RENEWABLE RESINS

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allnex
The Coating Resins Company

Facts & Figures

- Global company with over €2.1 billion in sales
- Broad technology portfolio: liquid coating resins, energy curable resins, powder coating resins, crosslinkers and additives, composites and construction materials
- Approximately 4000 employees
- Customers in more than 100 countries
- 32 manufacturing facilities
- 23 research and technology centers
- 5 joint ventures
- Extensive range of solutions for key coating segments: automotive, industrial, packaging coating and inks, protective, industrial plastics and specialty architectural

With manufacturing, R&D and technical facilities located throughout Europe, North America, Asia Pacific and Latin America, allnex offers global and reliable supply of resins and additives combined with local, responsive customer support.

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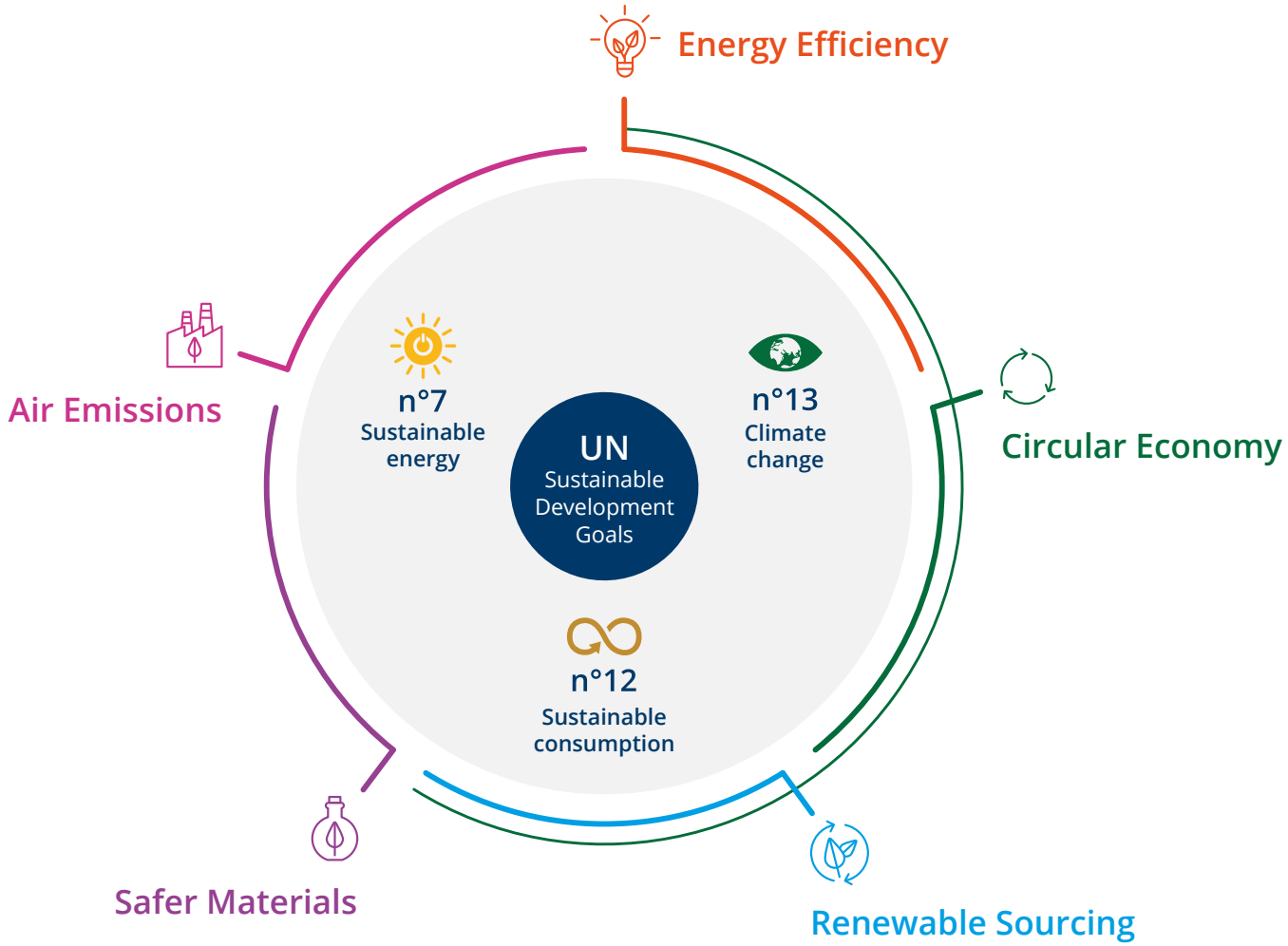
Our contribution to sustainable change

As the leading industrial coating resins company, sustainability is a key part of our continued success and commitment to our stakeholders. We embrace this responsibility and stay focused and dedicated to pursuing a greener and more sustainable future together with our customers. With our broad portfolio of technologies and sustainable focus, we are your ideal partner to smoothly and successfully make the transition to green solutions.

We are committed to contributing to the achievement of the United Nations Sustainability Development Goals (UNSDG). While we are set on taking further action by implementing and further developing initiatives for all the UN Development Goals, we are already able to make a significant impact in three key areas with existing measures and processes we have in place, focusing on five eco pillars:



Our five pillars for sustainability

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We aim at improving our performance in terms of sustainability by taking action on five high priority areas, both from a product and process standpoint. This underlines our commitment to deliver quality, eco-friendly and safer products to our customers, as well as doing the right thing for the planet as a company.

Circular Economy

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

Energy Efficiency

We design our product and manufacturing process to achieve the highest efficiency in energy utilization across the product lifecycle.

Renewable Sourcing

We aim at minimal use of finite resources and reduce the impact on climate change by looking at renewable alternatives for raw materials and energy we use.

Safer Materials

We are committed to making the substitution of potentially harmful chemicals with safer options one of our top priorities.

Air Emissions

We focus on reducing emissions of Volatile Organic Solvents across the product lifecycle to protect people and the environment.

This brochure

In this brochure we present the outcome of our efforts within the pillar of renewable sourcing, offering a broad range of resins containing renewable raw materials.

Some examples of our products
ADDITOL® additives and defoamers
BECKOPOX™ epoxy dispersions
DAOTAN® epoxy ester resins
DUROXYN® epoxy ester resins
EBECRYL® UV/EB curable resins
RESYDROL® alkyd resins
SETAL® resins

RADCURE

Product	Functionality	Viscosity cP @ 25 °C	Renewable Raw Material (wt%) 1)	Naturally Derived Carbon (%) 2)
EBECRYL® 242	2	21000	30	23
EBECRYL 450	6	8600	30	35
EBECRYL 452	4	600	24	29
EBECRYL 657	4	125000	42	52
EBECRYL 767	1	175000	30	23
EBECRYL 820	6	550	20	25
EBECRYL 846	6	45000	15	17
EBECRYL 870	6	48000	25	30
EBECRYL 1300	1	10000	70	54
EBECRYL 3608	2	70000	7	16
EBECRYL 3702	2	900000	16	16
EBECRYL 4491	2	60000	20	14
EBECRYL 4683	2 + 1	50000	35	27
EBECRYL 5848	3	25000	65	74
EBECRYL 5850	2	5000	56	60
EBECRYL LEO 10801	6	45000	24	30
IBOA	1	10	65	77
OTA 480	3	90	19	13
RAYLOK® 1622	3	520	21	23
Waterborne Products				
UCECOAT® 7999	n/a	<200	20	22
Only available using mass balance 3				
EBECRYL 600	2	3000 @ 60°C	23	22
EBECRYL 3700	2	4300 @ 60°C	23	22
EBECRYL 3700/18OT	2 + 3	85000	22	20

1) Renewable Raw Materials (wt %) : The amount of raw materials from renewable sources that is used to produce the finished product. This is a calculated value.

2) Naturally Derived Carbon (%) : This is the amount of renewable carbon compared to the total amount of carbon in the finished product.
It is measured by ASTM D6866 using C^{14} isotope analysis.

3) For products only available using mass balance the natural derived carbon meausurable content cannot be guaranteed.
Additional information is available in the Insights.

	Application	Product Description
	Industrial Coatings	Flexible coating for metal substrates, good adhesion and excellent flexibility.
	Flexo inks	Polyester acrylate which gives excellent pigment wetting and high reactivity.
	Flexo inks	Polyester acrylate with excellent pigment wetting; enables the production of high concentrated pastes, increasing productivity and process flexibility.
	Offset inks	Polyester acrylate with good pigment wetting, ink water balance and misting properties.
	Industrial Coatings	Excellent primer for difficult substrates.
	Flexo inks for indirect food contact packaging	Low migration product; exceptional pigment wetting allows preparation of highly concentrated pigment pastes.
	High speed Offset inks	Polyester acrylate which gives high reactivity and low misting.
	Offset inks	Polyester acrylate which gives excellent pigment wetting and high reactivity. Good litho behavior.
	Packaging Coatings and Inks	Good adhesion promoting properties. Excellent flexibility, high gloss and light color.
	Inks	Fatty acid modified epoxy acrylate recommended for ink formulations where improved pigment wetting is demanded.
	Litho Inks	Fatty acid modified epoxy acrylate recommended for ink formulations, good litho behavior and very good pigment wetting.
	Industrial Coatings	Elastomeric grade, extremely flexible, elongation at break over 250%. For temporary protective coatings, improves elasticity in combination with hard resins.
	Industrial Coatings	extremely tough. Low shrinkage during curing, good adhesion to plastic and metal, outdoor resistance.
	Litho Inks	Epoxidized Soya Oil Acrylate. BPA-free product. Good for Hot foil stamping.
	Litho Inks	High reactivity and high Tg: can be used for BPA-free development in Graphics and Wood Applications.
	Inks for indirect food contact packaging	Hexfunctional polyester acrylate oligomer that provides high reactivity and the proper ink-water balance necessary for good lithographic printing.
	Graphics/Industrial Coatings	Monomer with high diluting power, recommended where flexibility and high Tg need to be combined.
	All	It exhibits low viscosity and good flexibility for a triacrylate and its high functionality contributes to good reactivity and hardness.
	Clearcoat for wood	Low viscosity natural oil modified oligomeracrylate. It gives a transparent oil-like natural and warm aspect.
	Industrial Coatings	High-performance tin-free and low-MFFT aqueous binder for clear and white pigmented coating on wood. The cured coating develops an immediate optimum hardness not requiring oxidative drying.
	Graphics/Industrial Coatings	Exhibit high reactivity, surface hardness and gloss and the excellent solvent resistance typical of an epoxy resin.
	Graphics/Industrial Coatings	Exhibit high reactivity, surface hardness and gloss and the excellent solvent resistance typical of an epoxy resin.
	Graphics/Industrial Coatings	This resin is characterized by its low odor, light color, low irritancy and very fast cure response.

Liquid Resins

Product	Application	% Bio-based on resin solids
Water borne Alkyd Resins		
RESYDROL® AF 502w/35WA	Monocoat, topcoat stoving	45% - 55%
RESYDROL AM 420w/66BPWA	Primer, topcoat, monocoat stoving	30% - 35%
RESYDROL AX 237w/70BG	Primer, Air drying	25% - 30%
RESYDROL AX 246w/70BG	Primer stoving	15% - 20%
RESYDROL AX 247w/70BGMP	Stoving coatings	15% - 20%
RESYDROL AX 250w/75EP	Primer stoving	15% - 20%
RESYDROL AY 466w/38WA	Topcoat, air drying	40% - 45%
RESYDROL AY 586w/45WA	Wood external stain	55% - 65%
RESYDROL AY 6150w/45WA	Primer, topcoat, monocoat, air drying	30% - 40%
RESYDROL AY 6705w/44WA	Wood external stain	35% - 40%
RESYDROL AZ 6191w/42WA	Metal , wood internal & external trim	40% - 45%
RESYDROL AZ 6710w/41WA	Wood external stain	30% - 35%
RESYDROL AZ 6711w/40WA	Wood external stain	40% - 50%
RESYDROL VAF 6111w/60WA	Interior wall paint	35% - 45%
RESYDROL VAL 5547w	Wood impregnation	70% - 80%
RESYDROL VAY 6096w/39WA	Topcoat, air drying	25% - 35%
SETAQUA® 6006	Industrial wood, primer, topcoat, air drying	45% - 55%
SETAQUA 6004 YA	Industrial wood, primer, topcoat, air drying	70% - 80%
Waterborne Acrylic Resins		
RESYDROL® SF 8000/50WA	Interior trim	5% - 10%
RESYDROL SF 8010/50WA	Wood external stain	0% - 10%
RESYDROL SF 8011/50WA	Wood external stain	0% - 10%
Water borne epoxy dispersions		
BECKOPOX™ EM 2120w/45WA	Monocoat (DTM) air drying	5% - 15%
BECKOPOX EP 2384w/57WA	Monocoat (DTM) or primer air drying	15% - 25%

	% Bio-based on delivery form	Performance characteristics
	45% - 55%	High body, no organic co-solvent, pigment wetting.
	30% - 35%	Adhesion, balanced hardness and flexibilty, corrosion resistance.
	25% - 30%	Humidity and Corrosion resistance. High gloss.Easy application.
	10% - 15%	Dipping paints. Combined with CYMEL® 303 LF - offers corrosion resistance.
	15% - 20%	Electrical insulation paints.
	15% - 20%	Dipping paints. Combined with CYMEL 303 LF - offers corrosion resistance.
	40% - 45%	Humidity resistance. High gloss. Fast drying.
	55% - 65%	Adhesion and penetration on wood, open time and durability.
	30% - 40%	Humidity and corrosion resistance. High gloss. Easy application.
	35% - 40%	Durability, fast drying, suitable for vertical and horizontal wood applications.
	40% - 45%	Suitable for wood and metal applciations, gloss, flow, leveling and chemical resistance, durability.
	30% - 35%	Very hard, quick drying grade for wood applications, mostly used as a blending resin.
	40% - 50%	Very hard, quick drying grade for wood applications, mostly used as a blending resin.
	35% - 45%	Blending partner for acrylic applications to improve adhesion and applicability with low yellowing.
	70% - 80%	Penetration on wood, low grain rising and oil feeling application.
	25% - 35%	Humidity resistance. Fast drying.
	45% - 55%	Fast drying, wood penetration and corrosion resistance.
	70% - 80%	Fast drying, wood penetration, Water borne and yellowing resistance.
	0% - 10%	Drier free, good brushability, nice body, flow and leveling, ADH and surfactant free.
	<4%	Fast drying, drier free, excellent durability, no peeling, flaking or grain rising, ADH and surfactant free.
	<4%	Harder version of RESYDROL SF 8010.
	0% - 10%	Anti corrrosion performance close to 2K epoxy.
	5% - 15%	Hardness development, early water resistance.

Product	Application	% Bio-based on resin solids
Solvent borne alkyd resins		
SETAL® 62 EHV SM-60	Primer, monocoats, air drying	65% - 70%
SETAL 84 XX-70	Primer, stoving	10% - 15%
SETAL 118 XX-60	Wood acid cure, primer, stoving	60% - 65%
SETAL 1257 SM-69	Wood external trim	60% - 70%
SETAL 142 XX-60	Primer, air drying	30% - 35%
SETAL 1601 WS-65	Deco topcoats	40% - 50%
SETAL 196 XX-65	Top coat, airdrying, stoving	45% - 55%
SETAL 270 SM-70	Wood external trim	60% - 70%
SETAL 293	Wood external trim	80% - 90%
SETAL 304	Wood external trim	75% - 85%
SETAL 305 SM-90	Wood external trim	75% - 80%
SETAL 301 SM-83	Wood external trim	65% - 70%
SETAL 312 SM-88	Wood external trim	75% - 85%
SETAL 321 SM-75	Wood external trim	70% - 75%
SETAL 707 BA-75	Wood acid cure	50% - 55%
SETAL A F 48 TB/X	Primer, monocoat, topcoat, air drying	45% - 55%
SETAL A F 300 SN	Topcoat, stoving	15% - 25%
SETAL A F 310 SN	Topcoat, stoving	15% - 25%
SETAL A F 681 TBA	Wood external trim	60% - 70%
SETAL A U 601 TB	Wood external trim	65% - 70%
SETAL A U 601 HV TBA	Wood external trim	55% - 65%
SETYRENE™ 78 XS-55	Topcoat, air drying	45% - 55%
Solvent free hydrophobic polyol		
SETATHANE® D 1145	Flooring	65% - 70%
SETATHANE D 1150	Flooring	70% - 80%
SETATHANE D 1160	Flooring	70% - 80%
Emulsified hydrophobic polyol		
SETATHANE D E 2656	Flooring	75% - 85%
SETATHANE D E 2761	Flooring	65% - 70%
SETATHANE D E 2767	Flooring	20% - 25%

	% Bio-based on delivery form	Performance caracteristics
	35% - 45%	Fast drying, hardness.
	5% - 15%	Appearance, durability.
	35% - 40%	Hardness, adhesion, imapact resistance, durability, gloss retention.
	40% - 45%	Durability and drying, little yellowing.
	15% - 25%	Drying, yellowing resistance, adhesion.
	25% - 35%	Outdoor durability, fast drying.
	30% - 35%	Fast drying, low yellowing, gloss, gloss retention.
	40% - 50%	Color retention, brushability, body and flow, durability.
	80% - 90%	Brushability, leveling, filling, high gloss, suitable as reactive diluent .
	75% - 85%	Drying, durability and pigment dispersion properties.
	65% - 75%	Drying, durability and pigment dispersion properties.
	55% - 60%	Durability and drying, minimal yellowing.
	65% - 75%	Outdoor durability and low yellowing. Large amount of renewable raw materials.
	45% - 55%	Additive resin to increase solid contentand improve chemical and abrasion resistance. drying and hardness.
	35% - 45%	For high-solid acid curing and nitrocellulose systems.
	25% - 30%	Broad application, special effect finishes.
	5% - 15%	Mechanical properties, resistant to acid and waxes.
	10% - 15%	Reactivity, yellowing resistance, appearance.
	45% - 50%	Through-drying and yellowing resistance.
	30% - 40%	Rapid drying, hardness. High abrasion resistance and long-term flexibility.
	25% - 35%	Hardness and flexibility, high wear, abrasion and water resistance. resistance to household chemicals.
	25% - 30%	Drying, appearance.
	65% - 70%	Tough, hard-wearing, higher chemical resistance.
	70% - 80%	Tough yet flexible. Hard-wearing and chemical resistant.
	70% - 80%	Flexibility, lower hardness, retaining mechanical strengh, elastomeric nature.
	75% - 85%	Resistance to organic and inorganic acids, alkalis and solvents. Higher flexural strength.
	65% - 70%	Resistance to organic and inorganic acids, alkalis and solvents. Thermal shock resistant.
	20% - 25%	Resistance to organic and inorganic acids, alkalis and solvents. Can be used for primers.

Insights

Renewable materials are materials that can be manufactured from renewable resources, e.g. resources that replenish fast enough to keep pace with how fast they are used up, either through biological reproduction or other naturally recurring processes. The term 'bio-based materials' is generally used for materials derived from renewable biological resources.

Value of using renewable materials

Replacing fossil carbon feedstock by renewable carbon feedstock is overcoming issues of resources depletion caused by intensive usage and can have positive implications on carbon footprint. There is a strong imbalance in the fossil carbon cycle considering the rapid transformation of fossil carbon into CO2 (~10 years) and the very slow fixation of CO2 into fossil carbon (~10EXP6 years). The use of bio-carbon can address this cycle imbalance with a neutral carbon footprint proposition -considering that the CO2 released in the atmosphere is coming from the same quantity of CO2 fixation by plants during the photo-synthesis.

Determination of the renewable content of a resin

The content of an organic material is defined by the weight percent of bio-carbon on the total weight of organic carbon in the material/product (ASTM D6866).
% Bio-based (carbon) content = Bio (organic) carbon / total (organic carbon) * 100

In general, the renewable content can be expressed using the following formula:

$$\text{\% Biobased Content} = \frac{\text{Amount of Biobased Carbon}}{\text{Amount of Biobased Carbon} + \text{Amount of Petroleum Based Carbon}} \times 100$$

Types of renewable materials certifications

In the renewable material market, two types of bio-carbon content certification exist:
C14 Certification - provided after the determination of bio-carbon content using a C14 quantification in the product. It implies that raw materials with certified C14 content follow separated sourcing, storage and manufacturing routes. When finished products leave the production site, they are shipped to the customer with C14 certification stating the amount of bio-carbon content in the shipped product.
Bio Mass Balance Certification - provided when raw materials with variable renewable content are mixed during storage or during the production process. When finished products leave the production site, the level of renewable content of the shipped product is unknown but the mass-balance certification indicates that portion of renewable raw materials sourced is allocated to the certified grades.

Approach to the certifications

We will provide an allnex declaration of renewable content based on our supplier's statements and our internal auditing. This can be a C14 or Bio Mass Balance declaration, depending on customer needs and the raw material supply and process flows for a specific grade.
We are working to strengthen our capabilities on carbon footprint impact assessment and reporting. Today, when applicable we will quantify the inherent material carbon footprint reduction resulting from the replacement of one or more components with renewable alternatives in our products. The value is calculated from the measured bio-based carbon content and the total carbon content, the weight of bio-based carbon content being transformed in CO^2 emission savings (expressed in g/kg of dry products).

This value is independent from the process carbon footprint and does not constitute a full lifecycle carbon footprint analysis.

Bio-based raw material sourcing and potential interference with the food chain

We are adopting a responsible sourcing vision to develop our new renewable products, including considerations on issues such as competition with food, land use and impact on local communities in materials selection. We target whenever possible sourcing from second generation feedstock, as by-products/residues from forestry, agriculture, industry or waste streams, and we evaluate sources that use regenerative agricultural and forestry practices.

Verification of the renewable content of the sourced materials

We will run C14 control measurement at a third party institute for materials supplied with a C14 certification. For materials supplied with a bio mass certificate, we fully rely on our vendor certifications.

Notes

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