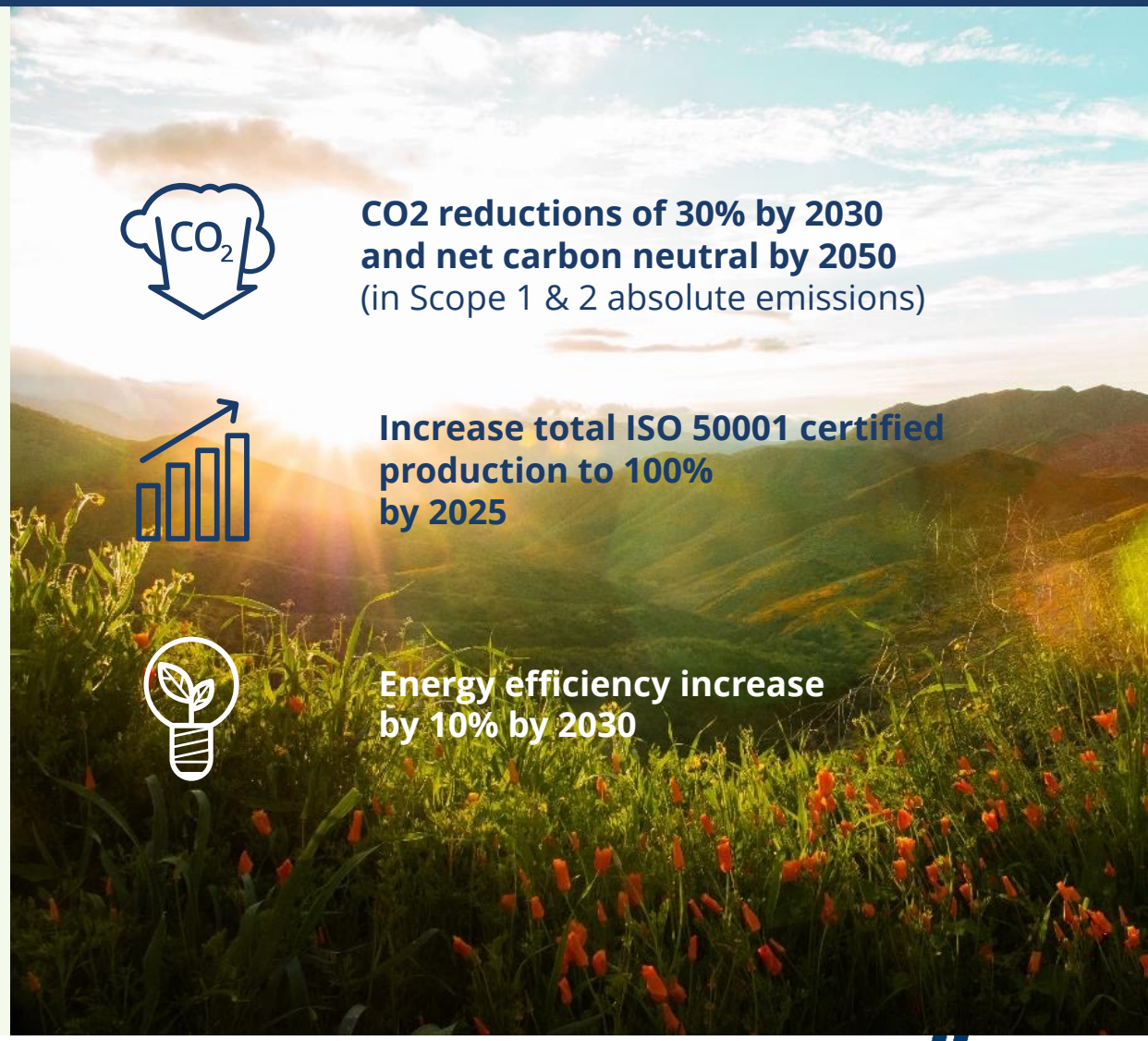
- Being ECOWISE™ is the best way to be part of the solution – and that's exactly what our initiative and ECOWISE™ branded products help everyone to do. They spring from our deep commitment to a more sustainable future. They are also living proof that, with our broad range of technologies and sustainable focus, we are the ideal partner for smoothly and successfully making the transition to the solutions a more ECOWISE™ future needs.

be ECOWISE™

INDUSTRIAL WOOD APPLICATIONS

BUILDINGS & DECORATIVE APPLICATIONS

PACKAGING & INKS APPLICATIONS



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WATERBASED BIOBASED ROAD MAP

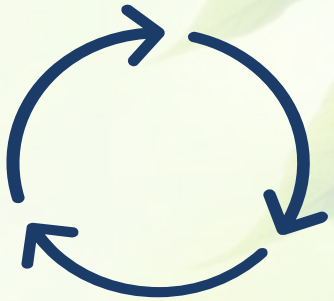
RENEWABLE

+

RECYCLED

=

BETTER CARBON



Chain of Custody Models

Segregation	RM / FG are stored separately Biocarbon content via ^{14}C (ASTM 6866-16) Recycled content via self-certification
Mass balance	Raw materials are mixed Targeting ISCC+ certification Recycled content via self-certification
~~Book and Claim~~	Raw materials can be procured anywhere in the world, to offset fossil sources Not in scope

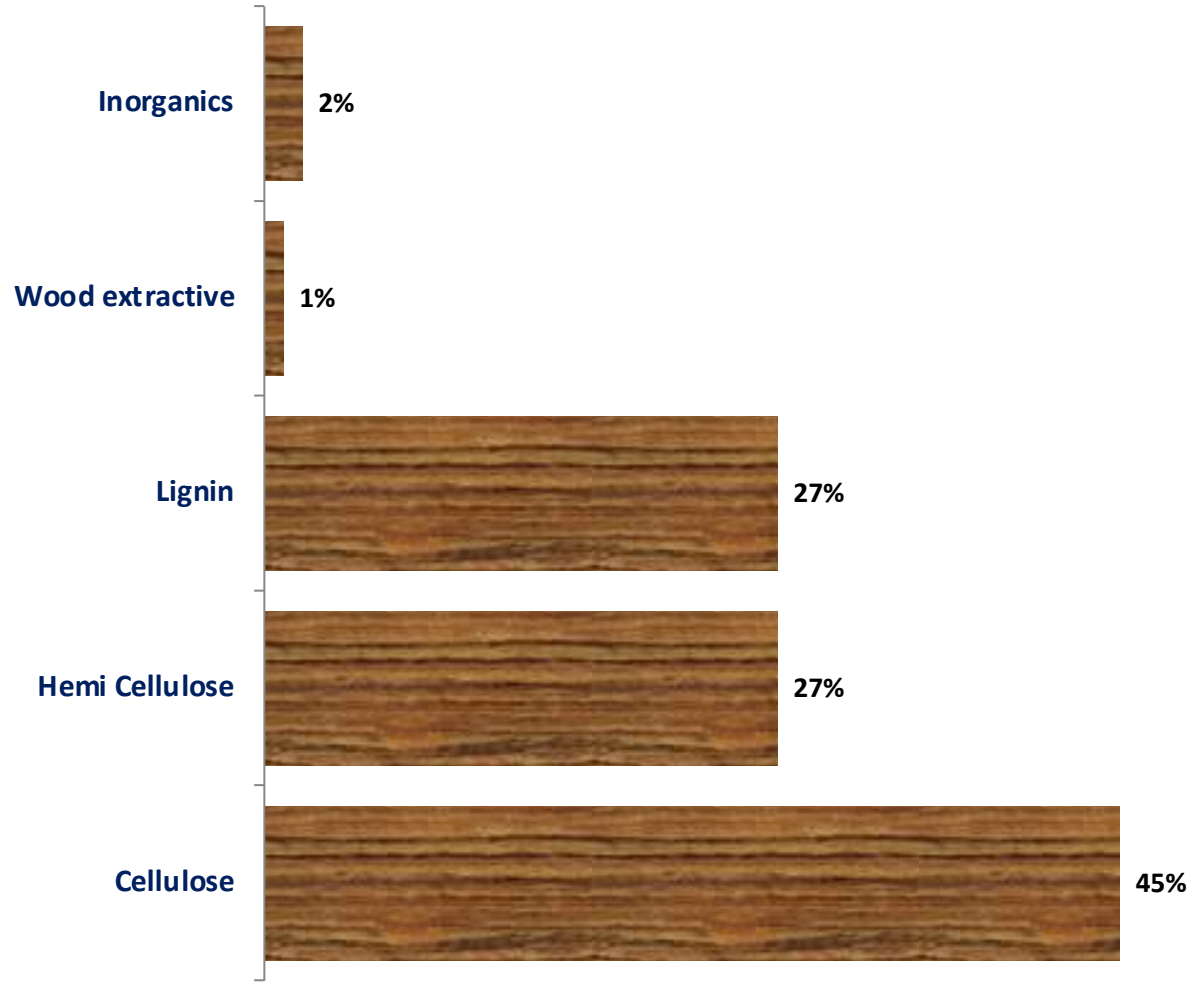
LCA (Life Cycle Assessment)

Documentation	Availability of data in generic data-bases Collecting data from suppliers Primary focus on carbon footprint

WHAT IS WOOD?

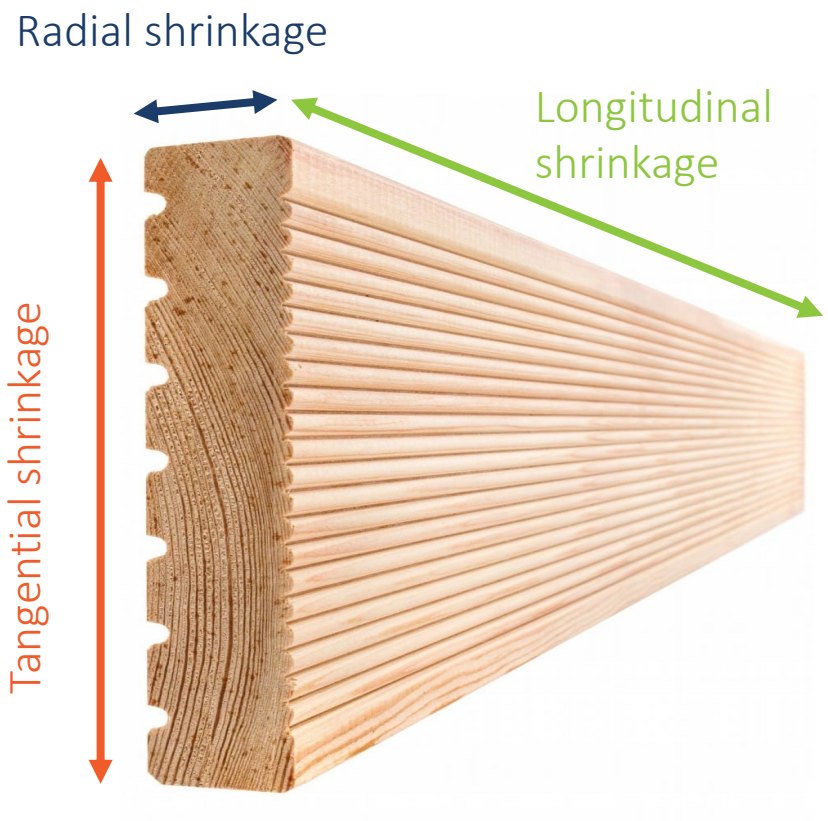
Wood is comprised largely of **cellulose** (a high molecular weight polymer), **hemi celluloses** (a branched, low molecular weight, sugar-based polymer) **and lignin** (a polymeric phenolic compound that acts as a binder between the micro fibrils of cellulose).

Degradation of wood starts when **lignin** absorbs UV and visible light (up to 450 nm) and generates **phenoxy radicals** that cause chain cleavage and breakdown of the cellulosic structure. This leads to increased water solubility, changing the dimensional structure, and reduced adhesion of coatings to the wood.



TERMINOLOGY

Wood is a **living substrate (hygroscopic)**, which means that there are differences in porosity and tannin content within same species of wood in grain patterns, wetting & penetration effects.



Drying stages of milled wood

Green state: when a tree is first felled.

Free water: liquid water in the pores or vessels of the wood.

Bound water: water that is trapped within the cell walls.

Fiber saturation point (FSP):once all the free water has been lost, the wood will reach FSP. (no shrinkage).

Dry state: below the **FSP**, the wood will then begin to lose bound water, causing reduction in the wood's volume.

As wood dries below its fiber saturation point, it shrinks!

WOOD CARE PRODUCTS VERSUS A DECKING COATING

Wood care is important when building anything in wood. The structure, material choices and maintenance plays a crucial role in the wood's function and service life.

Moisture traps and wood destroying organisms are creating a **risk factor** for future wood rot and blue decay to set in. There is always a big risk to wooden structures in permanent contact with the ground or water. Structures above ground, the risk of rot can be graded from almost negligible to essentially as great as in contact with the ground. It is not always easy to determine the risk!

Therefore the use of ***non pigmented*** **wood care products** is considered. These product will **penetrate deep into the wood**, contribute to a **better wood integrity**, **increase water resistance and create fungi /algae protection.**

Besides the aesthetic aspect of a decking product basic wood and its derived products, needs to be **protected against mechanical, chemical and physical attacks.**

The type of protection needed, can differ between market segments, depending on the requirements.

The market is segmented into **residential and non-residential**. The residential sector is expected to increase in market share, due to the presence of large number of residential building stock all across the globe. The non-residential includes all the commercial, institutional buildings where wooden decks are used for providing an appealing look.

With the **ecological aspects, environmental legislation**, and the growing demanding **quality requirements** in mind, **waterborne binders are THE FUTURE**, especially on the growing global decking market.

WOOD CARE BINDER SELECTIONS

RESYDROL® VAL 5547w	RESYDROL AY 586w/45WA	RESYDROL AZ 6191w/42WA
• a modified water soluble linseed resin • **supplied in 100%** • not suitable for film forming stains • can be used on exotic woods due to low pH • Bio-based on solids: 70 - 80%	• a core shell acrylic alkyd hybrid with low particle size • good water resistance • **fast drying** • Bio-based on solids: 55 - 65%	• a **tribrid resin** • fast drying • **increased water resistance** • **improved resistance to blue wood decay!** • Bio-based on solids: 40 - 45%

→

Product key features

low particle size

excellent penetration

affinity with the wood

good drying properties

create extra protection with biocides, fungicide and algaecides

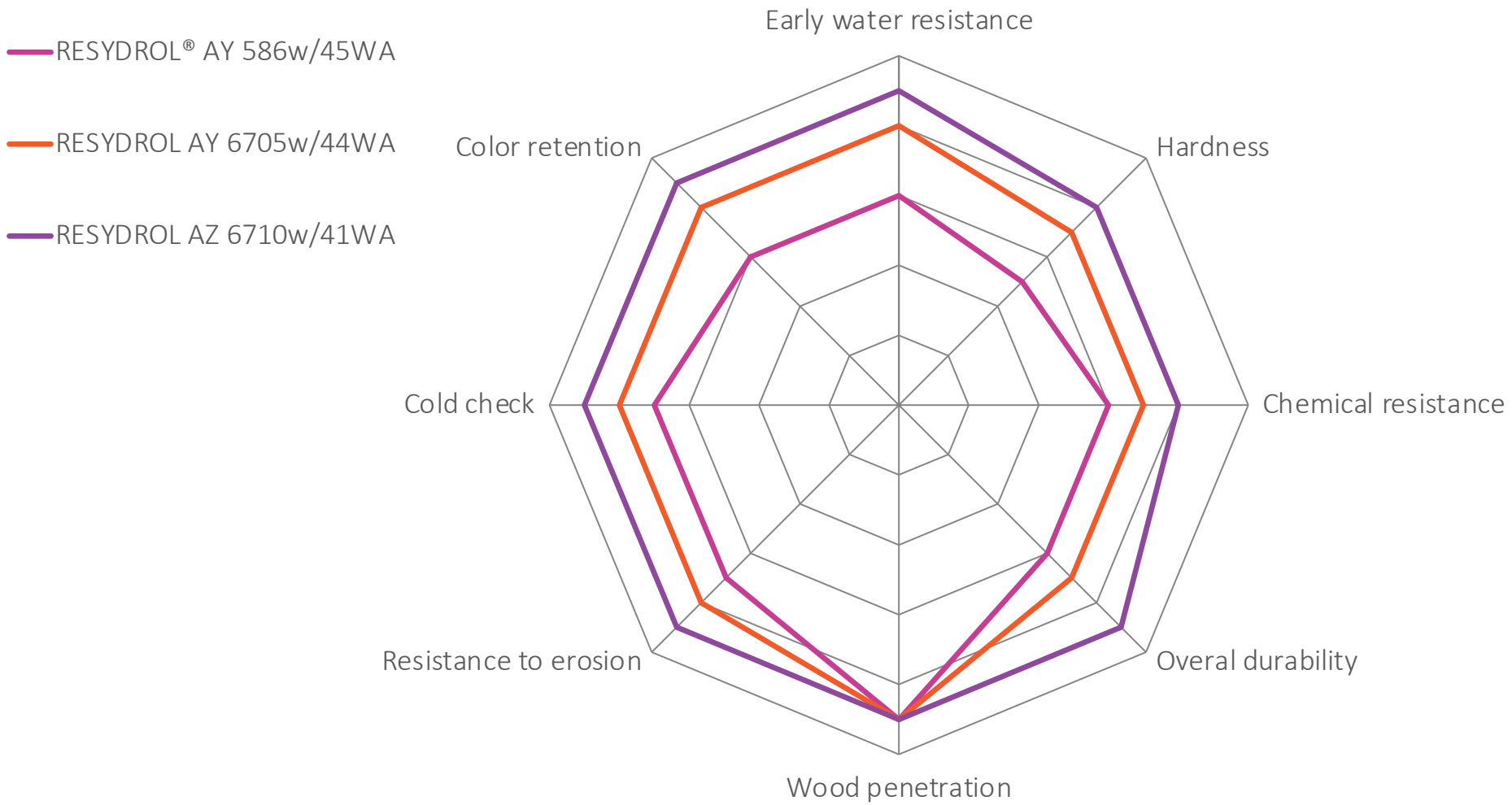
DECKING BINDER SELECTIONS – WB MODIFIED ALKYDS

RESYDROL® AY 586w/45WA	RESYDROL AY 6705w/44WA	RESYDROL AZ 6710w/41WA
• a core shell acrylic alkyd hybrid with low particle size. • good water resistance • **fast drying** • "**benchmark**" in the Global decking market • Bio-based on solids: 55 - 65%	• hybrid resin • fast drying • **increased water resistance (compared to AY 586)** • very good cold check • improved durability • **"balanced" performer** • Bio-based on solids: 35 - 45%	• tribrid resin, the **premium grade** • excellent cold check resistance • very fast drying • excellent durability • **"best in class" performer** • Bio-based on solids: 30 - 35%

→ excellent wood penetration
low water uptake
water beading effect
excellent cold check
open time - application
SB look (warm color)
low wood grain rising
low VOC formulation
natural look, erosion mode
multi adhesion

→ UV resistance
drying times on tannin rich wood
need for driers

DECKING BINDER SELECTIONS – WB MODIFIED ALKYDS



DECKING BINDER SELECTIONS – WB ACRYLICS

SETAQUA® 6774

- a **very flexible surfactant free resin**
- self-crosslinked
- MFT 5°c and 43% solids
- good flow and leveling performances

SETAQUA 6782

- surfactant free resin
- self-crosslinked
- **improved adhesion**
- increased hardness development
- **good chemical and abrasion resistance**
- MFT 11°c and 40% solids
- **good cold check and dirt pick up resistance**
- good outdoor durability

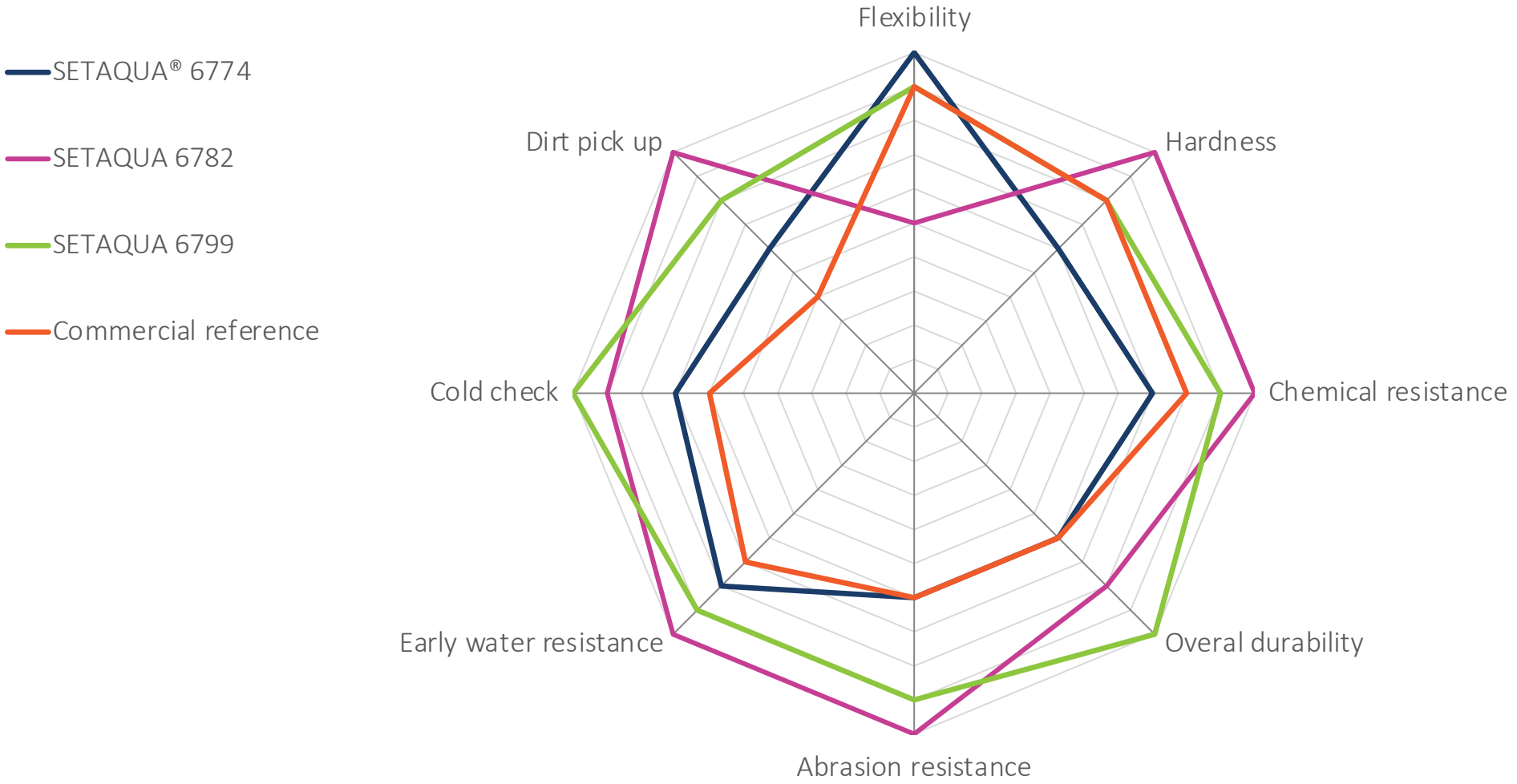
SETAQUA 6799

- surfactant free resin
- self-crosslinked
- **well balanced overall performer (hardness versus flex)**
- **excellent early water resistance**
- excellent flow and leveling
- improved open time
- **excellent cold check test**
- MFT 5°c and 41% solids
- **very good outdoor durability**

fast drying
early water (rain) resistance
no need for driers
excellent UV resistance
easy to formulate
low VOC formulation
adhesion
chemical resistance
abrasion resistance
recoat time

open time (warm weather)
plastic look
wood grain rising

DECKING BINDER SELECTIONS – WB ACRYLICS



DECKING BINDER SELECTIONS – WB ACRYLIC HYBRIDS

RESYDROL® SF 8010w/50WA

- a surfactant and **ADH free** binder
- **a well balanced overall performer**
- good balance between flexibility and end hardness
- very good flow and leveling. 50% solids and **MFT of 0°c**.
- **suitable binder for all type of climates**
- good outdoor durability

- Bio-based on solids: < 10%

RESYDROL SF 8011w/50WA

- a surfactant and **ADH free** binder
- a hard binder with increased hardness development
- **good chemical, dirt pick up and abrasion resistance**
- very good flow and leveling, 50% solids and **MFT of 8°c**
- **can be used as sole binder in warmer climates and as a co binder with WB alkyds (= flex)**
- good outdoor durability

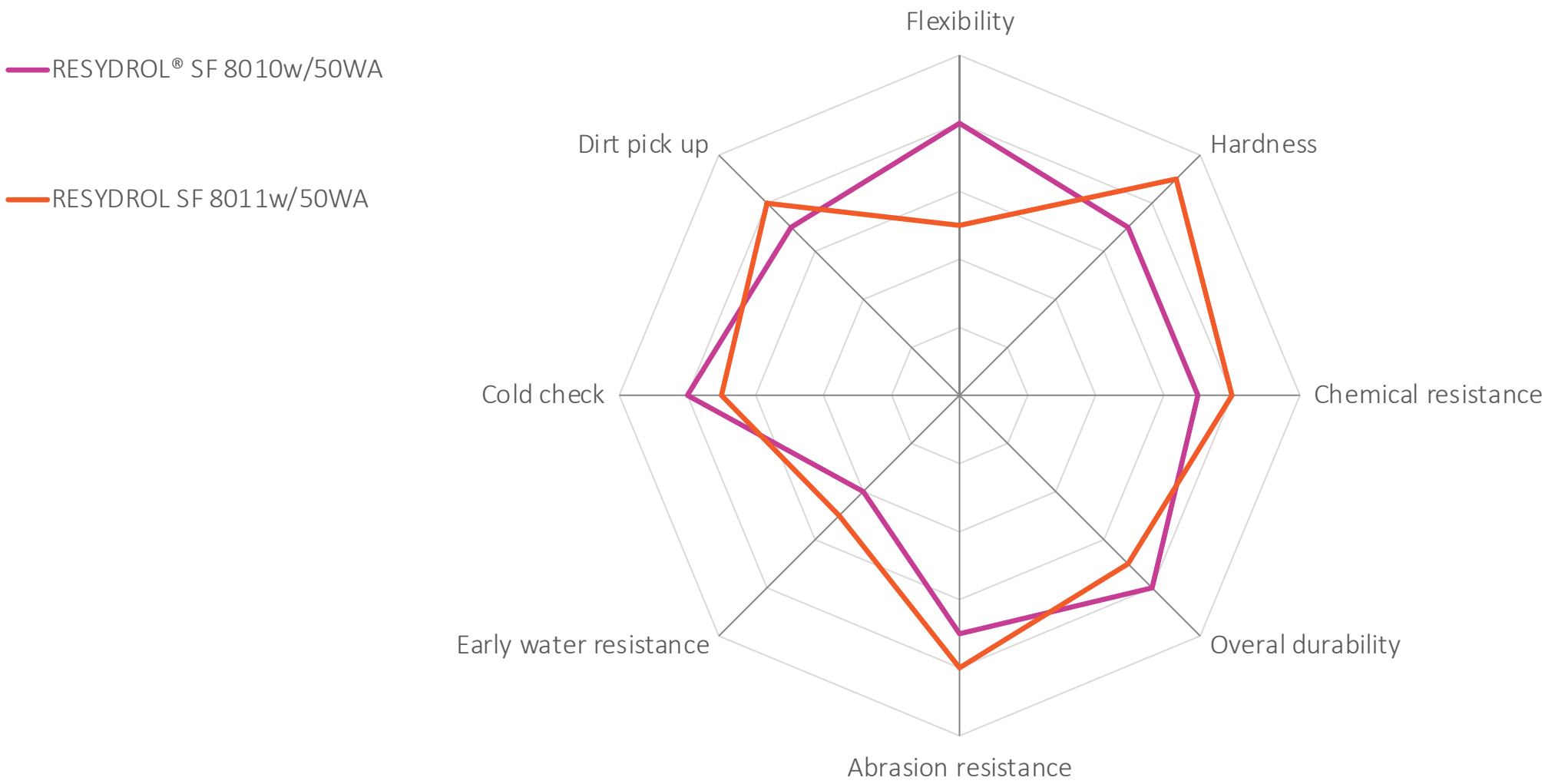
- Bio-based on solids: < 10%

fast drying
"controlled" erosion mode
no need for driers
excellent UV resistance

easy to formulate
low VOC formulation
adhesion
chemical & abrasion resistance
good cold check
recoat time
improved open time vs standard acrylics

in thicker layers - the plastic look
lower thickener response

DECKING BINDER SELECTIONS – WB ACRYLIC HYBRIDS



PERFORMANCE TESTING

The formulation set up

Total weight solids of the formulations are 22%
Teak color
No UV inhibitors were used!

Testing:

Accelerated tests (Xenon & EN 927-6)

EMEA region - outdoor for 2 years
- Benelux (mild maritime climate)
- Austria (cool temperature Alpine climate)

APAC region - outdoor for 2 years
- Malaysia (tropical rainforest climate)

Conditions

Several wood types were used like Spruce, Pine and Merbau
Number of layers: 1 layer and 2-layer configurations
Panels were placed vertical and horizontal

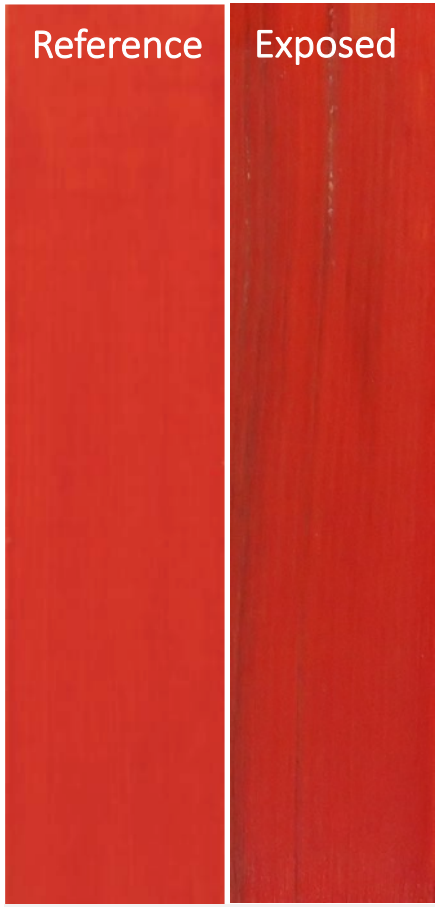
ACCELERATED TEST : 2000 HOURS XENON ARC

2-layer system

RESYDROL® AY 586w/45WA

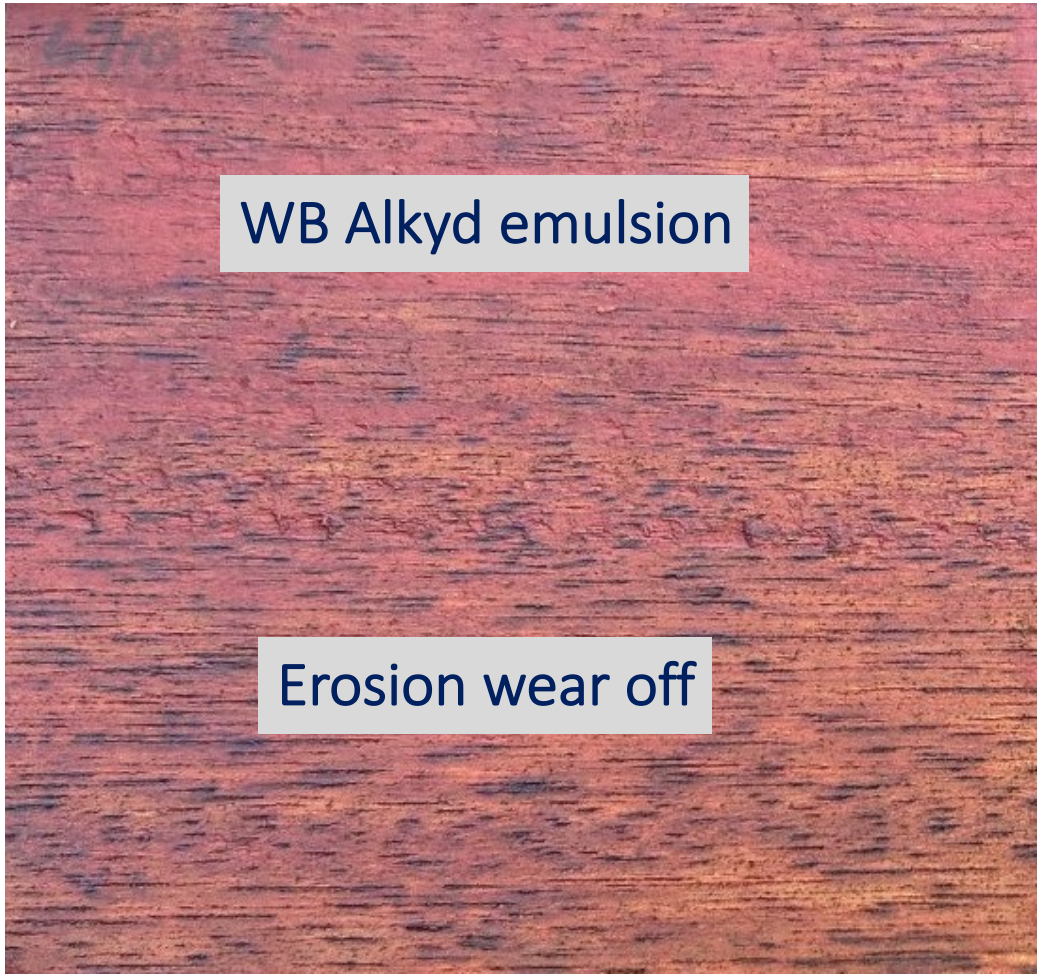
RESYDROL AZ 6710w/ 41WA

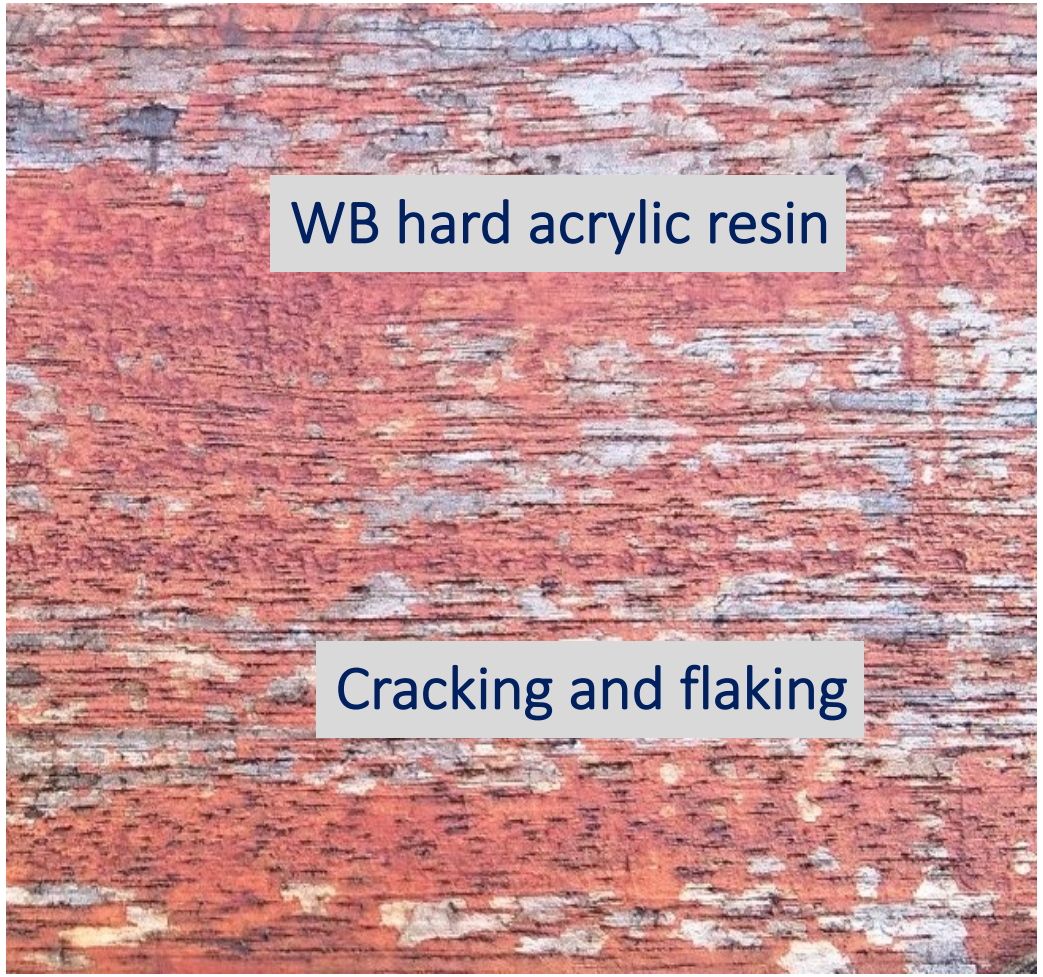
RESYDROL SF 8010



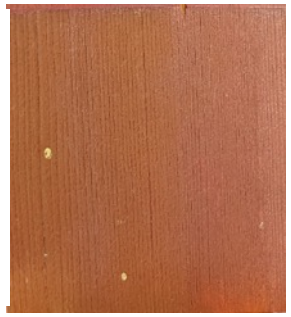
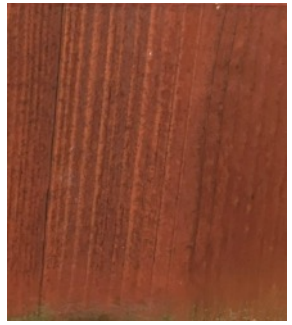
SETAQUA® 6799

CHALLENGES AHEAD ON OUTDOOR EXPOSURE!





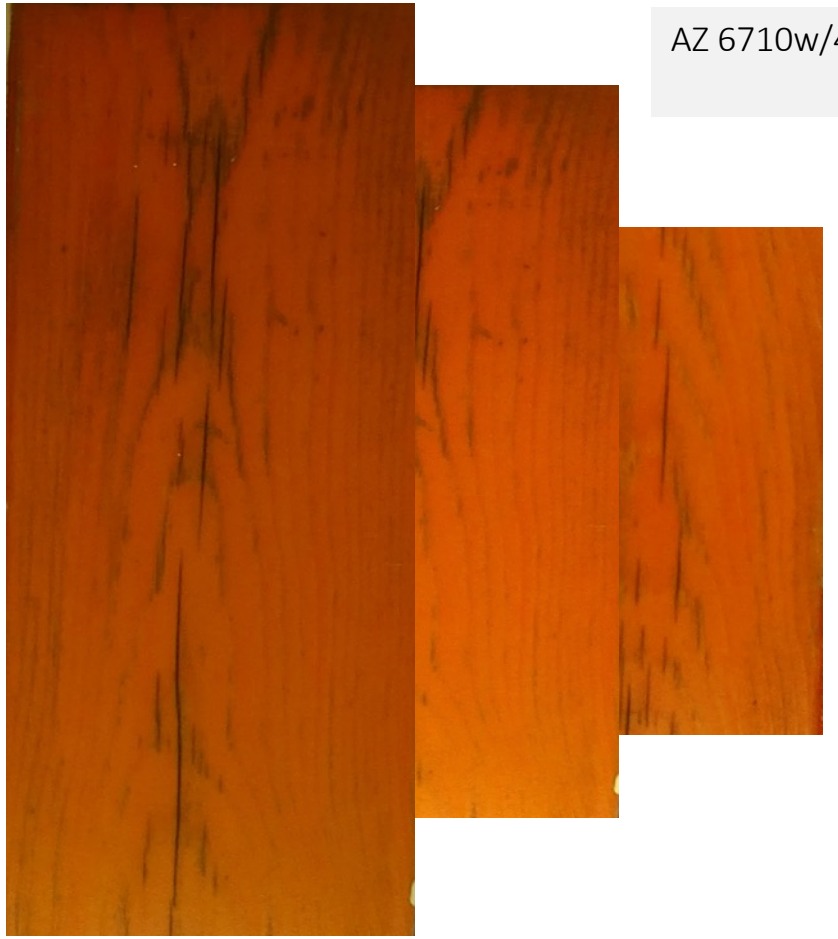
THE RESYDROL® SERIES ON EU SPRUCE WOOD

	AY 586w/45WA	AY 6705w/44WA	AZ 6710w/41WA	SF 8010/50WA	SF 8011/50WA + VAL 5547
2 layer system					
1 layer					

THE RESYDROL® SERIES ON EU PINE WOOD

AY 6705w/44WA

AZ 6710w/41WA



THE SETAQUA® SERIES ON EU SPRUCE WOOD

	SETAQUA 6774	SETAQUA 6782	SETAQUA 6799
2 layer system			
1 layer			

THE SETAQUA® SERIES ON EU PINE WOOD

2 layer system

SETAQUA 6774

SETAQUA 6782

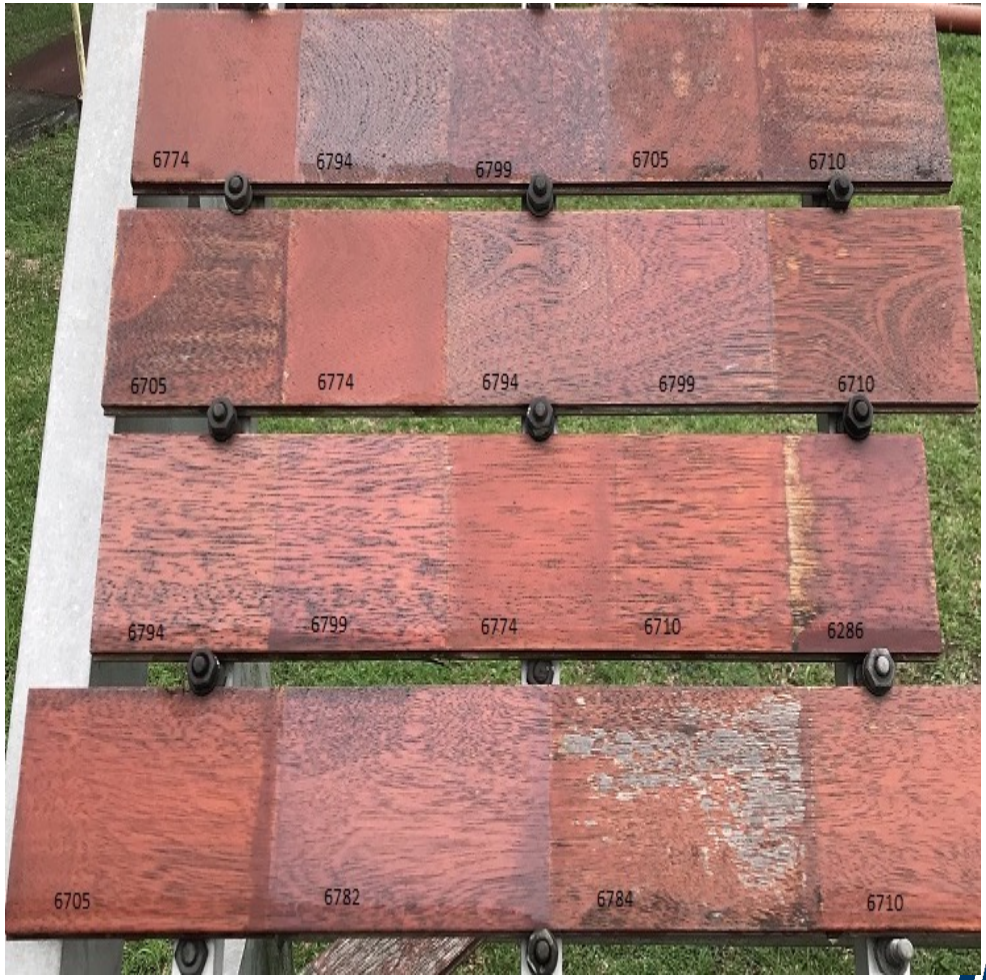
SETAQUA 6799

MALAYSIA - MERBAU WOOD 2 YEARS OF EXPOSURE

2 layers

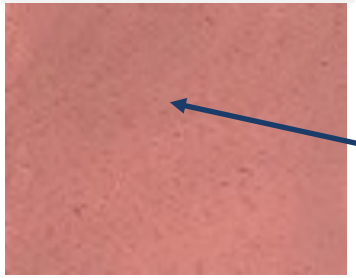
TIME ZERO

AFTER 2 YEARS

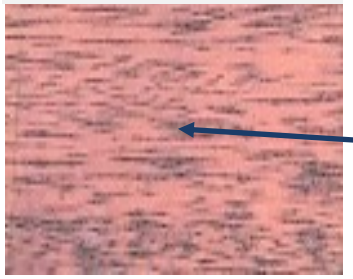


MALYASIA – MERBAU WOOD – DETAILED PICTURES

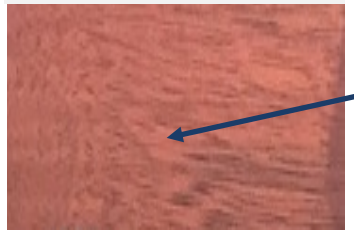
SETAQUA® 6774

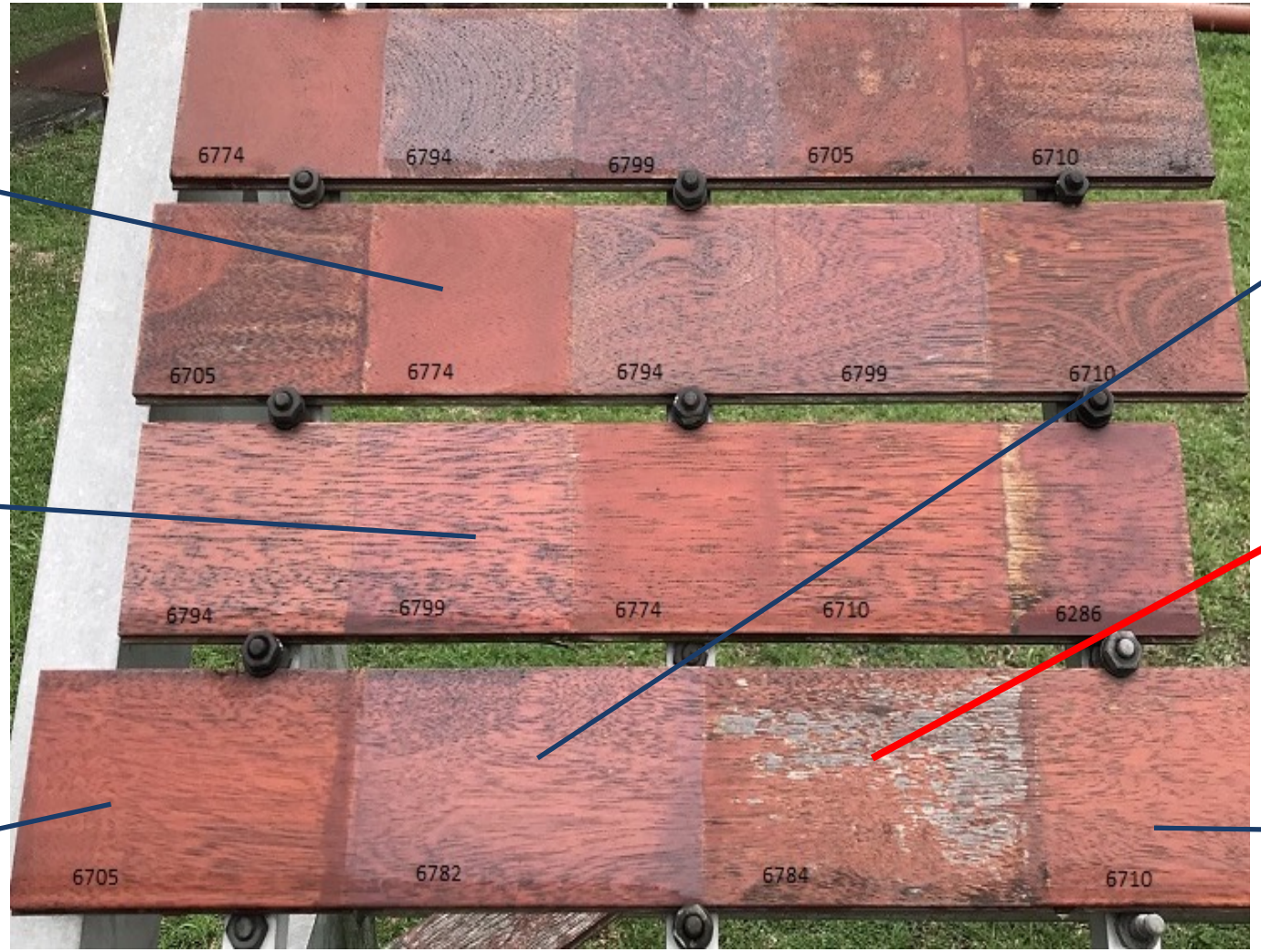


SETAQUA 6799

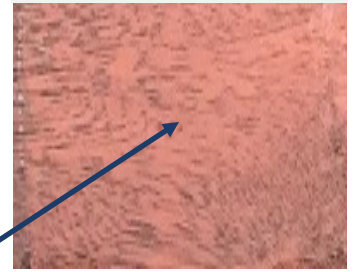


RESYDROL® AY 6705w/44WA





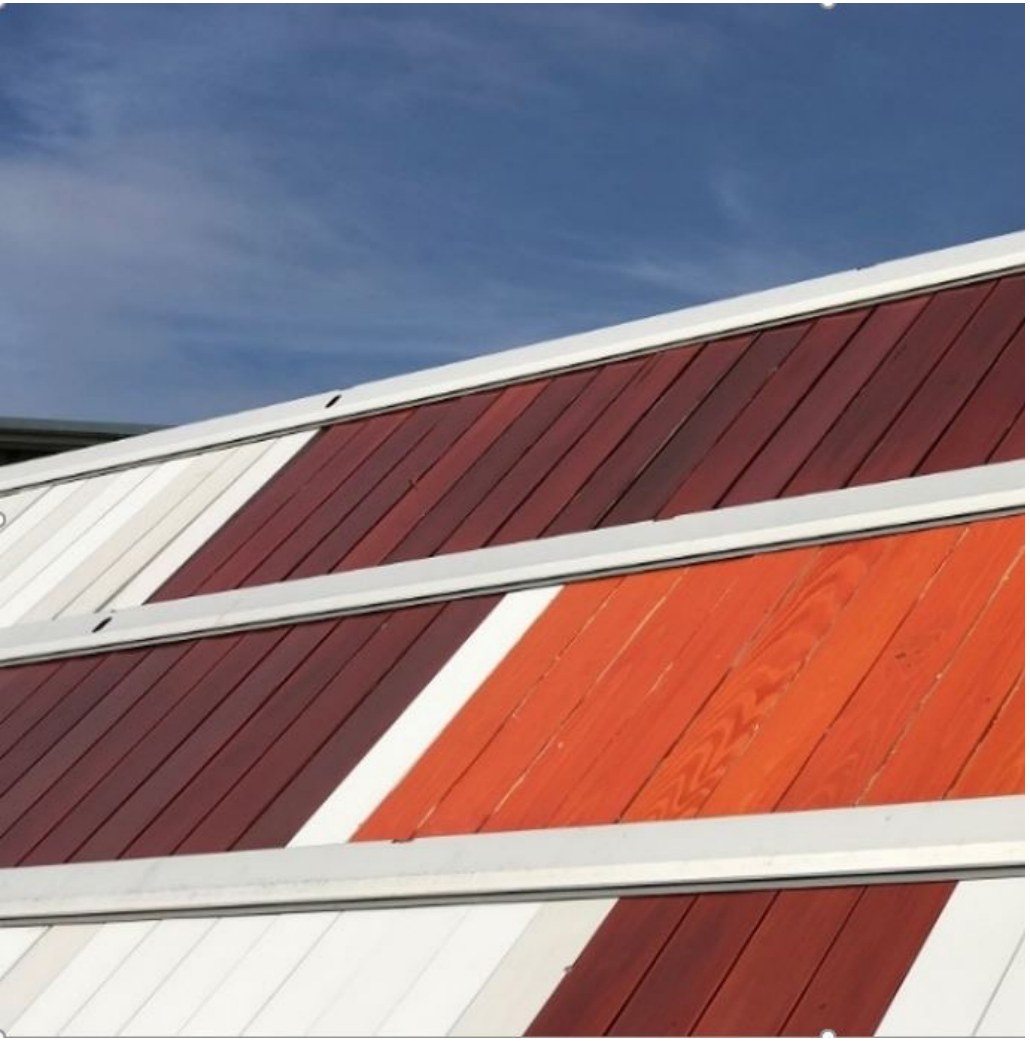
SETAQUA 6782



SETAQUA 6784

RESYDROL AZ 6710w/41WA

WATERBASED BIOBASED ROAD MAP FOR DECKING



RESYDROL® SF 8XXX – Fatty acid modified acrylics → C14 certified → RESYDROL SF 8010/50WA 6%; RESYDROL SF 8011/50WA 6%

RESYDROL AZ/AY WB Alkyds Hybrids and Tribrids → C14 certified → RESYDROL AY 586w/45WA 58%; RESYDROL AY 6705w/44WA 37%; RESYDROL AZ 6191w/42WA 43%; RESYDROL AZ 6710w/41WA 33%

SETAQUA® 67XX using drop-in building blocks → Mass balance/recycled → Exact same performance BC up to 70%

RESYDROL AZ 6710 drop-in building blocks → Mass balance/recycled → Exact same performance

WB Acrylics using functional replacement building blocks → C14 certified / Mass balance → Product development BB ±30-50 %

COMMERCIAL Q4 2022 2023/4

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GENERAL CONCLUSIONS

Depending on the key performances & demands, the customer can make different choices.

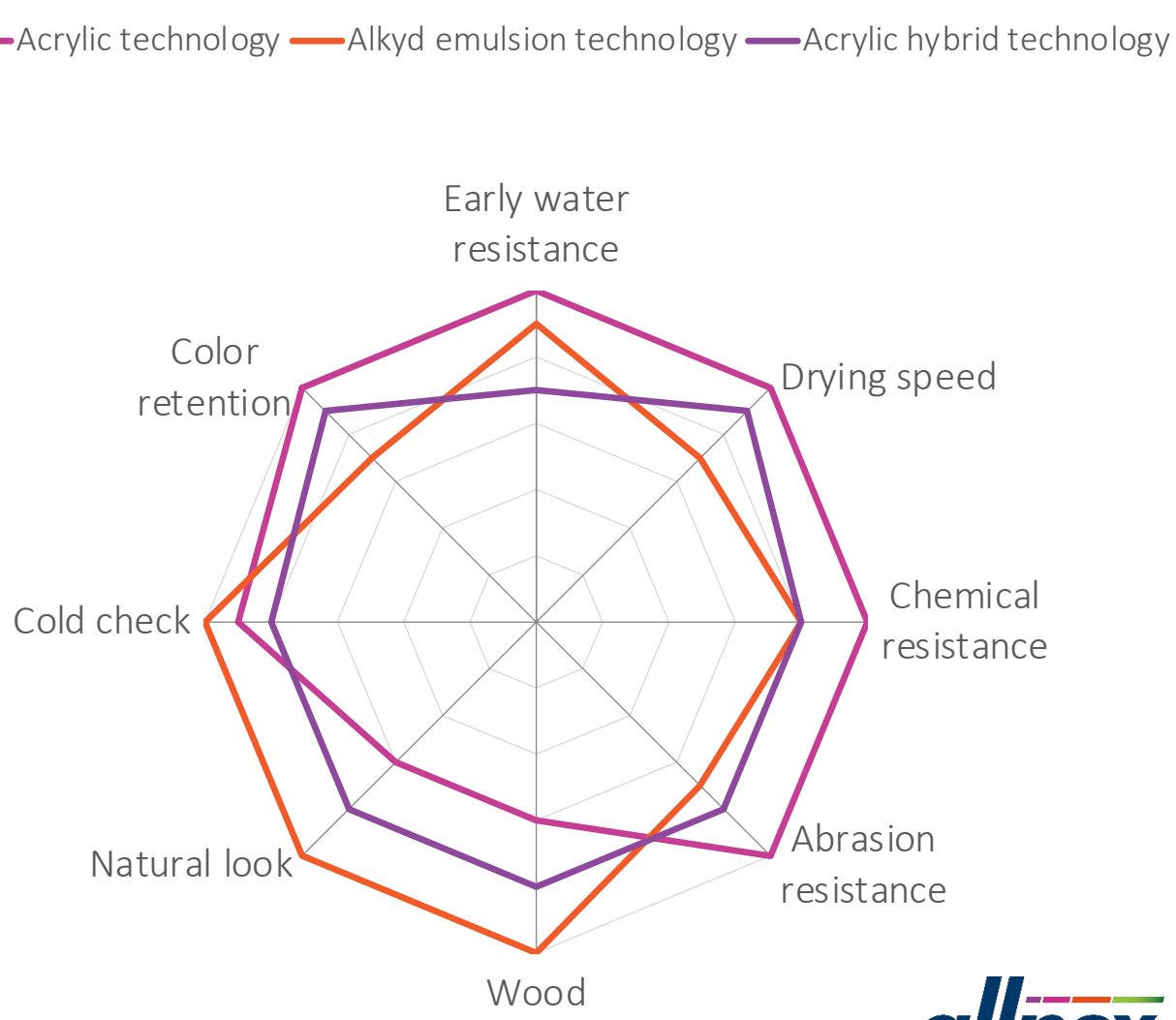
WB alkyd emulsions give a more natural look, easy to apply and create a natural wear off.

WB acrylics have a better UV resistance, faster drying, but lower penetration into the wood.

WB acrylic hybrids are the compromise in performance.

According to our internal tests, a *single binder* concept, is the *most robust* in formulations, *blending* can take a lot of *time to optimize.*

In a blend *"Make your own choice carefully"* we will provide a brief overview of what is possible within our technologies.



MAKE YOUR OWN CHOICE CAREFULLY

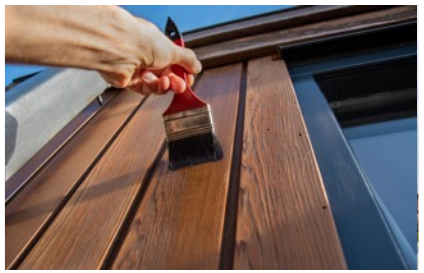
SETAQUA®	RESYDROL® AY	RESYDROL AZ	RESYDROL SF
no need for driers excellent UV resistance fast return to service excellent early water resistance limited wood penetration	natural look excellent wood penetration open time & SB look balanced performer **BB content** the need for driers	natural look excellent wood penetration good UV resistance open time & SB look fast drying premium grade **BB content** the need for driers	good wood penetration no need for driers good UV resistance open time (> acrylics) fast drying & recoat time **BB content** thick layers – 'plastic look'

Blending partners	20/80	80/20
SETAQUA + RESYDROL AY	improved open time SB look & wood penetration limited use of driers limited compatibility	not recommended
SETAQUA + RESYDROL AZ Optimized bio-content	good UV resistance improved open time SB look & wood penetration fast drying & recoat time limited use of driers	controlled erosion mode better wood penetration limited flaking & peeling extended open time, SB look driers are needed
SETAQUA + RESYDROL SF	Blending not recommended Compatible with LOA RESYDROL VAL 5547	

WATERBORNE WOODCARE AND DECKING PRODUCTS QUESTIONS?

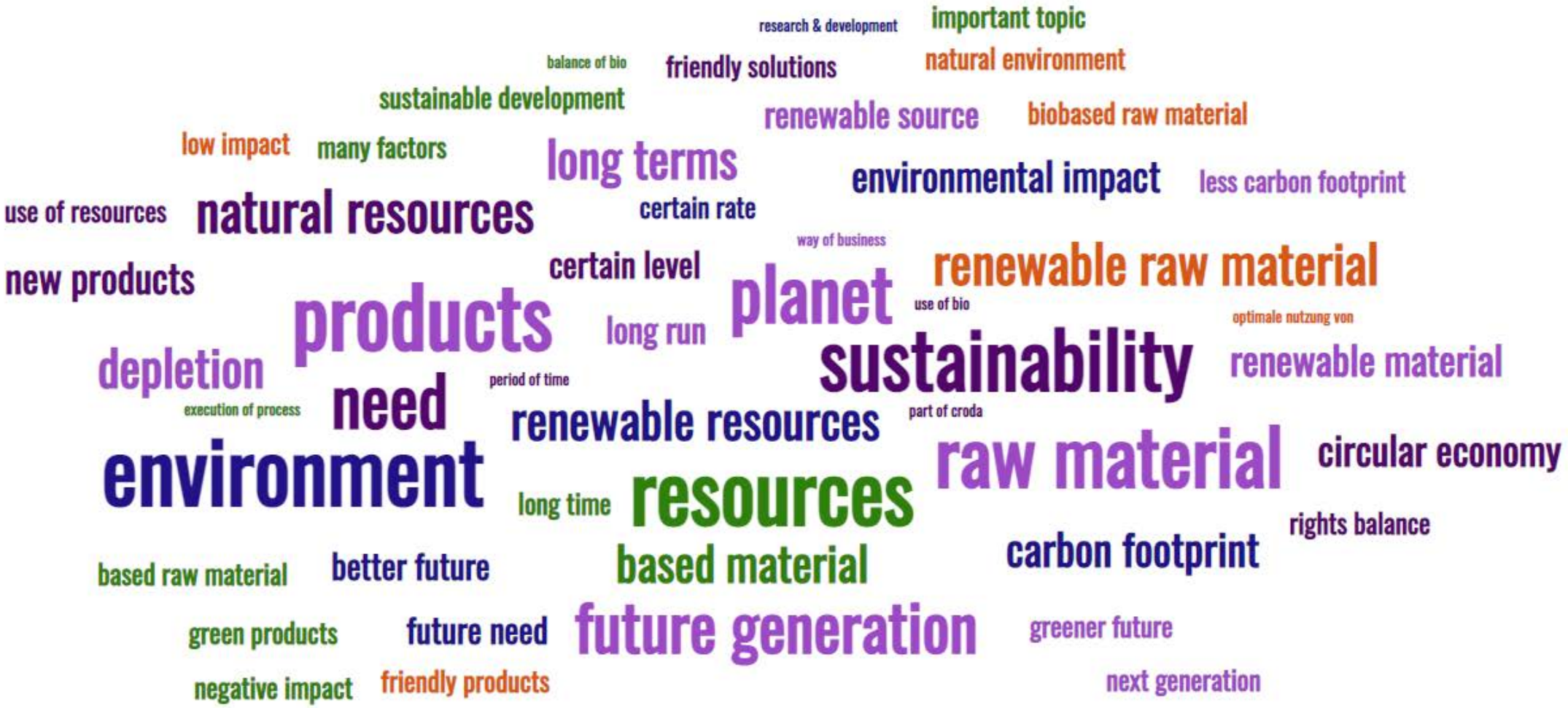
Luc Sterckx, TSBD Representative Architectural EMEA
Tom Vanheertum, Marketing Manager LRA EMEA

Woodcare and Decking Products

Q&A

What does sustainability mean for you?



LEGAL NOTICES

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