How to design high performance waterborne bio-based coatings

KRAHN Inspiration

21rst of April 2026

ecoat

RESPECT THE FUTURE

SUSTAINABLE & PERFORMING

Nicolas MESSIN

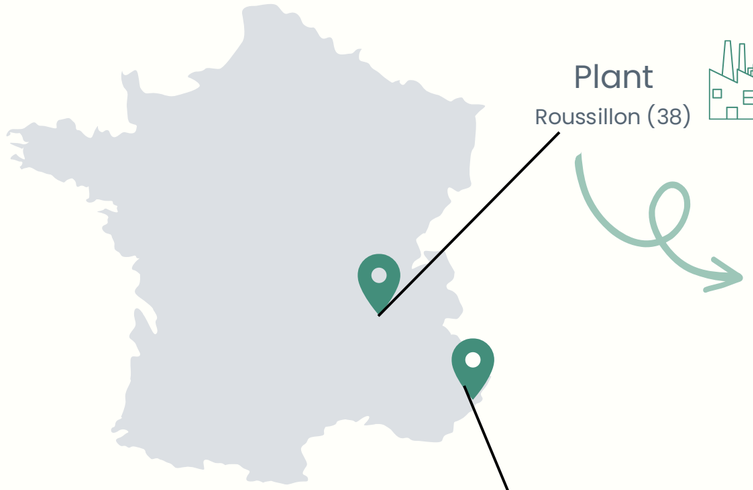
Sales Manager

Agenda

- Introduction to ECOAT
- METAL application
- WOOD application
- Conlusion and contacts

ECOAT IN BRIEF

An industrial green chemistry scale-up



Plant
Roussillon (38)

Headquarter
and R&D labs
Grasse (06)

- ON OSIRIS SHARED CHEMICAL PLATFORM (19 companies, 1600 direct jobs)
- ECOAT INDUSTRIAL PRODUCTION SINCE 2014
- 3000 m² ECOAT OWN BUILDING

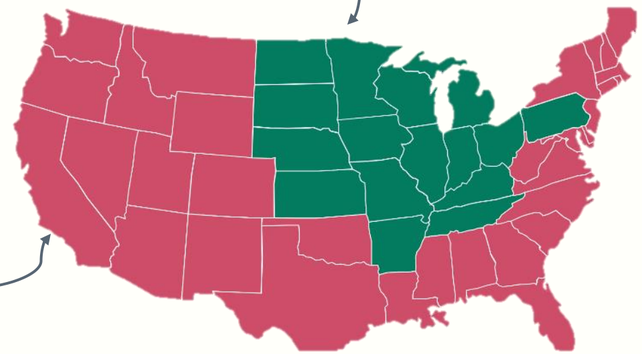
GLOBALLY AVAILABLE

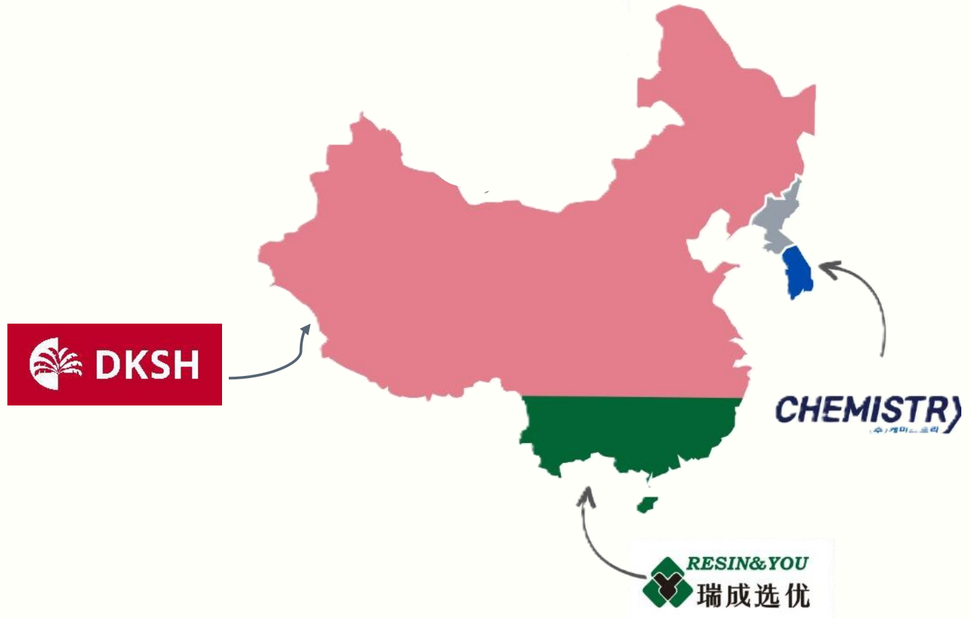
EMCO
CHEMICAL DISTRIBUTORS

MIDWEST

Barentz.

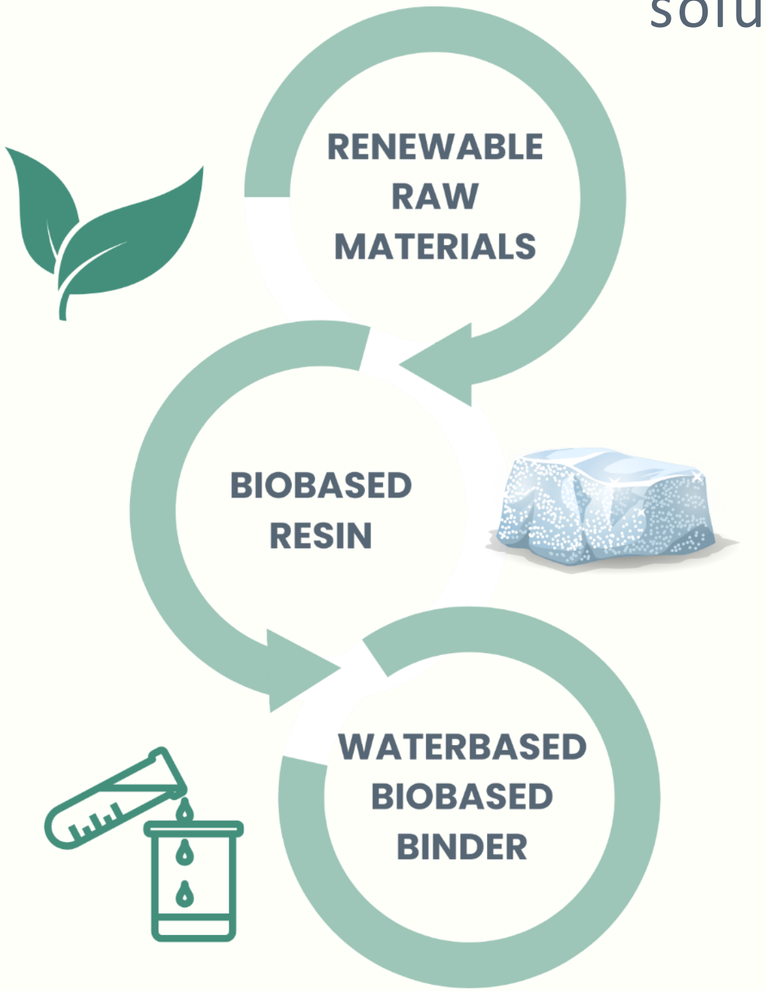
EAST & WEST
COAST





ECOAT IS THE GAME CHANGER

Our mission: bringing high-performance sustainable solutions to the coatings industry



PRODUCTS

Ecoat **designs and manufactures** bio-based polymers

SERVICES

Ecoat **supports** its customers in entering into the ecological transition

GREEN HOUSE GASES (GHG) EMISSION TRAGETS IN THE COATINGS INDUSTRY

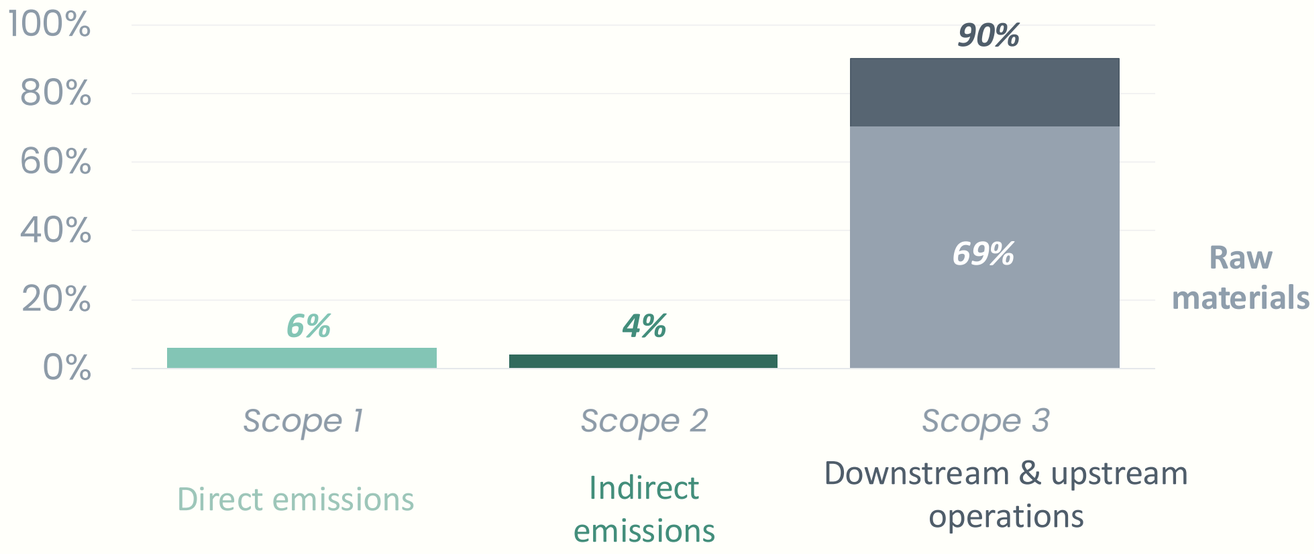
	GHG EMISSION REDUCTION TARGET	2023 PROGRESS
PPG	-50% for scope 1 & 2 -30% for scope 3 *(by 2030 – 2019 baseline)*	-10% for scope 1 & 2 -12% for scope 3
SHERWIN-WILLIAMS	-30% for scope 1 & 2 Scope 3 under study *(by 2030 – 2019 baseline)*	-3% for scope 1 & 2
AkzoNobel	-50% for scope 1 & 2 -50% for scope 3 *(by 2030 – 2018 baseline)*	-38% for scope 1 & 2 -9% for scope 3
NIPPON PAINT	Net zero by 2050	-27%/T for scope 1 & 2 vs 2022
RPM	-20%/T for scope 1 & 2 *(by 2025 – 2021 baseline)*	-19%/T for scope 1 & 2
HEMPEL Trust is earned	-90% for scope 1 & 2 *(by 2026)* -50% for scope 3 (*by 2030*) *(2019 baseline)*	-51% for scope 1 & 2
JOTUN	-50% for scope 1 & 2 Scope 3 under study *(by 2030 – 2017 baseline)*	-21% for scope 1 & 2
asianpaints	-80%/KL for scope 1 & 2 Scope 3 under study *(by 2030 – 2013 baseline)*	-75% for scope 1 & 2

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

to meet the Paris Agreement :

-80% of GHG emissions by 2050 or -4%/year



Average GHG emissions based on several sustainability reports of paint manufacturers

THE JOURNEY TO LOWER RAW MATERIALS IMPACT

The step-by-step approach with blending

Lower the carbon footprint

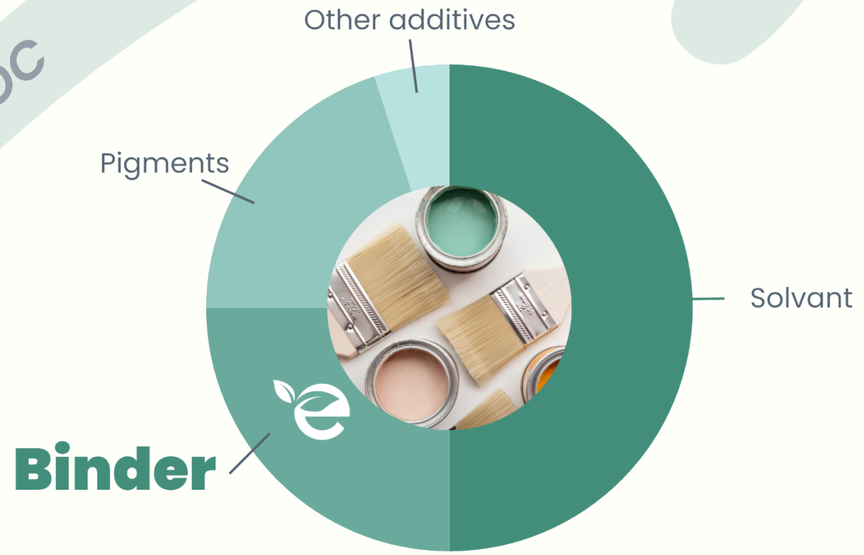
Lower the VOC

SOLVENTBASED

DILUTABLE

WATERBASED
PETROSOURCED

LOW CARBON FOOTPRINT COATINGS



TYPICAL COATING COMPOSITION

One solution:
WATER-BASED BIO-SOURCED BINDERS

BIOBASED BINDERS FOR COATING APPLICATION

ARCHITECTURAL

- Up to 98% biobased binders
- up to Class 1 wet scrub resistance

ANTICORROSION

- Up to 50% biobased binders
- Up to C3 anticorrosion paints

WOOD

- 47 to 96% biobased binders
- Impregnation / woodstain / topcoat

METAL APPLICATION

OUR METAL SOLUTIONS TO MATCH YOUR NEEDS

Lowest carbon footprint

INOKEM® UR 3301

THE MOST VERSATILE

INOKEM® UR 3309

THE OUTPERFORMING

INOKEM® UR 3304

THE COMPROMISE

Highest performance

PU-Alkyd dispersion

INOKEM® UR 3304
HYDROPHOBIC TECHNOLOGY FOR METAL PAINT AND WB VARNISH

- LOWER SOLVENT EMISSIONS AND CARBON FOOTPRINT COMPARED TO BENCHMARK TECHNOLOGIES (PUD, ACRYLICS, SOLVENTBORNE COATINGS)
- CONTAINS 47% OF BIOGENIC CARBON
- HIGH CHEMICAL PERFORMANCES IN WATER BASED COATING

INOKEM®UR 3304

for high anticorrosion performances in water-based coatings

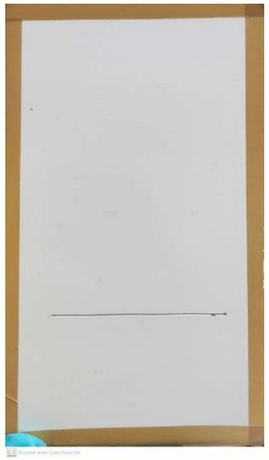
**%biobased calculated according to EN 16640*

DTM FORMULATION BASED ON INOKEM® UR 3304
Salt-Spray-Test

PAINT COMPOSITION	
Dry binder content (%)	24.00
Titanium dioxide content (%)	19.00
Anti-corrosion pigments (%)	5.00
PAINT CHARACTERISTICS	
Density (g/cm³)	1.25 ±0.02
Solid content in weight (%)	48.8 ± 1
PVC (%)	21
Brookfield viscosity (RV6 - V100)	36 P
ICI viscosity (25°C)	2 P

Anti-corrosion performance testing based on: ISO 9227 & ISO 12944-6

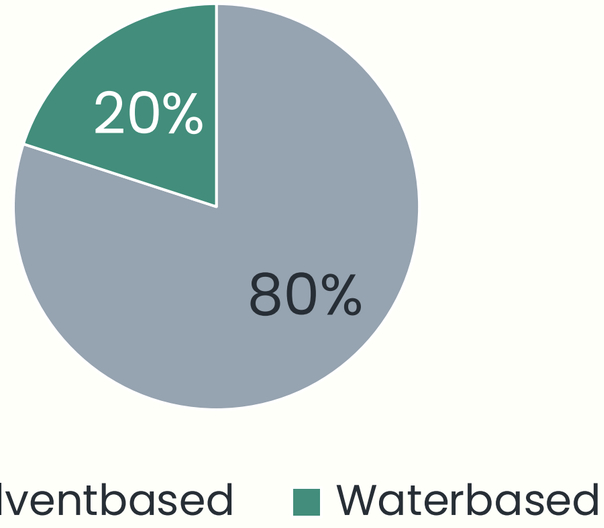
Studies still on-going

Exposure time (hours)	0	240	312	400	504
Appearance					
Relative loss of gloss	Initial gloss 83 GU at 60°	-16%	-21%	-21%	-23%

Results after 504 H			
Adhesion ISO 2409	**Rusting** ISO 4628-3	**Detachment**	**Corrosion degree** 4628-8
2	Ri0	1	Min : 0 Max : 4 Average : 3

BENCHMARK DTM MARKET

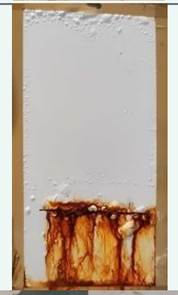
MARKET OF ANTICORROSIVE PAINT IN 2023



80% to 90% of **metal paint DTM** is **SOLVENT BORNE**

	Competitor 1	Competitor 2	Competitor 3	Competitor 4
Base	Water	Water	Solvent	Solvent
Dénomination	DTM	Multisubstrate	DTM	DTM
Warranty	8 years	12 years	8 years	10 years
Binder information	Acrylic	Acrylic	Alkyd	Long oil alkyd
% biobased	<1	<1	Low	Low
Gloss	Shine 60	Satin 33	Shine 68	Shine 33
COV (g/L)	65	50	499	500
Labelling		NA		

BENCHMARK

	INOKEM® UR 3304 Water-based paint	Competitor 1 Water-based	Competitor 2 Water-based	Competitor 3 Solvent-based	Competitor 4 Solvent-based
Binder information	Polyurethane alkyd	Acrylic	Acrylic	Alkyd	Long oil alkyd
Dry thickness	85µm	84µm	85µm	**100µm**	**102µm**
100 hours of exposition					
300 hours of exposition					
500 hours of exposition					
Delamination					

INOKEM® UR 3304 provides the best performance after 500 hours of Salt spray test

Paint based on INOKEM® UR 3304 only shows few blisters and low rusting, and a low corrosion degree in comparison to reference paints of the market

INOKEM® UR 3304 DTM : LIFE CYCLE ASSESSMENT

Functional unit: 1 kg of DTM paint.

Comparative LCA carried out with **Simapro v9.5/ IPCC 2021 method GWP100**, **taking into account the CO_2 storage effect of biogenic carbon at the gate.**

Cradle to gate study – manufacturing supposed in Grasse - product without packaging.

Production process data based on Decorative Paint PEFCR scenario.

Inokem® UR 3304: binder modelized cradle to ECOAT's gate without the packaging using Ecoinvent database v3.8 cut-off and supplier specific data (June 2024 Assessment).

Solvent based alkyd: binder modelized cradle to ECOAT's gate without the packaging using Ecoinvent database v3.8 cut-off (August 2024 Assessment).

Pure Acrylic binder: model from EPDLA LCA study (European Polymer Dispersion & Latex Association).

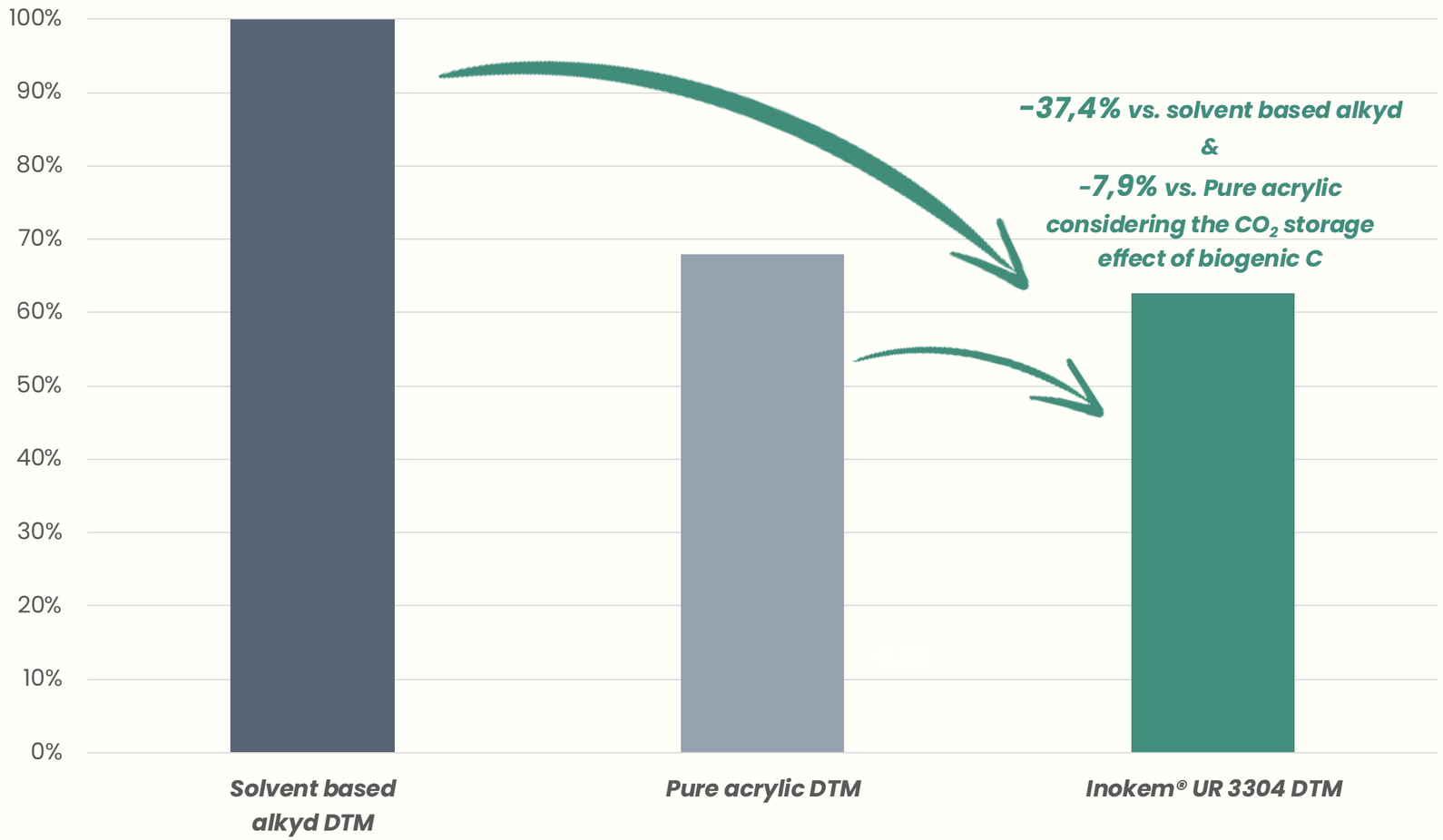
Paint raw materials: models from Ecoinvent database v3.8 cut-off and CEPE database (European Council of the Paint, Printing Ink, and Artist's Colours Industry).

Please consult us for more information

Climate change impact of DTM paints

Inokem® UR 3304 vs. references

Cradle to gate - IPCC 2021 GWP100 method + CO_2 storage effect of biogenic carbon



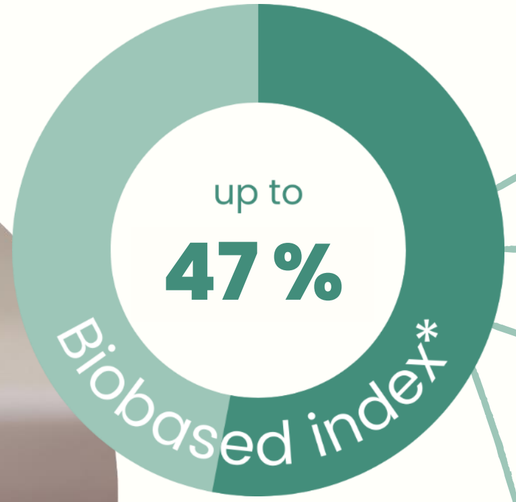
INOKEM® UR 3304

DTM SATIN BLACK PAINT - BENCHMARK

	DFT	Cotation	100		200		300		400		500	
INOKEM® UR 3304	85µm	**Blistering** ISO 4628-2		-		-		-		2(S2)		2(S2)
		Rusting ISO 4628-3		Ri 0		Ri 0		Ri 0		Ri 0		Ri 0
		Initial gloss : 32 **Loss of gloss (GU)** ISO 2813		-30%		-36%		-33%		-39%		-41%
Alkyd solventbased	105µm	**Blistering** ISO 4628-2		-		2(S2)		2(S2)		2(S3)		3(S4)
		Rusting ISO 4628-3		Ri 0		Ri 0		Ri 0		Ri 0		Ri 0
		Initial gloss : 21 **Loss of gloss (GU)** ISO 2813		-6%		-21%		-26%		-26%		-18%
Acrylic waterbased	87µm	**Blistering** ISO 4628-2		4(S3)		4(S5)		5(S5)		5(S5)		5(S5)
		Rusting ISO 4628-3		Ri 1		Ri 3		Ri 4		Ri 5		Ri 5
		Initial gloss : 33 **Loss of gloss (GU)** ISO 2813		-		-		-		-		-

Cotation	Delamination	
Adhesion ISO 2409	2	
Detachment / Rusting	0/RI0	
Corrosion Degree (mm) ISO 4628-8	4	
Adhesion ISO 2409	1	
Detachment / Rusting	5/R5	
Corrosion Degree (mm) ISO 4628-8	10	
Adhesion ISO 2409	-	
Detachment / Rusting	1/Ri5	
Corrosion Degree (mm) ISO 4628-8	ALL	

INOKEM®UR 3309



HIGH HYDROPHOBIC POLYMER

GOOD UV AND WEATHERING RESISTANCE

GOOD ADHESION TO FERROUS AND NON-FERROUS METALS

EXCELLENT BARRIER EFFECT

INOKEM®UR 3309

For high performances

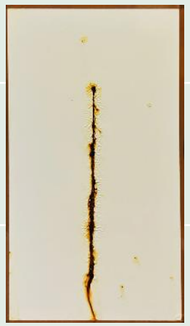
with and without anticorrosive pigment

or corrosion inhibitor

*%biobased calculated according to EN 16640

WHITE GLOSS DTM PAINT WITHOUT ANTICORROSIVE PIGMENT and CORROSION INHIBITOR

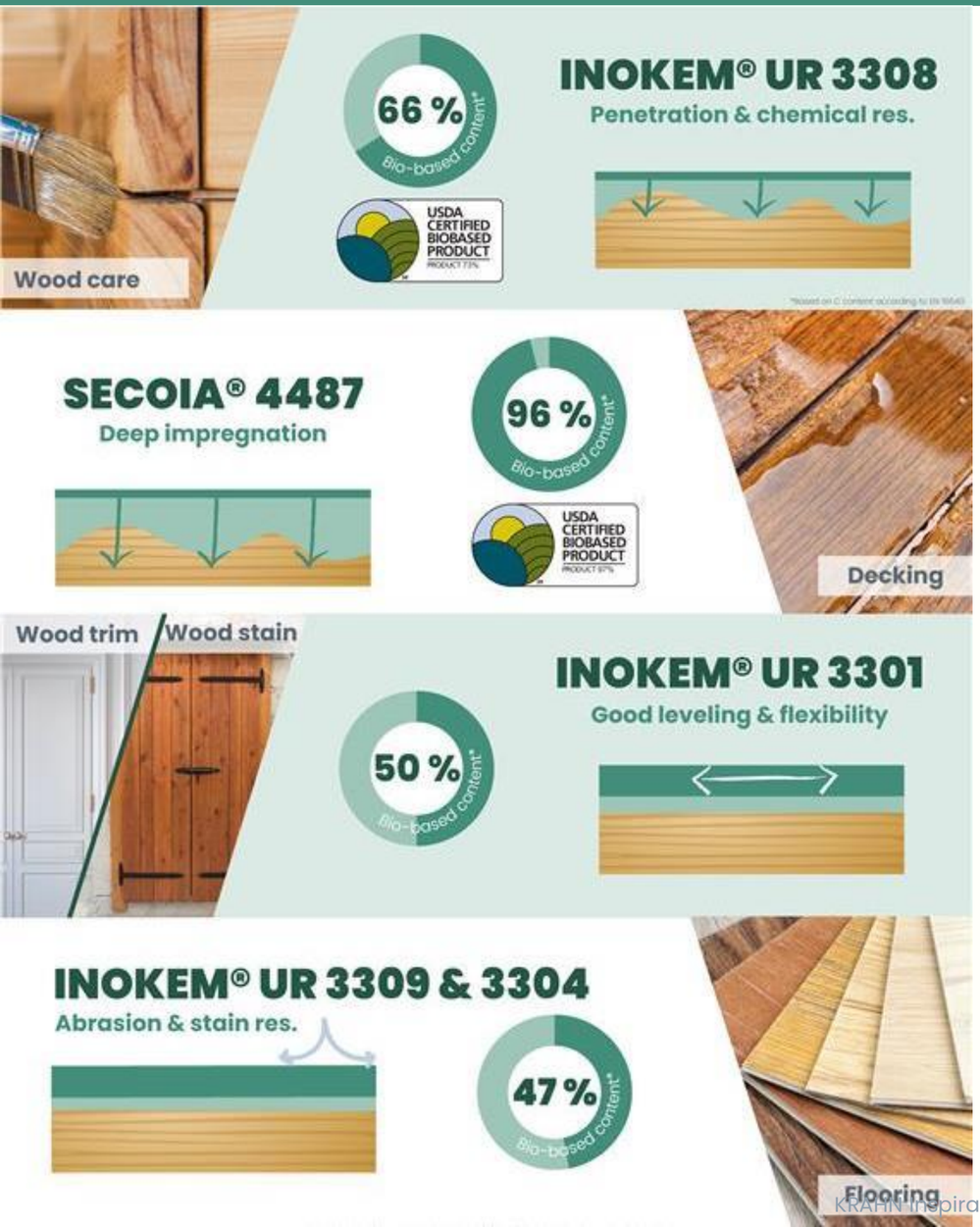
INOKEM® UR CAN BE USED WITH AND WITHOUT ANTICORROSIVE PIGMENT OR CORROSION INHIBITORS

	DFT	Cotation	100		200		300		400		500	
INOKEM® UR 3309	85 µm	**Blistering** ISO 4628-2		2(S2)		2(S2)		3(S3)		3(S4)		4(S4)
		Rusting ISO 4628-3		-		-		-		-		-
		Initial gloss : 89 Loss of gloss (GU) ISO 2813		-24%		-26%		-31%		-32%		NA
Acrylic binder	86 µm	**Blistering** ISO 4628-2		3(S3)		4(S3)		4(S4)		4(S4)		5(S4)
		Rusting ISO 4628-3		-		-		-		-		-
		Initial gloss : 83 Loss of gloss (GU) ISO 2813		NA		NA		NA		NA		NA

Cotation	Delamination	
Adhesion ISO 2409	0	
Detachment / Rusting	3	
Corrosion Degree (mm) ISO 4628-8	20	
Adhesion ISO 2409	NA	
Detachment / Rusting	5	
Corrosion on the plate ISO 4628-8	NA	

WOOD APPLICATION

SECOIA® 4487 & INOKEM® UR : A LARGE RANGE FOR OUTDOOR AND INDOOR WOOD APPLICATION



A versatile range to meet the requirements of various wood segments :

- CLADDING IMPREGNATION
- DECKING OIL SATURATOR
- WOODSTAIN
- WOOD TRIM
- FURNITURE VARNISH
- FLOOR VARNISH

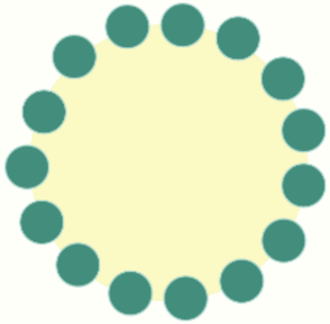
FOCUS ON SECOIA® 4487

A waterborne alkyd binder for wood impregnation

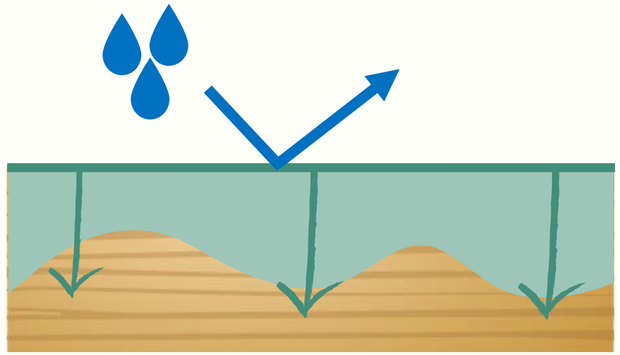
USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 97%

SECOIA® 4487

- Unique surfactant-free technology
- Designed for non-film forming wood coating & hydrophobicity
- Nourishes wood while maintaining its natural appearance
- Gives an important beading effect
- Reduces the carbon footprint



Solid particle (ppm dosage)



Deck, cladding, etc.
Pine, exotic wood, etc.

Wood penetration protects wood from weathering degradation

**Based on C content measured according to EN 16640*

SECOIA® 4487 – EFFICIENT PROTECTION OF WOOD

Secoia® 4487 deeply protects wood from moisture thanks to pickering technology.

SECOIA® 4487

ACRYLIC BINDER

Pine wood – Brush application - 2 layers - 21 days of drying before immersion
Pictures : after 4 days of immersion in distilled water.

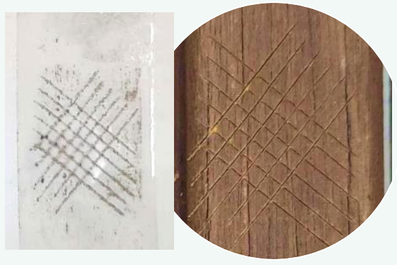
Both formula (Secoia® 4487 and acrylic) contains the same solid binder content. A rate of 0.3% of iron-based drier was added to Secoia® 4487 formula. Edges and backs of the samples were protected with solvent-based white paint.

SECOIA® 4487 : SWITCH TO WATERBORNE DECKING OIL

NATURAL WEATHERING

TEAK DECKING OIL BASED ON SECOIA® 4487 VS. ACRYLIC BENCHMARK.

1 YEAR of exposure (March 2024 to February 2025) – SOUTH OF FRANCE

	BENCHMARK	SECOIA® 4487
Left : pine wood Right : exotic wood		
Knots on pine wood		
Cross-cut test (ISO 2409) after restoration (1 layer) on exotic wood		

With Secoia® 4487 :

- ✓ Do not peel, no cracking & keep homogeneity
- ✓ Protects knots from cracking
- ✓ Preserve adhesion & facilitate restoration

SECOIA® 4487 **SB decking oil**

Ipe wood
After 7 months of natural exposure

SECOIA® 4487 DECKING OIL : LIFE CYCLE ASSESSMENT

Functional unit: 1 kg of decking oil.

Comparative LCA carried out with **Simapro v9.5/ IPCC 2021 method GWP100, taking into account the CO_2 storage effect of biogenic carbon at the gate.**

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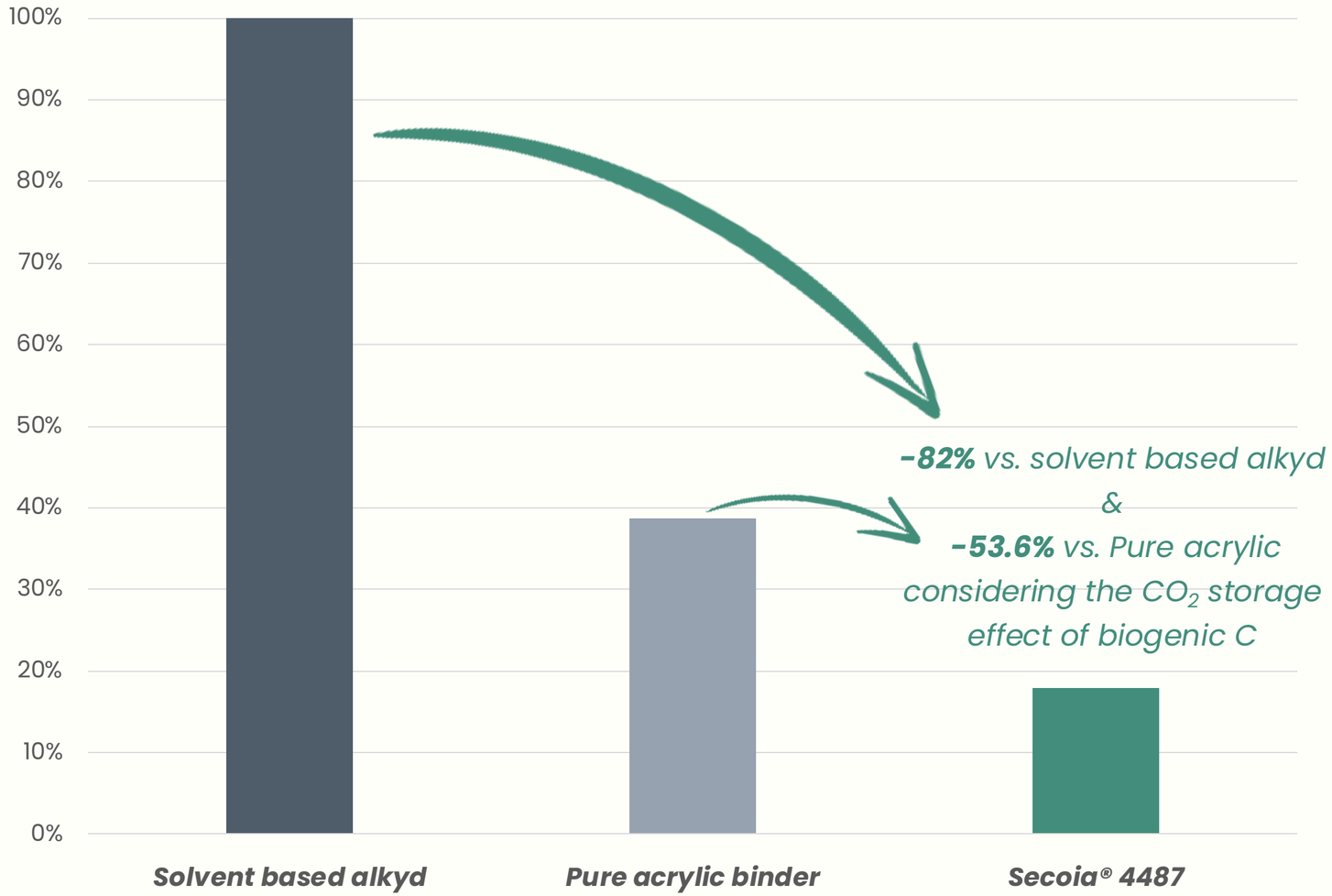
Paint raw materials: models from Ecoinvent database v3.8 cut-off and CEPE database (European Council of the Paint, Printing Ink, and Artist's Colours Industry).

Please consult us for more information

Climate change impact of clear decking oils
Secoia® 4487 vs. references

Cradle to gate - IPCC 2021 GWP100 method + CO_2 storage effect of biogenic carbon

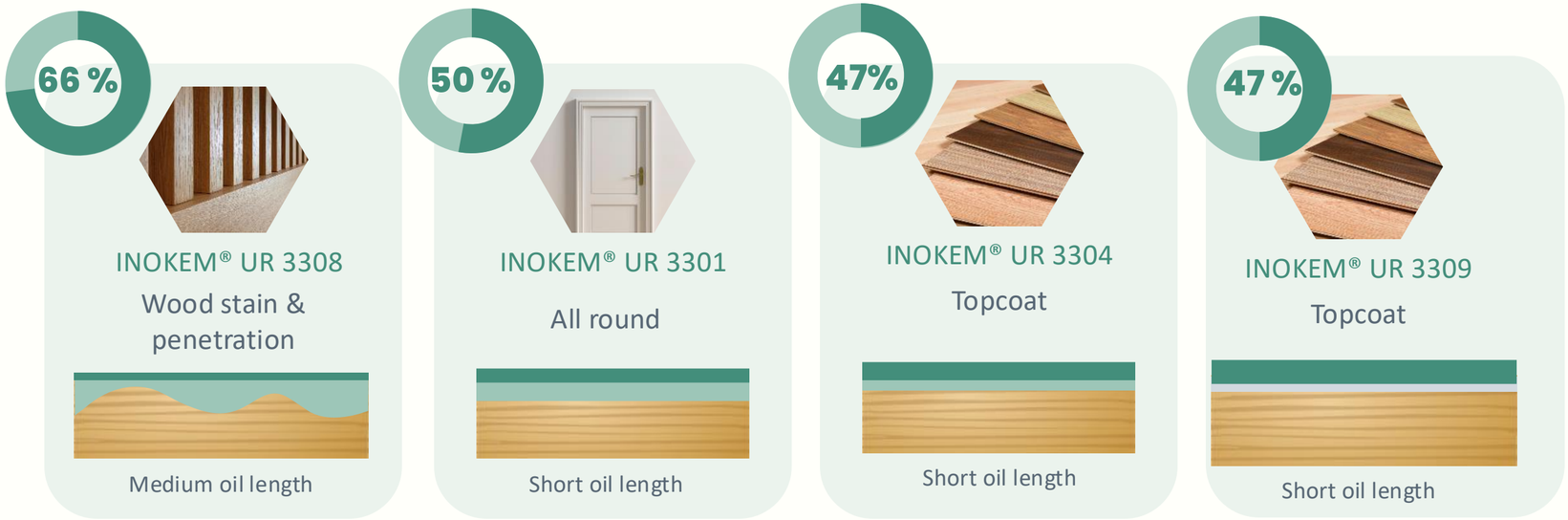


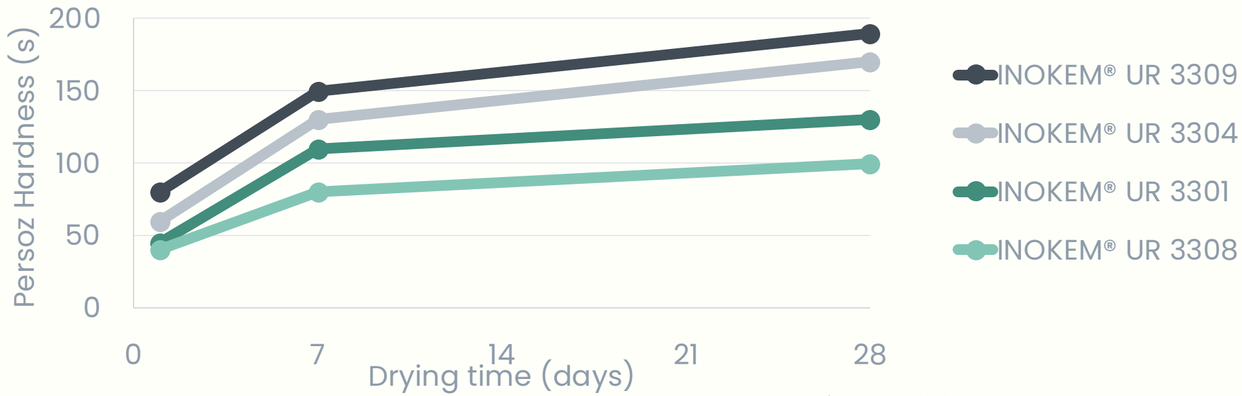
-53 % to -82 % ?

45 to 176
single trips

FOR 100 T OF PAINT

INOKEM® UR RANGE FOR WOOD APPLICATION





- ✓ INOKEM® UR RANGE EXHIBITS **EXCELLENT WATER REPELLENCY** AND **CHEMICAL RESISTANCE**
- ✓ CAN BE USED **EITHER ALONE OR IN BLEND** WITH ACRYLICS OR PUD ENABLING TO ENHANCE PERFORMANCES AND/OR REDUCE THE COST
  - ✓ *EXCELLENT COMPATIBILITY AND STABILITY*
- ✓ ALL THE RESINS HAVE A **OH FREE CONTENT** AT ABOUT 1% THAT CAN BE USED FOR REACTING IN 2K
  - ✓ *INDUSTRIAL APPLICATIONS FOR FURNITURE, FLOORING & TOPCOAT*

INOKEM® UR 3301 – A VERSATILE REFERENCE

VERSATILE WATERBASED PU-ALKYD FOR WOODSTAIN APPLICATION

INOKEM® UR 3301

- Good chemical resistance and adherence
- Good UV & weathering resistance
- Hydrophobic polymer
- Compromise between flexibility and hardness
- Good penetration on aged wood
- Indoor & outdoor application
- Compatible with acrylics, styrene-acrylics and PUD
- Lower CO_2 footprint versus PUD and acrylics

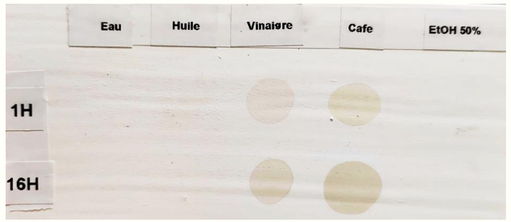
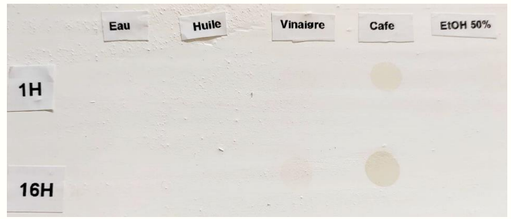
Suitable for trim paint, woodstain, multisubstrate paint, etc.

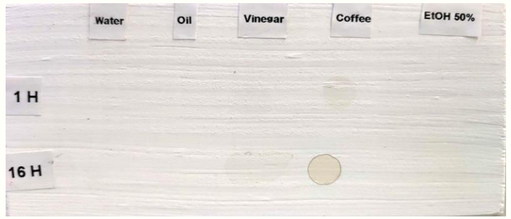
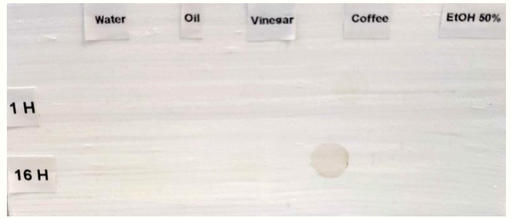
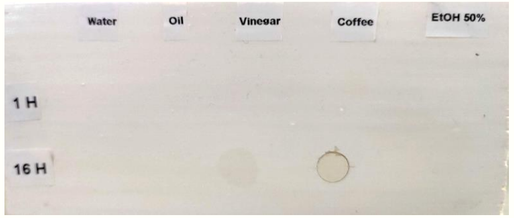
*Based on C content measured according to EN 16640

INOKEM® UR 3301 : CHEMICAL RESISTANCE

SATIN VELVET TRIM PAINT

PAINT FORMULA (LOW BIOBASED RATE):
18% dry binder, 2% recycled $CaCO_3$

Styrene Acrylic	Conventionnal Alkyd emulsion (Min 33% biobased)	Inokem®UR 3301 (Min 42% biobased content)
		
Rating : **20**	Rating : **10**	Rating : **6**

Market velvet paint 1 (water-based acry PU)	Market velvet paint 2 (water-based acry PU alkyd)	Market velvet paint 3 (glycerophtalic)
		
Rating : **9**	Rating : **5**	Rating : **12**

INOKEM® UR 3301 : ADHESION ON ALUMINIUM

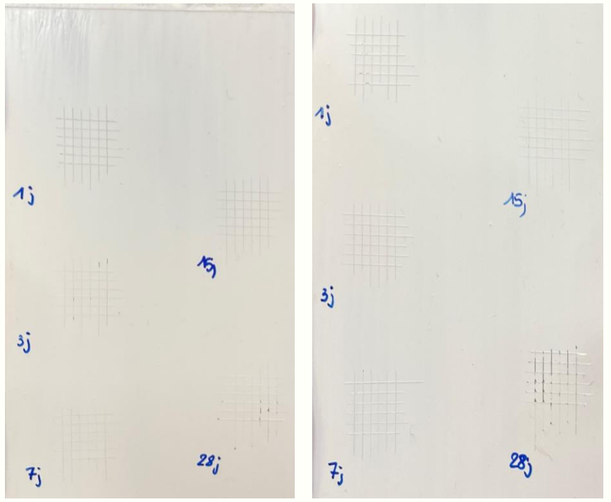
GLOSSY MULTISUBSTRATE PAINT

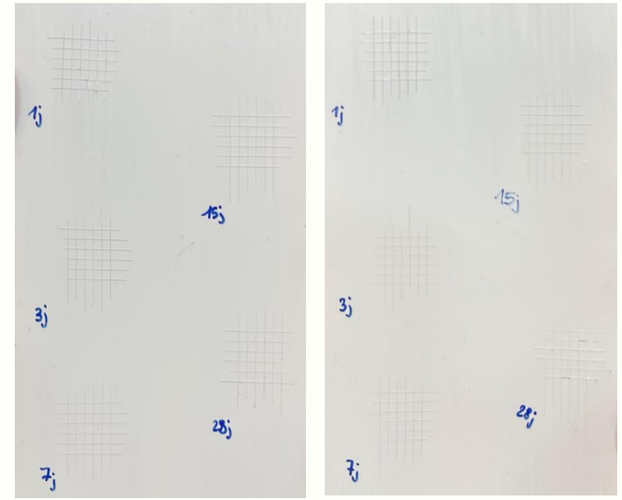
Procedure on ALUMINIUM:

- ✓ Substrate cleaning with acetone
- ✓ Two layer of each paint is applied with a brush at 12m²/L on Q-Panel A36 lightly sanded (P120) on one side and not sanded on the other side
- ✓ Cross cut test after 1, 3, 7, 15 and 28 days of drying

Aluminium

INOKEM® UR 3301		Multisubstrate market paint	
Sanded	Not sanded	Sanded	Not sanded





Drying time (Days)	**Adhésion** ISO 2409			
Sample	**INOKEM® UR 3301**		**Multisubstrate market paint**	
	Sanded	**Not Sanded**	**Sanded**	**Not sanded**
1	0	0	0	0
3	0	0	0	0
7	0	0	0	0
15	0	0	0	0
28	0	0/1	0	0

INOKEM® UR 3301 : SALT SPRAY TEST

GLOSSY MULTISUBSTRATE PAINT

	DFT	Cotation	100		200		300		400		500		Cotation	Delamination
INOKEM® UR 3301	85 µm	**Blistering** ISO 4628-2		-		2(S2)		2(S2)		2(S3)		3(S3)	**Adhesion** ISO 2409	1/2	
		Rusting ISO 4628-3		Ri 0		Ri 0		Ri 0		Ri 0		Ri 0	**Detachment Rusting**	2,5 RI0	
		Initial gloss : 32 **Loss of gloss (GU)** ISO 2813		-14%		-17%		-19%		-23%		-19%	**Corrosion Degree (mm)** ISO 4628-8	7	
multisubstrate market paint	87 µm	**Blistering** ISO 4628-2		2(S2)		2(S3)		2(S3)		2(S3)		3(S4)	**Adhesion** ISO 2409	1	
		Rusting ISO 4628-3		Ri 0		Ri 0		Ri 0		Ri 0		Ri 0	**Detachment Rusting**	4 Ri0	
		Initial gloss : 33 **Loss of gloss (GU)** ISO 2813		-9%		-6%		-12%		-15		-18%	**Corrosion Degree (mm)** ISO 4628-8	6	

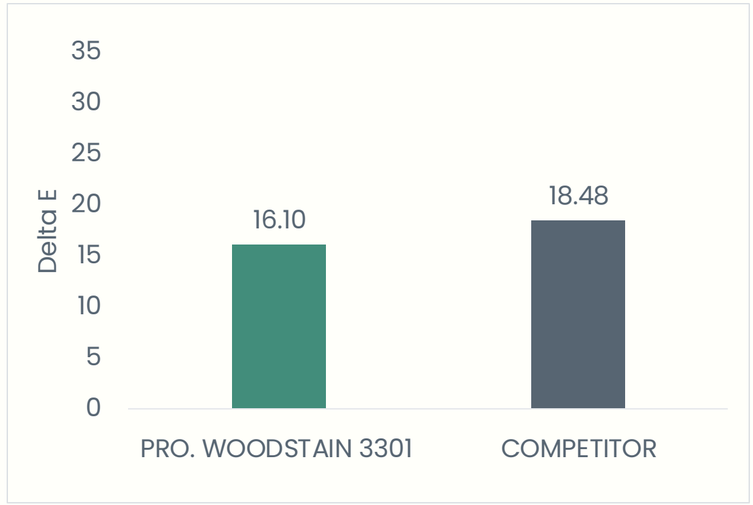
INOKEM® UR 3301 : SALT SPRAY TEST

PROFESSIONAL WOODSTAIN

REFERENCE	INITIAL		500 H	1000 H	2000 H	
WOODSTAIN **INOKEM® UR 3301**	Initial gloss 60°/85° : 27.6 / 21.8					Gloss 60°/85° 18.6 / 18.8 Gloss variation 60°/85° -33 % / -14 % Delta E 16.10 Observation No cracking
BENCHMARK **Alkyd Polyurethane Acrylic**	Initial gloss 60°/85° : 19.7 / 16.7					Gloss 60°/85° 19.9 / 20.7 Gloss variation 60°/85° +1 % / +24 % Delta E 18.5 Observation No cracking

GLOSS EVOLUTION – 2000 H

DELTA E – 2000 H



INOKEM® UR 3301 - WOODSTAIN - LCA

Functional unit: 1 kg of wood stain.

Comparative LCA carried out with **Simapro v9.5/ IPCC 2021 method GWP100**, **taking into account the CO_2 storage effect of biogenic carbon at the gate.**

Cradle to gate study – manufacturing supposed in Grasse - product without packaging.

Production process data based on Decorative Paint PEFCR scenario.

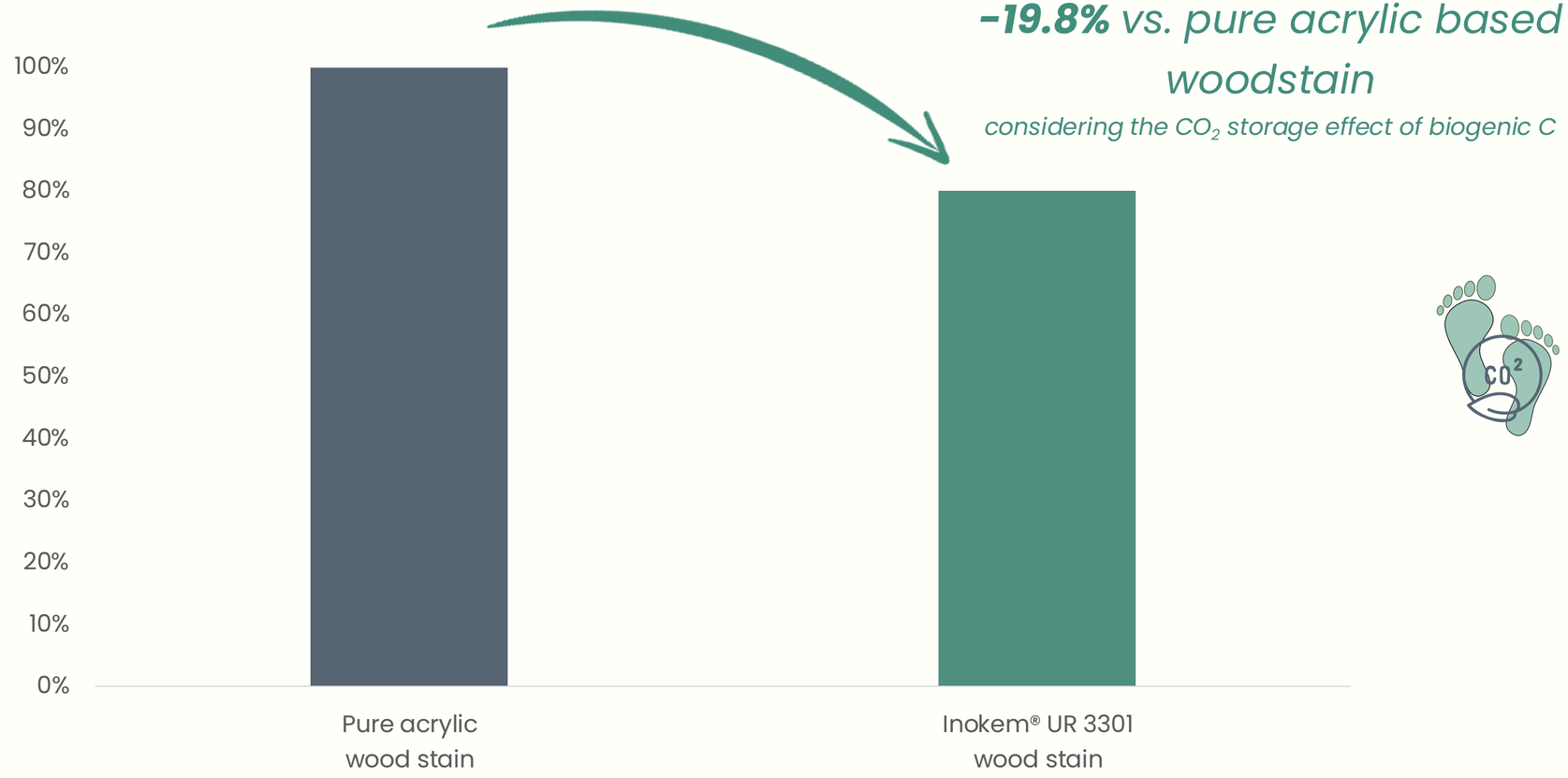
Inokem® UR : binder modelized cradle to ECOAT's gate without the packaging using Ecoinvent database v3.8 cut-off and supplier data (May 2024 Assessment).

Pure Acrylic binder: model from EPDLA LCA study (European Polymer Dispersion & Latex Association).

Paint raw materials: models from Ecoinvent database v3.8 cut-off and CEPE database (European Council of the Paint, Printing Ink, and Artist's Colours Industry).

Please consult us for more information

Climate change impact of **professional woodstains**
Cradle to gate - IPCC 2021 GWP100 method + CO2 storage (biogenic carbon)



***-19.8%** vs. pure acrylic based woodstain*

considering the CO_2 storage effect of biogenic C

ECOAT PRODUCTS OVERVIEW

Architectural

DECORATIVE INTERIOR WALL PAINTS
SECOIA® 1400

WHITE INTERIOR WALL PAINTS
SECOIA® 1501

TRIM PAINTS
INOKEM® UR 3301
INOKEM® UR 3304
INOKEM® 1101

Wood

INDOOR

SEALERS &VARNISHES
INOKEM® UR 3304
INOKEM® UR 3309

WORKTOPS & FLOOR OILS
INOKEM® UR 3308

OUTDOOR

DECKING OIL
SECOIA® 4487

CLADDING & WOOD CARE
INOKEM® UR 3308

WOOD STAINS
INOKEM® UR 3301 + Acrylics
INOKEM® UR 3308 + Acrylics

MULTI-SUBSTRATES
INOKEM® UR 3301

Metal

ANTI-CORROSION DTM PAINTS
INOKEM® UR 3301
INOKEM® UR 3304
INOKEM® UR 3309

MULTI-SUBSTRATES OUTDOOR PAINTS
INOKEM® UR 3301

CONCLUSION

BINDERS

LOW VOC

PERFORMING

LOW CARBON FOOTPRINT

WATERBASED

VERSATILE

BIOBASED

REDUCTION OF CARBON FOOTPRINT

Technical presentations are available

READY TO ENTER THE ECOLOGICAL TRANSITION?

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ecoat

RESPECT THE FUTURE

&

KRAHN

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