ARKEMA

ARKEMA COATING SOLUTIONS
Sustainable offer

Summary

Accelerating the shift to more sustainability

Why is shift important?

Richard Jenkins, Senior Vice President, Arkema Coating Solutions: The need for sustainability impacts every aspect of our society. In the last decade, “climate change” or “circular economy” were not common terms. Now, they are in the news every day. The need to transform our society and adopt responsible lifestyle touches virtually every industry and every citizen in the world. We have to collectively adapt to this new paradigm by adopting a holistic approach including the social, environmental and economic dimensions.

Helene Pernot, Coating Solutions Sustainable Offer Manager: The coatings value chain – from the raw material through to the finished products – has to adapt to these new expectations. Everything we do has the potential to significantly change our world. How we design our products, what they are made from, how they are used and how they are able to be reused matters. Our expertise in materials science is continuously focused on developing solutions to meet the sustainability challenges faced by the markets and our customers.

How can we change?

Richard: We begin by listening to societal and market needs – and then adapt to an industry-wide way of thinking. Along with us, this includes customers, suppliers, regulators, employees, consumers and the financial community. Everyone in the value chain has to be working toward the same goal. That is how we begin to make a meaningful impact.

Helene: To change our impact on the world, we have to adapt the materials and processes we use. And, we need to do it together. A transformation is possible only if all industry players collaborate. We have to move as one toward safer solutions for people and the planet, lowering the carbon footprint across the value chain and enabling circular practices to preserve resources.

What are we doing to get there?

Richard: Arkema is committed on its whole supply chain to align with the 1.5°C trajectory set by the Paris Agreement on Greenhouse Gas (GHG) and to transition 65% of our sales to meet the UN Sustainable Development Goals (SDGs) by 2030. In the coatings industry, our teams are continuously focusing on three areas - designing and producing more sustainable performance materials; supporting the transition to more sustainable technologies (decarbonization, responsible manufacturing, etc.); and fostering the emergence of new markets driven by mega trends to enable the shift toward more sustainable uses, such as home efficiency, living comfort or electric mobility.

Helene: We have made tremendous progress in the past few years by eliminating hazardous air pollutants, transitioning to alternative feedstocks, reducing energy use across the value chain and making products that inherently contribute to sustainability in everyday life. Examples include materials that enable super-durable cool roof coatings, paint binders with up to 97% biorenewable content, low temperature curing resins and more. To accelerate the shift from fossil to renewable feedstocks and foster the reduction of CO_2 emissions, we have started to certify our resins and additives plants to supply bio-attributed products using the mass balance approach according to the ISCC+ standard.

These are just a few examples of our current efforts. More importantly, however, are those yet to come as our journey is just starting. We will continue to work with partners throughout the coatings value chain to identify and enable new solutions that move us, the industry and the world toward a more sustainable future.

Richard Jenkins, Senior Vice President, Arkema Coating Solutions

Helene Pernot, Head of Sustainable Offer, Arkema Coating Solutions

Create high performing solutions to meet sustainability needs

INTRODUCTION

The transformation of our offer is at the heart of our strategy and is driven by all levels of our organization. This is a new way of working in going beyond the traditional culture focused on quality & technical performances of products. All stakeholders of the ecosystem need to collaborate and be aligned on the challenges to solve. This requires, among others, a deep understanding of the end markets need, tools to assess the sustainable performance of our products, a ramp-up of knowledge on sustainability across the organization and a transparent communication on product environmental footprints.

Listen to the voice of customers
& final market expectations

Assess our products
and the impact of our actions

Communicate with transparency

Collaborate across the value chain
to create solutions adressing market challenges

Raise knowledge accross the organization

Moving toward higher positive impact sustainable solutions

MATERIALS
-
Design our product offer **to enhance sustainability and performance**

+

TECHNOLOGIES
-
Support the transition of technologies **to decarbonize and clean the industry**

→ Waterborne
→ UV/LED/EB
→ Powder
→ High solids

+

NEW MARKETS
-
Enable a market shift **to create a more sustainable society**

→ Home efficiency
→ New mobility
→ Living comfort

Leveraging alternative feedtstocks

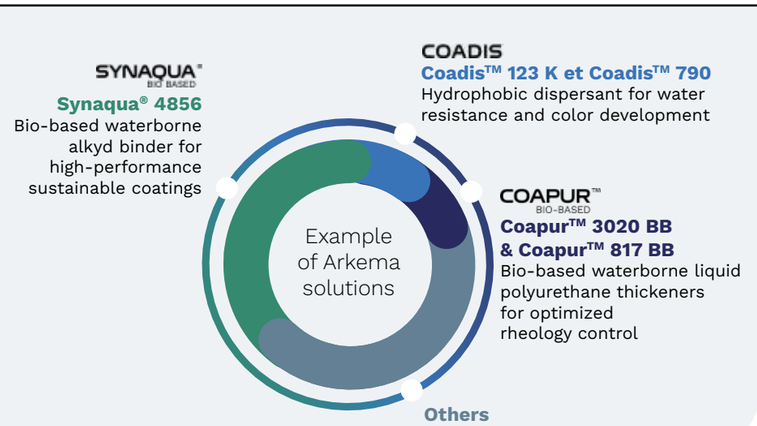
More and more consumers are aware of the impact of their consumption on the planet. They have a clear willingness to adopt a more sustainable and responsible lifestyle through the consumption of products with a reduced impact on the environment. To meet these growing expectations, brand owners are moving away from fossil-derived materials toward materials coming from circular sources in order to preserve resources and reduce the impact on climate. The coatings sector is undergoing the same change and creating growth opportunities for bio-based coatings. To support this transition, we are engaged to accelerate the development of high performance resins and additives sourced from bio-based feedstocks by using the complementary approaches of physical segregation and mass balance.

BIO-BASED PAINT FOR INTERIOR WALLS

Challenge

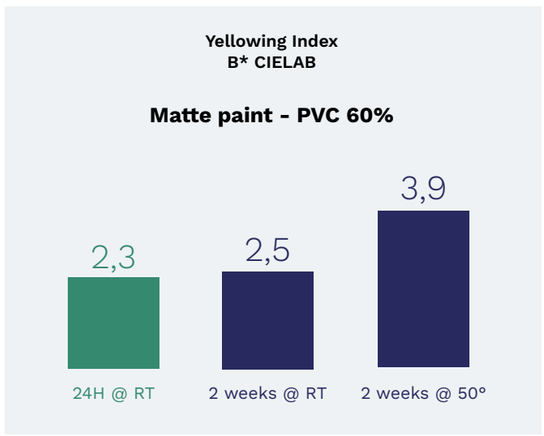
In the rising demand for more sustainable products, consumers are not ready to compromise. One of the challenge of Brand owners is to develop bio-based paints with at least the same level of performance than fossil-based products. To contribute to this challenge, Arkema offers a full range of high-performance bio-based resins and additives. This use case illustrates that the combination of waterborne alkyd resin made from 97% biobased raw materials with a waterborne polyurethane thickeners enables formulators to create bio-based paints with a long lasting color strength.

MARKET EXPECTATIONS



Technical performance

→ **Low yellowing**



Sustainable performance

→ **Synaqua® 4856**

is a waterborne alkyd resin made from **97% bio-based** raw materials coming from byproducts of predominately Nordic foresting, it is APEO, ammonia, solvent and plasticizer free including low emissions suitable for many ecolabel paint formulations.

97%
bio-based

→ APEO free, low VOC & SVOC

→ **Coapur™ 3020 BB and Coapur™ 817 BB**

are polyurethane thickeners made from **90 & 93%** bio-based raw materials to improve antisettling, leveling and application properties of the paint.

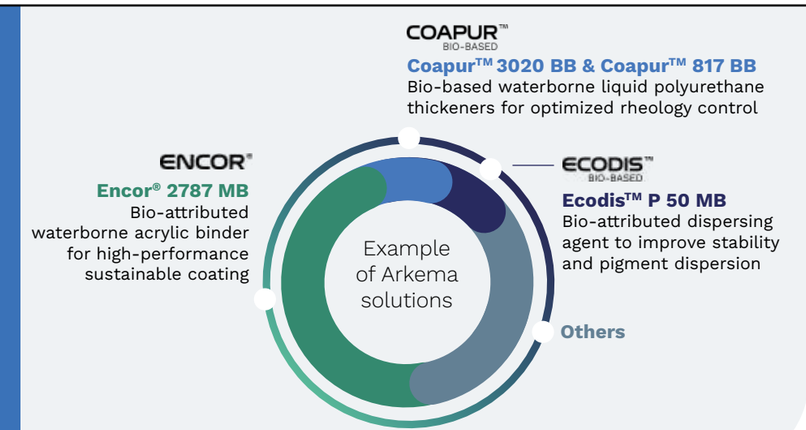
90 and 93%
bio-based

LOWER CARBON FOOTPRINT PAINT FOR INTERIOR AND EXTERIOR APPLICATIONS

Challenge

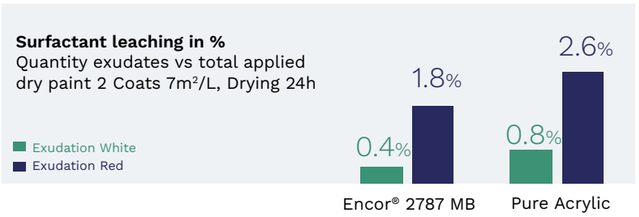
Developing bio-attributed materials using a mass balance approach is an alternative pathway to meet the challenge of combining performance, circular sourcing and lower carbon footprint. In this approach, bio-based and fossil raw materials are produced in the same existing assets while the quantity of bio-based raw materials is segregated by bookkeeping at each step of the value chain. The sourcing can be implemented in the short term as bio-attributed products are drop-in solutions enabling to keep the same level of high quality and performance without the need to requalify.

MARKET EXPECTATIONS

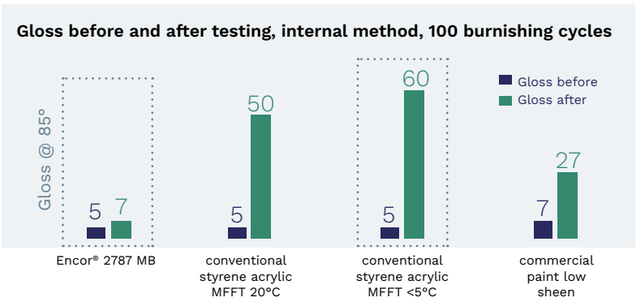


Technical performance

→ **Excellent surfactant leaching resistance**

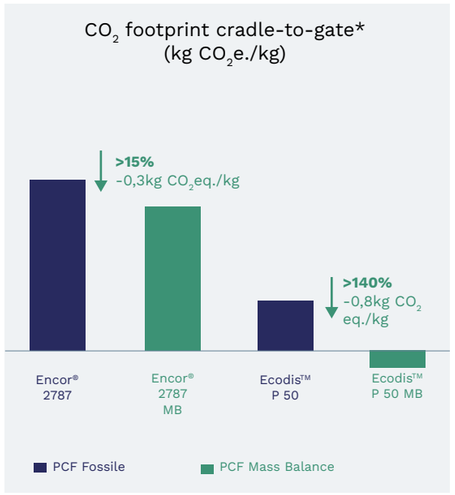


→ **Improved gloss resistance (interior)**



Sustainable performance

→ **Lower CO_2 footprint versus fossil grade**



* PCF cradle to gate including biogenic carbon uptake

Transitioning to lower energy consumption technologies

Rising and volatile energy costs, tightening emission regulations and an overall drive for environmentally conscious manufacturing practices have led many finishing professionals to look for alternative curing technologies. If the application phase is key to take full advantage of coating technical performances, it also impacts the turnover and productivity of companies. We offer a wide range of materials suitable for almost all the curing technologies of the market and help our customers to transition to lower energy consumption technologies.

UV/EB CURED COATINGS FOR COIL

Challenge

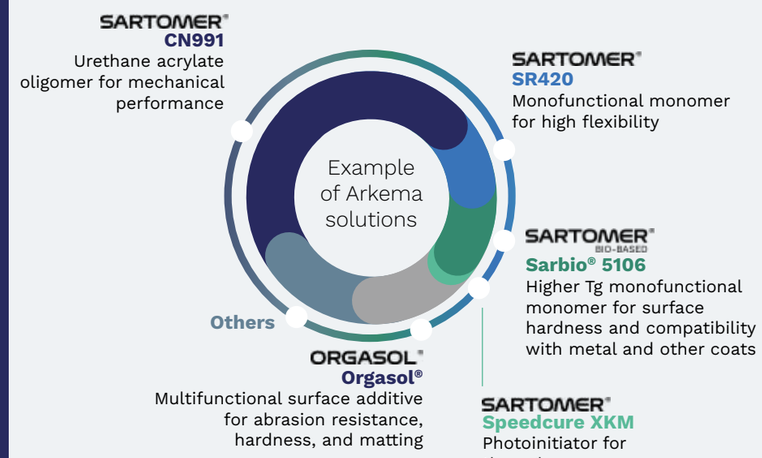
The benefits of precoated metal span from aesthetic advantages to economic efficiencies, making it the substrate of choice in a wide pallet of construction areas. To decarbonize the industry, coil coating players position the UV/EB coating technology as a game changer. According to the European Coil Coating Association (ECCA), the UV/EB curing technology has the potential to reduce energy use by at least 60% versus conventional technologies. As a pioneer in energy curing systems, Arkema supports this transition with a full range of high performing solutions suited to UV/EB coating technologies.

MARKET EXPECTATIONS

Lower impact on environment

Higher throughput process

Aesthetic & Functional Properties



SARTOMER® CN991
Urethane acrylate oligomer for mechanical performance

SARTOMER® SR420
Monofunctional monomer for high flexibility

SARTOMER® BIO-BASED Sarbio® 5106
Higher Tg monofunctional monomer for surface hardness and compatibility with metal and other coats

ORGASOL® Orgasol®
Multifunctional surface additive for abrasion resistance, hardness, and matting

SARTOMER® Speedcure XKM
Photoinitiator for through cure

Technical performance

100% active content

2X surface coverage per kilogram of paint compared to conventional systems

High coating performance

Sustainable performance

→ **At least 60% of energy savings**

(ECCA - Zero Carbon Coil Coating Line – The Way Forward)

no extraction of solvents
+
no incineration
+
ambiant temperature cure

→ **Reduced material use**
as extended surface coverage

POWDER COATINGS TO PROTECT MDF & WOOD SUBSTRATES

Challenge

Across stakeholders of the coating industry, powder resin technology is recognized as an advanced technology in terms of durability, flexibility and robustness as well as sustainability as it enables the removal of VOC and the reduction of waste during application. There is a growing demand to expand the performance of powder technologies to low curing temperature to support the decarbonization of the industry and to enable the expansion to a vast array of non-traditional substrates such a medium density fiber boards (MDF). In this use case, we will illustrate how the Arkema low curing temperature powder resins portfolio drives the creation of innovative MDF coatings.

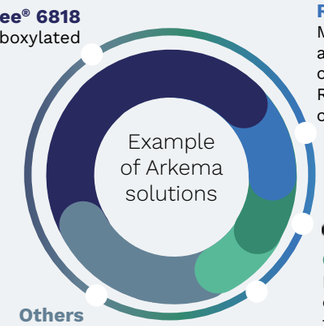
MARKET EXPECTATIONS

Unconventional colours and effects

Safer

Resistance

Expand the use of powder to non-metal substrates



REAFREE® Reafree® 6818
Saturated carboxylated

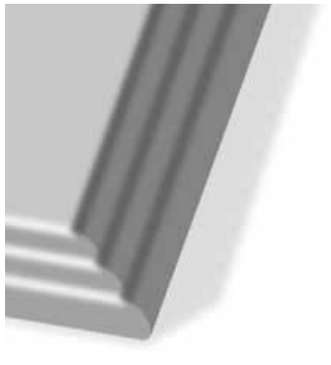
REAFREE® Reafree® C4705-10
Masterbatch at 10% of a special catalyst in a carboxylated polyester. Recommended to accelerate curing of hybrid Reafree® 6818

CRAYVALLAC® BIO-BASED Crayvallac® PC
Micronised hydrogenated castor oil derivative surface additive for powder coatings

CRAYVALLAC® Crayvallac® WN-1265
Micronised amide wax for powder for slip and degassing

Technical performance

→ **Exceptional design flexibility to meet unconventional colours and effects**



Sustainable performance

→ **Very low curing temperature at 135°C** = **extended use of powder coating to MDF and wood substrate**

→ **1 layer using powder versus several with liquid** = **Reduce material use**

→ **Less energy to cure vs liquid solutions** = **Reduced energy consumption**

→ **No VOC**

Making safer products

Among consumer expectations for a more sustainable lifestyle, Health & Well being is one of the first concerns. More and more digital applications scoring safety profile of consumer goods are developed to guide consumers toward informed choices. For the coatings & ink materials, the elimination of substance of concern and hazardous air pollutants has been a long term trend which led to the conversion from solvent borne formulations to low VOC formulation such as waterborne, UV/EB and powder resins. Arkema has a pro-active approach to assess health, safety and environmental impacts of our products in order to anticipate future regulations and market trends. This approach leads us to propose a selection of profile products offering safety profile to further protect consumers, workers and community.

INK FOR INDIRECT FOOD PACKAGING

Challenge

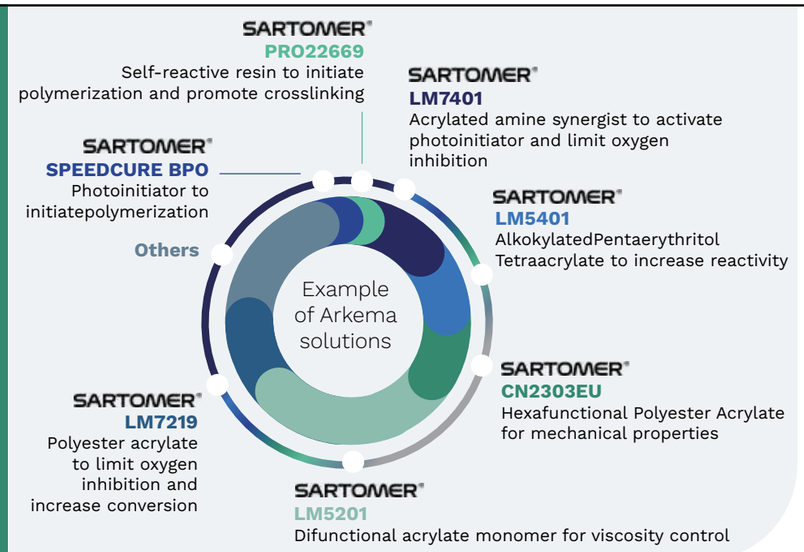
Consumers now place significantly more value on food safety and health. Designing food packagings with safety in mind is crucial. Printing inks and varnishes applied on packaging make no exception and have to combine high safety profile with high resistance during usage lifetime. Arkema is continuously innovating in this field to extend its product offer of low migration solutions for indirect food packaging. The latest grades include products combining multifunctionality, high molecular weight, and high reactivity under low energy curing LED systems.

MARKET EXPECTATIONS

Safer

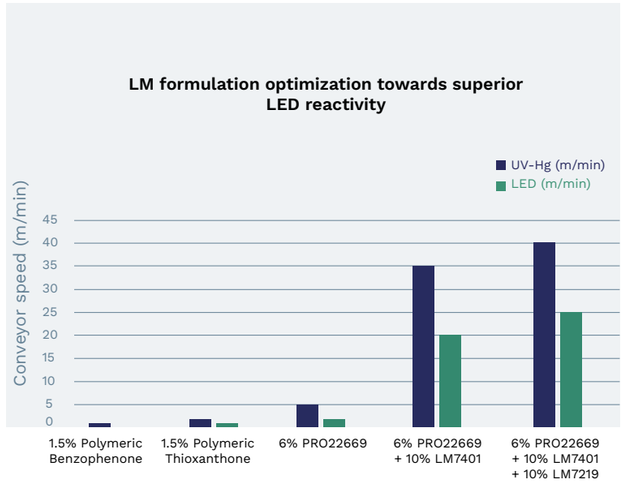
Aesthetic

Lower impact on the environment



Technical performance

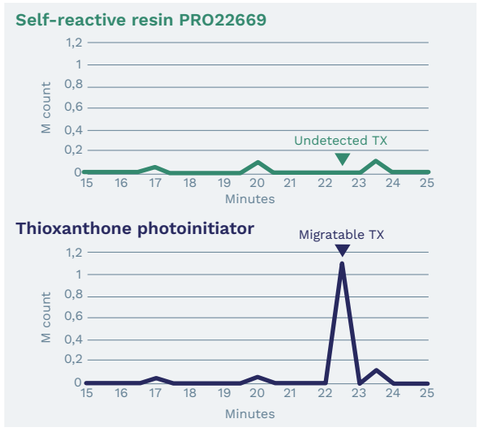
→ **Better reactivity under LED**



Sustainable performance

→ **Reduced migration risk under LED**

No migration by set off and no migration through the packaging



Better compromise with no Thioxanthone migration and low extractible acrylates

IMPROVE HEALTH AND SAFETY OF PAINT APPLICATOR

Challenge

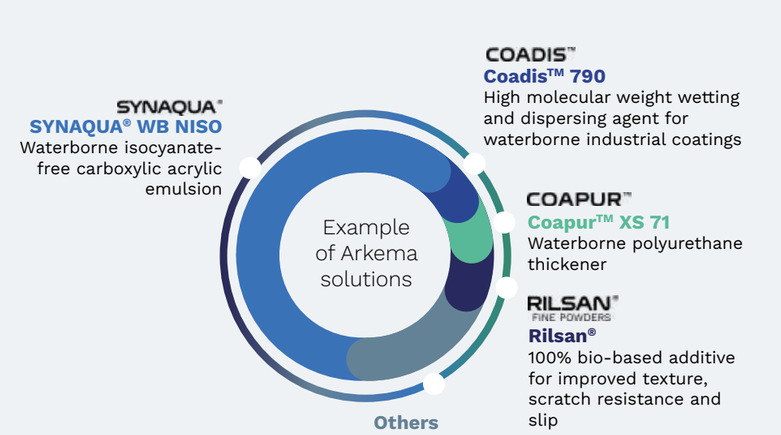
From decades, the coatings value chain has strived to achieve better performances while reducing substance of concern and hazardous air pollutants levels. Thanks to its complete portfolio of technologies including, high solid, waterborne, UV and powder, Arkema is definitely focused on the development of safer solutions with lower volatile organic compounds. In order to move one step further and anticipate future regulations, Arkema is continually exploring innovative solutions to improve the protection of consumers and the working conditions of paint applicators. This use case introduces a waterborne isocyanate-free system offering similar performance to a standard 2 pack polyurethane system with significantly lower VOC.

MARKET EXPECTATIONS

Durability

Safer for paint applicators

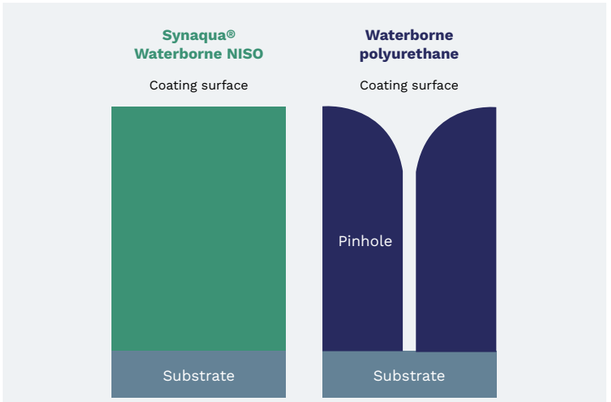
High film thickness capability



Technical performance

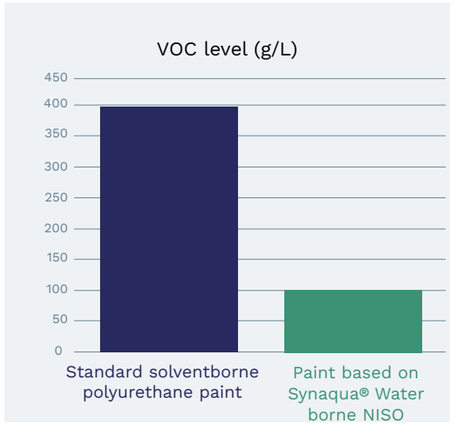
→ **Similar performance to a standard 2 pack polyurethane system**

50% dry film thickness increase without pinholes vs. waterborne polyurethane



Sustainable performance

→ **Waterborne formulation with low VOC Isoccyanate-free to protect paint applicators**



Foster the emergence of new markets

REDUCING ENERGY CONSUMPTION OF BUILDINGS

Challenge

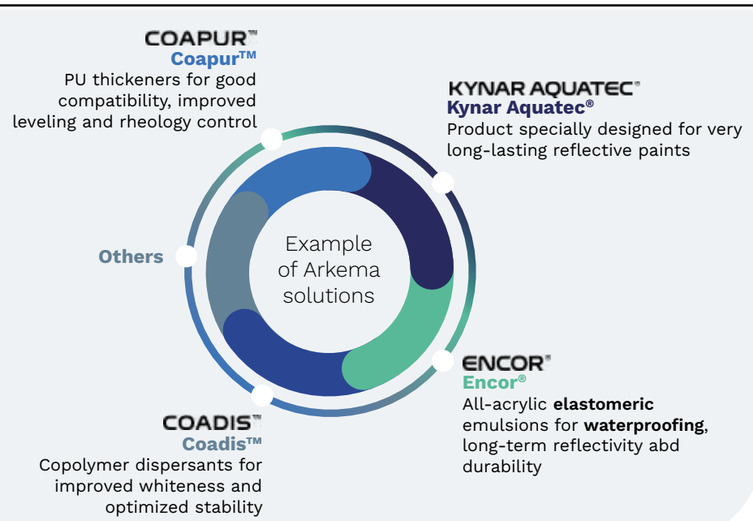
With global warming, cool roofing is emerging as an efficient and economical solution for lowering building temperatures and costs for air conditioning. The idea is simple: a white roof coating that reflects the sun's rays during periods with lots of sunlight. Many building roofs can be converted into cool roofing. From primer, to top coat, going through base coat, Arkema offers a complementary range of products tailored to cool roof constraints.

MARKET EXPECTATIONS

Reduce air conditioning consumption

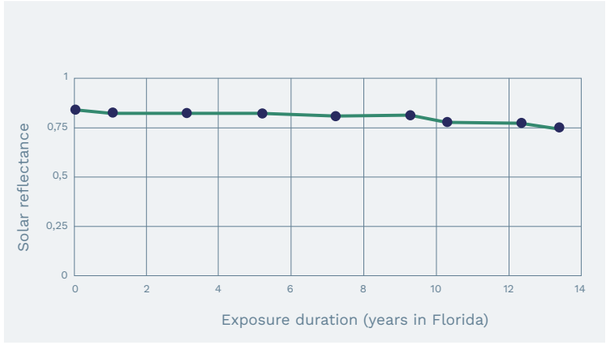
Improve indoor thermal comfort

Hyperdurable



Technical performance

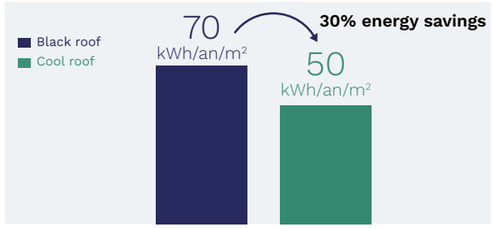
→ **Very high level of reflectivity throughout coating lifetime**



Sustainable performance

→ **Impressive energy savings**

→ **30% of energy saved**



→ **Reduce air conditioning costs by 30%**

→ **Improve indoor thermal comfort up to 6°C**

Focus on Mass Balance approach

The transition from virgin fossil to renewable feedstocks, either bio-based or recycled, is a key priority to reduce GHG emissions and move to a more circular economy. There are several ways to implement this transition. It can be done either through a segregated approach or through a system of mass balance attribution. The choice to use a segregated or mass balance approach depends on several dimensions such as the availability of raw materials or the size and investments needed to build dedicated plants all along the value chain. Arkema is developing both approaches to accelerate the transition and innovation into renewable materials.

What is a segregated production ?

A segregated production is a production in which the bio-based materials are processed in segregated production lines. In this configuration, bio-based content can be measured by C14 analysis in final products.

What is the mass balance approach?

The mass balance approach consists in replacing fossil by renewable feedstocks at the origin of the supply chain, processing both feedstocks in the same production assets. The quantity of renewable material is segregated by bookkeeping to attribute this quantity to finished products at the end of the chain. The Mass Balance approach requires no modification to the process, or new product accreditation as the high quality and performance of the products remain the same, which makes it easier for our customers to adopt them.

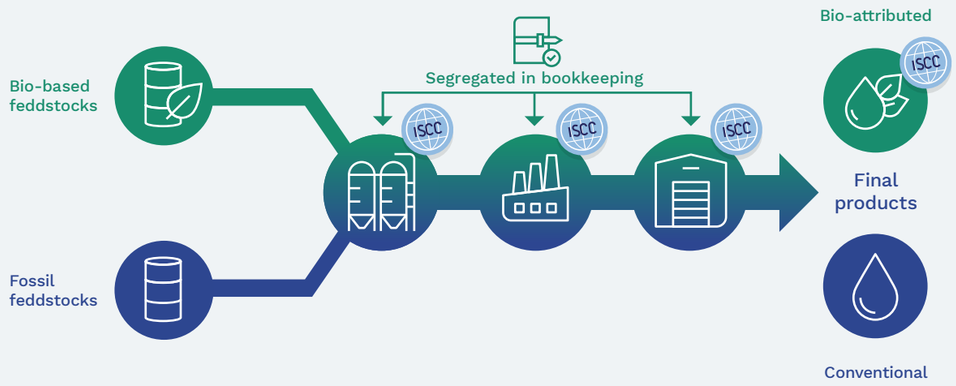
Certifying the traceability of this bio-based origin

To ensure the traceability of our Mass Balance products, our entire supply chain is certified by a third party according the ISCC+ standards. We provide our customers with certificates that guarantee the share of bio-based feedstock in the product they are purchasing. The ISCC+ certification of the whole supply chain guarantees that the origin of the renewable sources meets standards for sustainable feedstocks.

How does Mass Balance complement segregated approach?

Arkema is implementing both segregated and mass balance sourcing to accelerate the innovation into renewable materials.

Mass balance approach principle



Waterborne

RESINS

- Bio-based calculated on commercial form
- Bio-based measured ASTM D6866
- Ratio of bio-attributed carbon/total organic carbon

Product	Chemistry	Curing Type	Bio content	Sustainable attributes	Markets
Synaqua® 5120 BG 72	Waterborne Alkyd	1K / 1K Stoving	> 35%	Waterborne; Bio-based content	General Industry
Synaqua® 811 S 48 MB	Waterborne Acrylic	1K Stoving	> 10%	Waterborne; Bio-attributed	Can
Synaqua® 9511 MB	Waterborne Acrylic	1K Stoving / 2K	> 15%	Waterborne; Bio-attributed; UV	General Industry
Synaqua® 2350 EP 60	Waterborne Epoxy Ester	1K / 1K Stoving	> 25%	Waterborne; Bio-based content	General Industry
Synaqua® 2080	Alkyd Emulsion	1K	43%	VOC reduction; Bio-based content	Decorative
Synaqua® 4804	Alkyd Emulsion	1K	43%	VOC reduction; Bio-based content	Decorative
Synaqua® 4850	Alkyd Emulsion	1K	43%	VOC reduction; Bio-based content	Decorative
Synaqua® 4856	Alkyd Emulsion	1K	97%	VOC reduction; Bio-based content; Lower carbon footprint	Decorative
Synaqua® 6812	Alkyd Emulsion	1K	74%	VOC reduction; Bio-based content	Decorative
Encor® 2711	Acrylic Emulsion	1K		VOC reduction; perform as solventborne	Decorative
Encor® 2787 MB	Acrylic Emulsion	1K	> 20%	VOC reduction; Bio-attributed; Exterior and interior durability	Decorative
Encor® 2793	Acrylic Emulsion	1K		VOC reduction; interior durability	Decorative
Kynar Aquatec® ARC	Polyvinylidene fluoride			Significant extension coating lifespan	Architectural coatings Metal façade restoration Field-applied topcoat for metal roofing
Kynar Aquatec® CRX	Polyvinylidene fluoride	2K		Significant extension coating lifespan	PVC lineals Composite applications Protective coatings
Kynar Aquatec® FMA-12	Polyvinylidene fluoride			Significant extension coating lifespan	Cool roof coatings for elastomeric roofings Textile membrane coatings Architectural coatings

RHEOLOGY MODIFIERS

Product	Chemistry	Bio content	Sustainable attribute	Key benefits	Markets
Coapur™ 3020 BB	Polyurethane	90%	Bio-based; Lower carbon footprint	Viscosity stability Film build • Leveling	Architectural paints Industrial coatings Adhesives & Sealants
Coapur™ 817 BB	Polyurethane	93%	Bio-based; Lower carbon footprint	Spatter resistance • Viscosity stability • Compatibility • Rub out	Architectural paints Industrial coatings Adhesives & Sealants
Rheotech™ 4000 LC	Acrylic HASE		Lower carbon footprint	Syneresis resistance • In-can body	Architectural paints Industrial coatings Adhesives & Sealants
Rheotech™ 4000 MB	Acrylic HASE	80%	Bio-attributed	Syneresis resistance • In-can body	Architectural paints Industrial coatings Adhesives & Sealants
Crayvallac® LA-377	Urea-urethane liquid		Lithium Chloride free	Antisettling • Viscosity adjustment	Architectural paints Industrial coatings Adhesives & Sealants

DISPERSING AGENTS

Product	Chemistry	Bio content	Sustainable attribute	Key benefits	Markets
Ecodis™ P 30 MB	Polyacrylate dispersant	100%	Bio-attributed	High efficiency • Versatility • Low foaming • Opacity	Architectural paints Industrial coatings Adhesives & Sealants
Ecodis™ P 50 MB	Polyacrylate dispersant	100%	Bio-attributed	High efficiency • High PVC • Low foaming • Opacity	Architectural paints Industrial coatings Adhesives & Sealants
Ecodis™ P 90 MB	Polyacrylate dispersant	100%	Bio-attributed	High efficiency • High PVC • Storage stability • Opacity	Architectural paints Industrial coatings Adhesives & Sealants

MULTIFUNCTIONAL ADDITIVE

Product	Chemistry	Av parti-cle size µm	Bio content	Melting point °C	Sustainable attribute	Markets
Rilsan® D	polyamide powders	from 20 to 100	100%	190	Bio-based from renewable castor plant Lower carbon footprint (biomethane gas use for production)	Metal coating Coil coating Floor coating Wood coating Plastic coating Composite

High Solid

RESINS

■ Bio-based calculated on commercial form

■ Bio-based measured ASTM D6866

■ Ratio of bio-attributed carbon/total organic carbon

Product	Chemistry	Curing Type	Bio content	Sustainable attributes	Markets
Synocure® 9226 BA 82 MB	High Solids Acrylic	2K	> 50%	High solids; Bio-attributed	General Industry
Synocure® 589 S 75 MB	High Solids Acrylic	2K	> 35%	Bio-attributed; High Solids; Chemical Resistance	General Industry
Synocure® 9299 BA 70 MB	High Solids Acrylic	2K	> 55%	Bio-attributed; High Solids; Chemical Resistance	Automotive Refinish
Synocure® 866 EEP 75 MB	High Solids Acrylic	2K	> 20%	High solids, HAPs free; Bio-attributed; DTM Capable; Super Durable	General Industry
Synocure® 9201 S 75 MB	High Solids Acrylic	2K	> 45%	High solids; Bio-attributed; DOI; Chemical Resistance	Automotive Refinish
Synocure® 9237 S 70 MB	High Solids Acrylic	2K	> 35%	High solids; Bio-attributed; DTM Capable	Protective & Marine
Synocure® 9293 BA 70 MB	High Solids Acrylic	2K	> 60%	High solids, HAPs free; Bio-attributed; Drying	Automotive Refinish
Synocure® 854 BA 80 MB	High Solids Acrylic	2K	> 55%	High solids, HAPs free; Bio-attributed; UV resistant	Protective & Marine
Synocure® 892 BA 70 MB	Carboxyl Acrylic NISO	2K	> 50%	NISO, High solids; Bio-attributed; UV resistant	Protective & Marine
Synolac® 435 BA 70 MB	Alkyd	1K / 1K Stoving / 2K	> 60%	High solids; Bio-attributed	Industrial Wood Finishes
Synolac® 5085 MB	Polyester Polyol	1K Stoving / 2K	> 10%	Solvent free; Bio-attributed	General Industry
Synolac® 1529 BA 80 MB	Polyester Polyol	1K Stoving / 2K	> 30%	High solids; Bio-attributed	General Industry
Synolac® 9613 S 76 MB	Oil Free Polyester	1K Stoving	> 10%	High solids; Bio-attributed; High Yield	Coil
Synolac® 9658 S 76 MB	Oil Free Polyester	1K Stoving	> 10%	High solids; Bio-attributed; High Yield; UV resistant	Coil
Synolac® 9689 SD 65 MB	Oil Free Polyester	1K Stoving	> 15%	Xylene free; Bio-attributed; UV resistant	Coil
Synolac® 9640 S 65 MB	Oil Free Polyester	1K Stoving	> 10%	Chrome free; Bio-attributed; Corrosion Resistance	Coil
Synolac® 9675 S 65 MB	Oil Free Polyester	1K Stoving	> 10%	Bio-attributed; Wet-On-Wet --> Gain Of Time	Can
Synolac® 2700 WD 70	Solventborne Silicone Alkyd	1K	> 30%	Bio-based content; Exterior durability	Decorative
Synolac® 4060 WDA 90	Solventborne Alkyd	1K	> 60%	High solids; Bio-based content	Decorative
Synolac® 4103 WD 85	Solventborne Alkyd	1K	> 55%	High solids; Bio-based content	Decorative
Synolac® 613 WDA 80	Solventborne Alkyd	1K	> 55%	High solids; Bio-based content	Decorative
Gelkyd® 4648 WD 80	Solventborne Thixotropic Alkyd	1K	> 50%	High solids; Bio-based content	Decorative
Supergelkyd® 4743 WP 90	Solventborne Thixotropic Alkyd	1K	> 60%	High solids; Bio-based content; Exterior durability	Decorative
Unithane® 4555 WDA 55	Urethane Modified Alkyd	1K	> 30%	Bio-based content; Exterior durability	Decorative
Kynar 500® FSF	Polyvinylidene fluoride			Significant extension coating lifespan	"Architectural coatings Building façade and protection Roofing "
Kynar 500® Plus	Polyvinylidene fluoride			Significant extension coating lifespan	"Architectural coatings Building façade and protection Roofing "

RHEOLOGY MODIFIERS

Product	Chemistry	Bio content	Sustainable attribute	Key benefits	Markets
Crayvallac® ANTISETTLE CVP	Castor Derivative powder	100%	Bio-based	Ease of activation	Industrial coatings Adhesives & Sealants
Crayvallac® MT	Castor Derivative powder	99%	Bio-based	Ease of activation	Industrial coatings Adhesives & Sealants
Crayvallac® EP	Polyamide Wax powder	99%	Bio-based	Ease of activation • High solids	Industrial coatings Adhesives & Sealants
Crayvallac® SUPER	Polyamide Wax powder	93%	Bio-based	High Efficiency	Industrial coatings
Crayvallac® ULTRA	Polyamide Wax powder	86%	Bio-based	Robustness • Recoatability	Industrial coatings
Crayvallac® EXTRA	Polyamide Wax powder	90%	Bio-based	High temperature tolerance	Industrial coatings
Crayvallac® OPTIMA	Polyamide Wax powder	92%	Bio-based	Good leveling	Industrial coatings
Crayvallac® REV	Polyamide Wax powder	83%	Bio-based	Robustness • Efficiency • Versatility	Industrial coatings
Crayvallac® PA3 X 20	Polyamide paste	17%	Bio-based	High sag resistance • Antisetting	Industrial coatings
Crayvallac® PA3 BA 20	Polyamide paste	17%	Bio-based	High sag resistance • Antisetting	Industrial coatings
Crayvallac® PA4 X 20	Polyamide paste	17%	Bio-based	Enhanced transparency	Industrial coatings
Crayvallac® PA4 BA 20	Polyamide paste	17%	Bio-based	Enhanced transparency	Industrial coatings
Crayvallac® PA3 XAF 20	Polyamide paste	17%	Bio-based	Alcohol free	Industrial coatings
Crayvallac® PA5 XSR 25	Polyamide paste	22%	Bio-based	Alcohol free • Shear robustness	Industrial coatings
Crayvallac® SL	Polyamide Wax powder	92%	Bio-based	High temperature process	Adhesives & Sealants
Crayvallac® SLX	Polyamide Wax powder	91%	Bio-based	Robustness	Adhesives & Sealants
Crayvallac® SLT	Polyamide Wax powder	98%	Bio-based; Low activation temperature	Low activation temperature	Adhesives & Sealants
Crayvallac® SLW	Polyamide Wax powder	69%	Bio-based	High tack • Early grab	Adhesives & Sealants

MULTIFUNCTIONAL ADDITIVE

Product	Chemistry	Av particle size µm	Bio content	Melting point °C	Sustainable attribute	Markets
Rilsan® D	polyamide powders	from 20 to 100	100%	190	Bio-based from renewable castor plant Lower carbon footprint (biomethane gas use for production)	Metal coating Coil coating Floor coating Wood coating Plastic coating Composite

Powder

RESINS

Product	Chemistry	Ratio	Curing t(min.)/ T (0C) object	Acid value ASTM D-1639 (mg KOH/g.)	Sustainable attribute	Markets
Reafree® 6818	Carboxylated PE Hybrid	50:50 Hybrid	15/135°	70-78	Low Cure Enabling powder expansion to non-metal substrates	Medium Density Fiberboard, Industrial Wood Finishes
Reafree® C 4705-10	MB Catalyst	-	-	30-40	Low Cure	
Reafree® 6846	Carboxylated PE Hybrid	50:50 Hybrid	15/140°	68-77	Low Cure	Appliance, General Industrial
Reafree® 5709 MB	Carboxylated PE	95:5 HAA	15/160°	32-38	Bio-Attributed Low Cure Superdurable	Architectural, Agricultural
Reafree® 6499-TS MB	Carboxylated PE Hybrid	70:30 Hybrid	10/190°	32-37	Bio-attributed	General Industrial
Reafree® 8585 MB	Carboxylated PE	94.5:5.5 HAA	20/160° 15/180°	28-34	Bio-attributed	General Industrial

FLOW & LEVELING – DEGASSING

Product	Chemistry	Bio content	Sustainable attribute	Key benefits	Markets
Crayvallac® PC	Castor Derivative powder	100%	Bio-based	Degassing • Low Tg • Improved leveling	Powder coatings
Crayvallac® MT	Castor Derivative powder	99%	Bio-based	Degassing • Mid Tg • Improved leveling	Powder coatings

UV/LED/EB

MONOMERS

Product	Chemistry	Functionality	Viscosity (mPa.s@25°C)	Color (Pt/Co)	Bio content	Tg (°C)	Sustainable attribute	Applications
LM5201	Low Migrat-able 3-methyl 1,5-pentanediol diacrylate (MPDA)	2	6	35	NA	50	Reduced risk of migration Superior weathering performance	Flexographic, Inkjet & Screen Inks Plastic Coatings
LM5601	Low Migratable Dipentaerythritol Pentaacrylate (DiPEPA)	5	13300	19	NA	90	Reduced risk of migration Improved cure response under LED	Flexographic, Inkjet & Offset Inks Overprint Varnishes Plastic Coatings
SARBIO 5201	1,10 Decanediol Diacrylate (DDDA)	2	9,8	20	55%	54	Biobased feedstock Superior weathering performance	Inkjet Inks Plastic Coatings
SARBIO 6201	Polyethylene Glycol (200) Dimethacrylate (PEG(200)DMA)	2	15	45	50%	70	Biobased feedstock	3D Printing Adhesives & Sealants Artificial Marble Electrical Potting & encapsulation Industrial Flooring & Waterproofing
SR789	Tricyclodeca-nemethanol Acry-late (TCDA)	1	17	22	NA	35	Improved cure response under LED Superior weathering performance	3D Printing Conformal Coatings Inkjet & Screen Inks Metal, Plastic & Wood Coatings
SR833S	Tricyclodecanedi-methanol Diacry-late (TCDDMDA)	2	140	30	NA	185	Improved cure response under LED Superior weathering performance	3D Printing Artificial Marble Composites Conformal Coatings Electrical potting & Encapsulation Flexographic & Inkjet Inks Plastic Coatings

OLIGOMERS

Product	Chemistry	Functionality	Viscosity (Pa.s@25°C)	Color (Gd)	Bio Content (%)	Young Modulus (MPa)	Elongation at break (%)	Tensile Strength (MPa)	Tg (°C)	Sustainable attribute	Markets
SARBIO 7201	Fatty Acid Modified Polyester Acrylate	6	7,8	7	40	720	1	8,3	20	Bio-based	Flexographic inks, Offset inks
SARBIO 7107	Soy Bean Oil Epoxy Acrylate	5	22,5	6	85	70	14	5	30	Bio-based	Artificial marble, Electrical potting & encapsulation, Offset inks, Optical fibers, Overprint varnishes, Wood coatings
LM7401	Acrylated Amine Synergist	1	0,07	0,33	NA	NA	NA	NA	-65	Improved cure response under LED Reduced risk of migration	Flexographic, Inkjet & Screen inks, Overprint varnishes, Wood coatings
CN9210	Aliphatic Urethane Acrylate	6	1,90 @ 60°C	0,25	NA	1930	3	25	120	Improved cure response under LED, most suitable for EB curing Non Intention-ally Added Tin Superior weathering performance	3D printing, Composites, Flexographic & screen inks, Overprint varnishes, Plastic coatings
CN9276	Aliphatic Urethane Acrylate	6	6	0,4	NA	1700	1	14	90	Non Intention-ally Added Tin Superior weathering performance	Inkjet, screen & Off-set inks, Overprint varnishes, Plastic & wood coat-ings
CN9301B80	Aliphatic Urethane Acrylate diluted with 20% of HDDA	3	3,4	0,1	NA	874	3,5	21,6	63	Most suitable for EB curing Superior weathering performance	Plastic coatings Wood coatings
CN981	Aliphatic Urethane Acrylate	2	8,9 @60°C	0,2	NA	920	75	25	35	Most suitable for EB curing Superior weathering performance	3D printing, Adhesives & sealants, Composites, Flexographic & screen inks, Overprint varnishes, Plastic coatings
CN991	Aliphatic Urethane Acrylate	2	9,7	30 Pt/ Co	NA	10	15	1,5	15	Most suitable for EB curing Superior weathering performance	3D printing, Flexographic, Inkjet & screen inks, Overprint varnishes, Plastic coatings

UV/LED/EB

PHOTOINITATOR

Product	Chemistry	CAS number	Type	Absorption maxima (nm)	Form	Perfor-mance	Sustainable attribute	Markets
Speedcure 7010	Polymeric Thioxanthone	1003567-83-6	Norrish Type II	257, 312, 383	Solid	Depth Cure LED Low Odor Pigmented systems	Improved cure response under LED Reduced risk of migration	Flexograph-ic, Offset & Screen inks Industrial coatings

RHEOLOGY MODIFIERS

Product	Chemistry	Bio content	Key benefits	Sustainable attribute	Markets
Crayvallac® ANTISETTLE CVP	Castor Derivative powder	100%	Ease of activation	Bio-based	Industrial coatings Graphic arts Adhesives
Crayvallac® MT	Castor Derivative powder	99%	Ease of activation	Bio-based	Industrial coatings Graphic arts Adhesives
Crayvallac® SUPER	Polyamide Wax powder	93%	High Efficiency	Bio-based	Industrial coatings Graphic arts Adhesives

MULTIFUNCTIONAL ADDITIVE

Product	Chemistry	Av parti-cle size µm	Bio content	Melting point °C	Sustainable attribute	Market
Rilsan® D	polyamide powders	from 20 to 100	100%	190	Bio-based from renewable castor plant Lower carbon footprint (biomethane gas use for production)	Metal coating

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