

**BUILD MORE
SUSTAINABLE SOLUTIONS**

Evonik Crosslinkers



LEADING BEYOND CHEMISTRY TO IMPROVE LIFE TODAY AND TOMORROW

Evonik aims to be a best-in-class specialty chemical company. Our Sustainability Strategy 2020+ is an expression of this aspiration, with ambitious environmental targets and an understanding of how to translate sustainability into profitability.

The next phase of Evonik's strategic transformation fully integrates sustainability into every strategic management process: Portfolio management, innovation and corporate culture. Sustainability becomes our central innovation driver and investments in green growth technologies support our ambitious targets.

- **Handprint:** increase "Next Generation Solutions" sales share to >50% by 2030
- **Footprint:** reduce scope 1 and 2 CO₂ emissions by 25% by 2030
- **Complementing ESG governance**



NEXT GENERATION SOLUTIONS

Currently, Evonik generates 35% of its sales from products and solutions with a clearly positive sustainability profile that is above, or even well above, the market reference level. We call them Next Generation Solutions. By 2030, we aim to invest more than €3 billion in our Next Generation Solutions - products with superior sustainability benefits. We will substantially increase the sales share of our Next Generation Solutions from 37% at present, to over 50% by 2030.



NEXT GENERATION TECHNOLOGIES

We aim to reduce our footprint by significantly cutting both direct and indirect greenhouse gas emissions from production and processing. With the support of Next Generation Technologies, Evonik will reduce its scope 1 and 2 emissions by 25%, from 6.5 million metric tons at present to 4.9 million metric tons by 2030. At the same time, the investments in sustainability are profitable: By investing €700 million in Next Generation Technologies, we will cut our operating costs by more than €100 million a year up to 2030.



FURTHER INFORMATION
about Evonik and its
Sustainability Strategy

CROSSLINKERS

CREATING MARKETABLE AND INTELLIGENT SOLUTIONS

The Crosslinkers business line offers a broad range of products and competences for coatings and adhesives, civil engineering as well as for high-performance elastomers and composites.

Evonik is the pioneer in isophorone chemistry and covers the entire isophorone, diamine, and di-isocyanate and polyisocyanate value chain. Additionally, our product portfolio contains a full toolbox of amine curing agents for ambient and heat cure applications which, due to the mechanical strength, durability, chemical resistance and excellent adhesion properties, are mainly used in industrial applications.

We have proudly served our customers and their diverse markets with technically innovative, problem solving and performance enhancing solutions for many decades. Now we stand proudly with the planet building solutions to help guide our customers to improved sustainability.



"Developing renewable solutions and more sustainable processes that help our customers to address today's sustainability and environmental regulation challenges is close to our hearts and aligns with our own ambitious environmental targets."

Dr. Christian Schmidt
Head of Evonik Crosslinker business line

Customer Focus

OUR VISIONS:

CROSSLINKERS IS THE BEST PARTNER FOR A SUCCESSFUL AND SUSTAINABLE FUTURE, PROVIDING PIONEERING TECHNOLOGY AND A GLOBAL REACH

Global Positioning

Commitment to Excellence

PERFECT PARTNER

Sustainability

Experience

Crosslinkers and curing agents for use in high solids, waterborne and other more ecological epoxy and PU coatings systems, as well as civil engineering, structural adhesives and composite systems.



**HANDPRINT SOLUTIONS
FOR MORE SUSTAINABLE
APPLICATIONS**

WIND ENERGY



VESTAMIN[®], Ancamine[®], Ancamide[®]
Prolonging life cycles and reducing downtime improves the efficiency of wind turbine performance

ADHESIVES



Nourybond[®], Ancamine[®]
Automotive adhesion promoters and solvent-free curing agents for high chemical resistance coatings and adhesives

**RENEWABLE
RAW MATERIALS**



VESTA eCO series
Isophorone chemistry solutions based on bio, bio-circular and circular feedstocks

ELECTRO MOBILITY



VESTALITE[®] S, Ancamine[®], Ancamide[®]
Suitable replacement for steel and aluminum helping to reduce vehicle weight and fuel consumption

POWDER COATINGS



VESTAGON[®] B
Enables high-class powder coatings with low emissions, superior levelling and high reactivity

ARTIFICIAL LEATHER



VESTANAT[®]
Used to make synthetic/vegan leather via an eco-friendlier manufacturing process

MARINE COATINGS



Ancamine[®], Ancamide[®]
Provides high solid coatings with ultra low volatile organic components

AEROSPACE



Ancamine[®], Ancamide[®]
Used to make composite materials lighter for improved fuel efficiency

INDUSTRIAL FLOORING



Ancamine[®], Anquamine[®]
Superior performance vs. traditional solvent epoxy-based systems



**FOOTPRINT SOLUTIONS
BUILT ON MORE SUSTAINABLE
SOURCES AND PROCESSES**

**SUSTAINABLE
PROCESSES**



Project Eager
New program to assess & implement CO₂ reduction measures by 2030



SUSTAINABLY IMPRESS THE PLANET WITH THE PIONEER IN ISOPHORONE CHEMISTRY

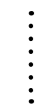
Since inventing isophorone chemistry in 1962, we have made continuous steps over the decades to improve the sustainability of our isophorone-based solutions and its production across our sites across the globe. Now, as it turns 60, we've produced another world first – the new eCO series, which supports our ambition to eliminate CO₂ through reduced emissions.

With our VESTA range of products for high-performance solutions, you benefit from our intimate understanding of isophorone chemistry that comes from being the technology originator, our operational excellence and global distribution network and production capacity.

Go with the original.

Discover the sustainability journey of our Isophorone Chemistry

Production of isophorone
(Herne, Germany)



1962

... **1972**



Production of crosslinkers for environmentally friendly powder coatings
(Marl, Germany)

Commissioning of the first American isophorone line
(Mobile, USA)



... **1992**

... **2011**



Cradle to gate LCA analysis of the isophorone value chain

Commissioning of the first Chinese isophorone line
(Shanghai, China)



... **2014**

... **2015**



Herne site successfully audited as part of Together for Sustainability initiative

... **2022**



Launch of VESTA eCO series for reduced CO₂ emissions






THE WAY TO A CLIMATE NEUTRAL ISOPHORONE BASED PRODUCTS

It starts here - with solvents, amines and isocyanates made from raw materials which originate from renewable feedstocks. Acetone plays a significant role in the carbon footprint of isophorone production. By reducing the CO₂ footprint of acetone, the entire isophorone based value chain becomes more sustainable.

RENEWABLE RAW MATERIALS

Renewable acetone uses carbon sources that avoid or substitute the use of any additional fossil carbon from the geosphere to significantly lower the carbon footprint compared to standard acetone. For our isophorone chemistry solutions we distinguish between bio, bio-circular and circular feedstocks:

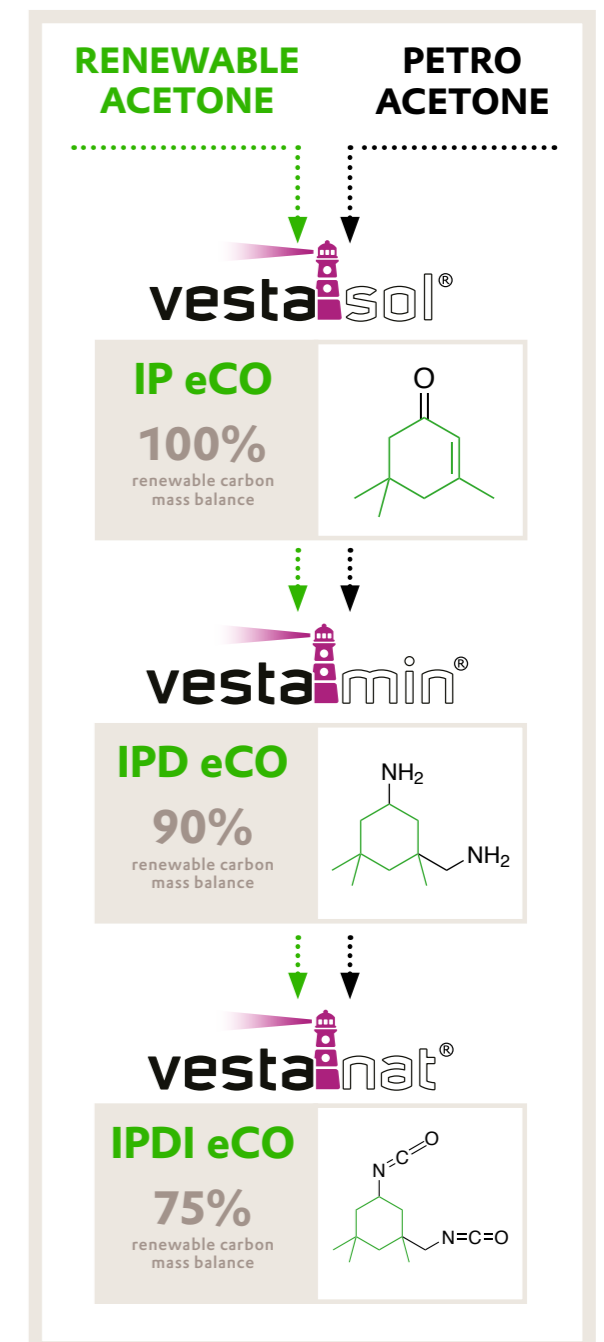
<p>bio materials</p> 	<p>Bio based feedstocks are virgin agricultural raw materials like corn or straw.</p>
<p>bio-circular materials</p> 	<p>Bio-circular refers to waste and residues of biological origin from agriculture, forestry and related industries including fisheries and aquaculture, as well as the biodegradable parts of industrial and municipal waste.</p>
<p>circular materials</p> 	<p>Circular means feedstocks derived from the mechanical and/or chemical processing of recyclable materials of non-biological origin.</p>

THE MASS BALANCE APPROACH

Mass balance mixes virgin fossil and renewable raw materials into existing systems and production processes. The amount of renewable materials is allocated mathematically to specific products and verifies the use of renewable resources across all stages of production.

- Strictly segregated in bookkeeping
- You can only sell as much renewable material as you have sourced renewable acetone (conversion factors)
- Audited and certified by an independent body, namely ISCC and REDCert
- Allows for large-scale production and enables cost-effective solutions

Mass Balance allows for instant CO₂ reduction in existing production plants to give our customers green drop-in solutions at the best possible price to meet more stringent environmental and sustainability targets.



THE VESTA ECO SERIES



eCO stands for our ambition to eliminate CO₂ by using renewable feedstock via a mass balance approach to produce acetone. With the brand new eCO grades we've swapped virgin fossil raw materials for renewable ones to reduce CO₂ emissions to contribute to sustainability. As the pioneer in isophorone chemistry Evonik is currently the only company in the world offering a renewable I-Chain platform that includes isophorone, -diamine and -diisocyanate products. **Same performance. Less CO₂ emissions.**

vesta^{sol}® eCO

vesta^{min}® eCO

vesta^{nat}® eCO

Specialty solvents and intermediates for the coatings and printing inks industry.

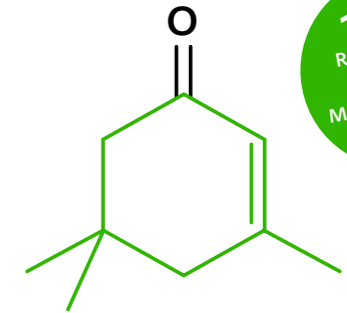
VESTASOL® IP eCO

VESTASOL® IP eCO is a starting material for many commercial products used in the agrochemical and disinfectant markets. Additionally, it provides a remarkable gloss, excellent levelling and high compatibility in coatings and inks.



HYGIENICALLY CLEAN

VESTASOL® IP provides the synthetic cornerstone to produce disinfectants based on the antiseptic chloroxylenol (PCMX), ensuring germ-free hands for healthcare professionals. The new IP eCO is a perfect match for the ambition of the industry to come up with more sustainable disinfectants



APPLICATIONS

- Chemical syntheses
 - Polycarbonates
 - UV-absorbers
 - Vitamine E
 - Disinfectants
- Coatings
- Crop protection

IP BENEFITS

- Improves levelling and gloss
- Excellent solvent power
- Interlayer adhesion
- High boiling

IP eCO BENEFITS

- Lower CO₂ profile
- Same properties and performance
- Drop-in solution, no compromise
- ISCC certified



Curing agents for epoxy resin systems, chain extender for PUR systems and raw material for polyamides.

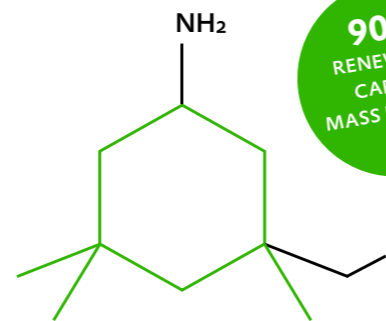
VESTAMIN® IPD eCO

Cycloaliphatic diamine, based on isophorone chemistry. It is a mixture of two stereo-isomers of 3-aminomethyl-3,5,5-trimethylcyclohexylamine, and is a colorless low viscosity liquid with a faint amine odor.



TURNING WIND INTO ENERGY

VESTAMIN® IPD plays a prominent role in the production of durable rotor blades by improving robustness, prolonging life cycles and reducing downtime and maintenance costs improving efficiency and wind turbine performance. While doing something good for the handprint, using IPD eCO also improves the footprint by reducing CO₂ emissions.



90%
RENEWABLE
CARBON
MASS BALANCE

APPLICATIONS

- Wind turbine rotor blades
- Floor coatings
- Marine coatings
- Composite materials for pipes

IPD BENEFITS

- UV stability
- Chemical resistance
- Mechanical resistance
- Increased toughness

IPD eCO BENEFITS

- Lower CO₂ profile
- Same properties and performance
- Drop-in solution, no compromise
- ISCC certified



Large, diverse portfolio of aliphatic and cycloaliphatic diisocyanate monomers for light stable PUR resins and elastomers. Cycloaliphatic polyisocyanates for durable 1K and 2K PUR coatings. Silane-urethane hybrid crosslinkers for scratch-resistant coatings.

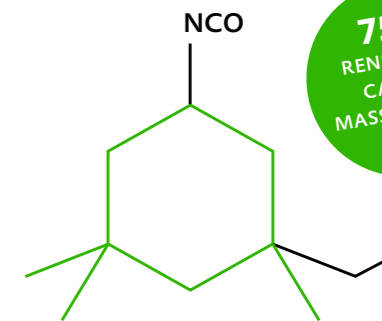
VESTANAT® IPDI eCO

Cycloaliphatic diisocyanate and characterized by its two reactive isocyanate groups comprising differences in reactivity (primary and secondary NCO groups).



MORE SUSTAINABLE AND INNOVATIVE SOLUTIONS FOR THE ARTIFICIAL LEATHER INDUSTRY

VESTANAT® solutions for waterborne polyurethane dispersions comply with the Zero Discharge of Hazardous Chemicals (ZDHC) and Manufacturing Restricted Substances List (MRSL).



75%
RENEWABLE
CARBON
MASS BALANCE

APPLICATIONS

- Polyurethane dispersions
- NCO terminated prepolymers
- Moisture curing coatings
- Adhesives and sealants
- Radiation curable resins
- Solvent-borne TPU
- PUR elastomers

IPDI BENEFITS

- Chemical resistance
- Weatherability
- Compatibility
- Light stability

IPDI eCO BENEFITS

- Lower CO₂ profile
- Same properties and performance
- Drop-in solution, no compromise
- ISCC certified

TAKING SUSTAINABLE TRANSFORMATION ONE STEP FURTHER WITH THE TECHNOLOGY LEADER IN EPOXY CURING AGENTS

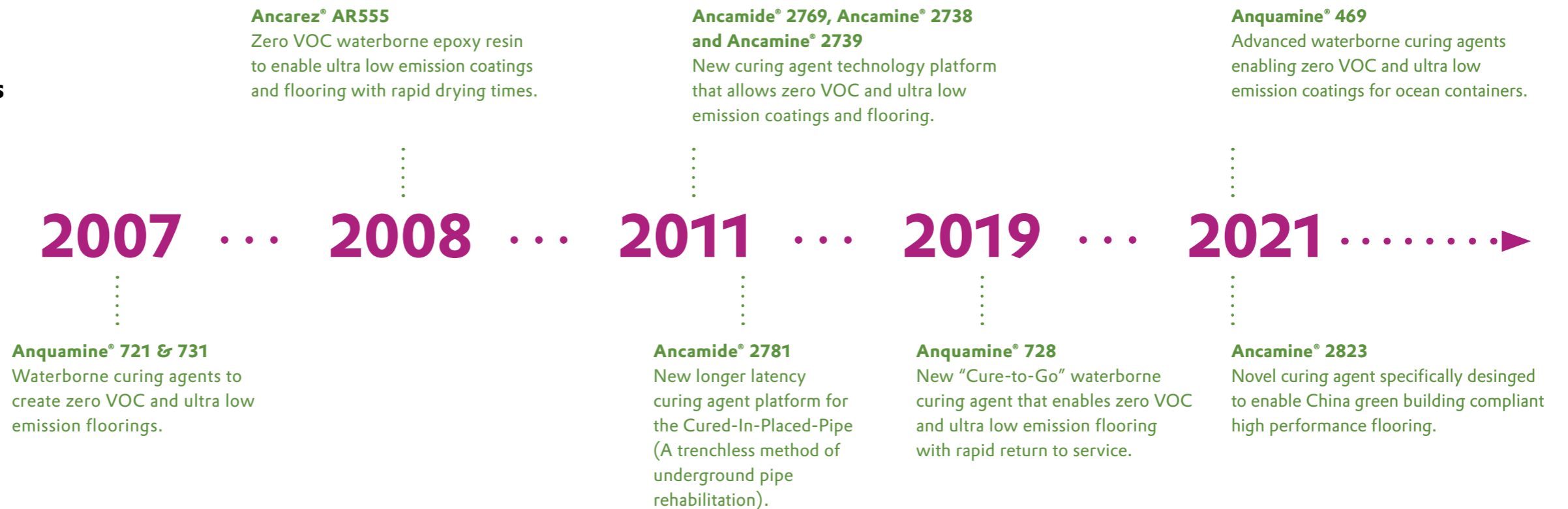
Long before sustainability was a corporate imperative, the development and production of more environmentally friendly curing agents via resource saving processes was on our minds and in our plans. With this as a foundation we have created various solutions for more sustainable applications.

We have continuously found ways to optimize our state-of-the-art manufacturing processes to increase yields using less energy, reduce emissions and remove volatile substances from wastewater.

Additionally, our latest developments at our facilities in Singapore, Nanjing and Marl have all enabled in-region production to significantly reduce the amount of international shipping of finished goods. The other benefit is the increasing utilization of locally sourced raw materials which boosts the local economy and also helps to positively impact the carbon footprint.



Discover the sustainability journey of our Epoxy Curing Agents



EPOXY CURING AGENTS

FOR MORE SUSTAINABLE SOLUTIONS

Our polyamide and amido amine curing agents are derived from bio, bio-circular or circular raw material sources. As lower emission water-borne solutions they reduce environmental impact, improve EHS and handling profile (toxicity, vapor pressure, irritation potential and odor) and improve worker safety during application. These latest epoxy curing agents offer fast-curing times at low temperatures (1K Adhesives), requiring less energy, while providing high corrosion resistant finishes to ensure greater durability and less maintenance over longer life cycles. By improving the overall sustainability of the bonding process, we support you to achieve the environmental requirements and the high-performance demands of sustainable technologies like the next generation of wind energy, lightweight construction and e-mobility.

EPOXY CURING AGENTS (ECA)



ECA based on Renewable Raw Materials

- Raw material sources
- Process energy & recourse consumption
- Waste
- EHS profile
- Logistics



ECA for Sustainable Technologies

- Durability/Maintenance
- Performance
- VOC
- Technological benefits



ECA for Sustainable Processes

- Process energy consumption
- EHS profile
- Handling
- Waste

ADHESIVES

SUSTAINABLE SOLUTIONS FOR EPOXY ADHESIVES

The latest epoxy curing agents for adhesive applications offer sustainable solutions to meet the performance demands of end users and applicators. We help epoxy adhesives formulators to cope with current and future challenges in environmental protection and sustainability in adhesive bonding. Our epoxy curing agents are used in one-component (1K) and two-component (2K) adhesive applications and meet the diverse needs of the complex adhesive market, including a range of sustainable solutions that help our customers to improve their ecological footprint.



ENERGY EFFICIENT 1K ADHESIVE CURING WITH MODIFIED ALIPHATIC AMINES

Ancamine® 2014AS & FG and Ancamine® 2441 & 2442 are modified aliphatic amines designed for use as a thermo latent catalyst for DICY, or sole curing agents for 1K epoxy adhesives to help our customers to improve the energy consumption of their bonding processes by reducing curing temperatures and times.



ECA based on Renewable Raw Materials

AMIDOAMINES & POLYAMIDES

Ancamide® 260A & 350A, 500 & 506, 3030

Industry standards based on up to 70% fatty acids

MANNICH BASES

Ancamine® 2719

Fast-curing agent based on cardanol



ECA for Sustainable Processes

ENERGY EFFICIENCY

Ancamine® 2014AS & FG, 2441 & 2442, 2337S

Effective curing temperatures of 1K adhesives down to 80°C (sole) or 120°C (DICY)

ENHANCED HANDLING

Ancamine® 2914UF

Mercaptane-competitive ultra-fast bonding



ECA for Sustainable Technologies

LIGHTWEIGHT CONSTRUCTION

Ancamide® 910A

Highly flexible and excellent adhesion on multiple substrates

WIND ENERGY

Ancamide® 3030 & 3130

Industry standard for rotor blade bonding

COMPOSITES

COMPOSITES - THE MORE SUSTAINABLE ALTERNATIVES

Composite materials are more environmentally friendly and sustainable alternatives to traditionally manufactured materials as they offer long service life and low maintenance requirements, combined with high material performance at very light weights. Composites have become a key technology, particularly in the mobility sector for making a significant contribution in reducing emissions. Our broad range of epoxy curing agents offer developers and manufacturers of composites a versatile toolbox of high-performance solutions to cope with the challenges of sustainability and multiple material and process requirements.



VESTALITE® S SERIES FOR HIGH-PERFORMANCE SHEET MOLDING COMPOUNDS

VESTALITE® S amine-based curing agents are designed for high performance epoxy SMC applications offering an excellent balance of low viscosity, good processability and short curing times as well as high mechanical properties and temperature stability complemented by a very low emission profile.



ECA based on Renewable Raw Materials

AMIDOAMINES

Ancamide® 502 & 506

Industry standards based on up to 65% fatty acids

AMINES

VESTAMIN® IPD eCO

ISCC PLUS certified amine curing agent



ECA for Sustainable Processes

ENERGY EFFICIENCY

Ancamine® 2014AS & FG, 2441 & 2442, 2337S

Improved curing temperatures for semi-finished composites

HIGH PRODUCTIVITY

VESTAMIN® R215

For high speed pultrusion processes



ECA for Sustainable Technologies

LIGHTWEIGHT CONSTRUCTION

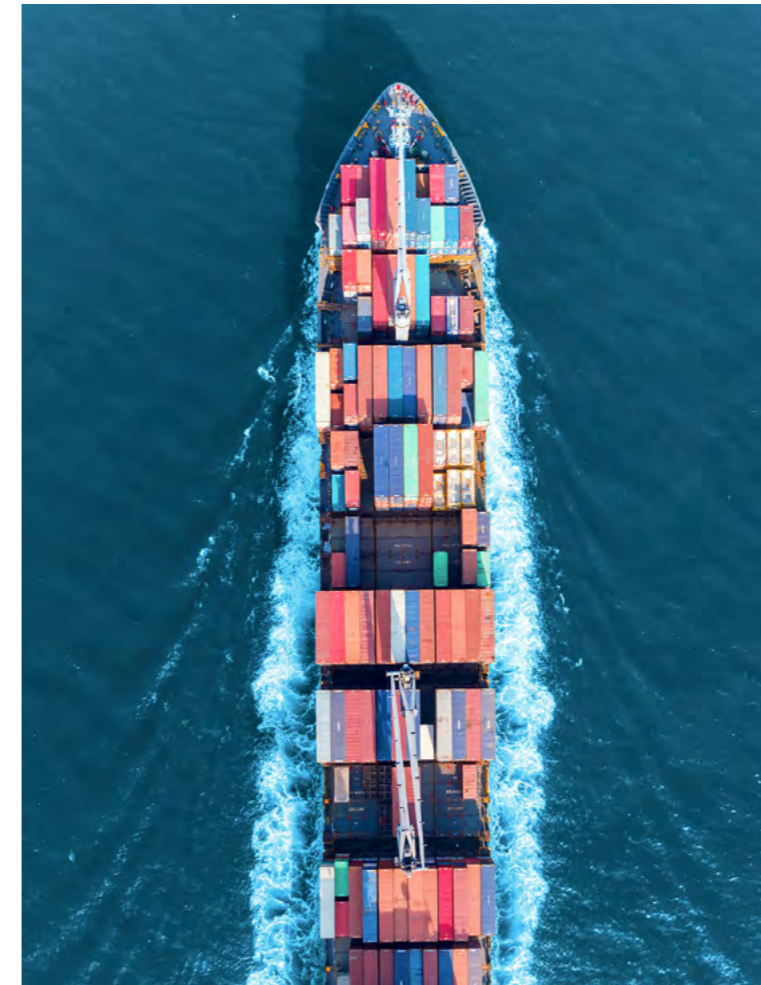
VESTALITE® S101

For high performance SMC applications with ultra low VOC

COATINGS

HIGH SOLIDS COATINGS WITH ULTRA LOW VOC

Epoxy curing agent technologies offer coating formulators solutions to meet both environmental regulations, as well as high-performance application demands. Regulatory requirements, voluntary corporate commitments, and intensified consumer attention have all resulted in facilitating new technologies that are more ecological and sustainable. Our epoxy curing agents provide coating formulators with a range of products to meet current environmental regulations, as well as positioning them for future trends. And of course, all with the performance expected from Evonik products.



SATISFY THE MOST DEMANDING MARINE PROTECTIVE COATING SUSTAINABILITY AND PERFORMANCE DEMANDS

Anquamine® 469 is a waterborne curing agent specially designed for waterborne protective coatings with low VOC. It offers excellent salt spray resistance and good adhesion curing at high temperature with high moisture and is ideally suited for container production conditions.



ECA based on Renewable Raw Materials

POLYAMIDES & AMIDOAMINES

Ancamide® 2769, 903MAV, 2652, 2830

Excellent long-term corrosion protection for coatings



ECA for Sustainable Processes

BACK IN SERVICE IN UNDER 1 HOUR

Ancamide® 2832 and 2864

Provide exceptional asset protection, aesthetics, high corrosion and chemical resistance, and excellent blush resistance



ECA for Sustainable Technologies

ULTRA-LOW VOC AND EMISSIONS

Ancamine® 2739, Anquamine® 469, Ancamide® 2769

Provide emission compliant coatings with high mechanical properties and excellent corrosion protection

CIVIL ENGINEERING

CURING AGENTS THAT MEET REGULATORY REQUIREMENTS IN CONSTRUCTION

We provide environmentally friendly chemistries including modified amine, polycarbamide and waterborne epoxy curing agents for use in floor coatings, mortars, grouts and epoxy modified concrete applications. When formulating epoxy systems for use in civil engineering applications, finding a balance between product performance, environmental regulations and worker health and safety standards is a challenge, but our line of epoxy curing agents are designed to make that challenge easier. Our range of epoxy curing agents for application in construction offers low emissions during both installation and use and contributes to extended lifetimes because of high durability.



CURE TO GO

Anquamine® 728 enables epoxy floor coatings with unrivalled cure speed and improved aesthetics. This waterborne curing agent enables fast return to service and avoids emission of organic volatiles.



ECA based on Renewable Raw Materials

AMIDOAMINE

Ancamide® 500 Series

Curing agent can be used as a component of FDA-compliant epoxy coatings, can cements and adhesives



ECA for Sustainable Processes

FAST RETURN TO SERVICE/ 1 DAY FLOORING

Anquamine® 728

Primer (3hrs)

Ancamine® 2800

Moisture Vapor Barrier

Polycarbamide or Epoxy

Mid-coat (2-7 hrs)

Polycarbamide

Topcoat (2-7 hrs)



ECA for Sustainable Technologies

WATERBORNE TECHNOLOGY

Anquamine® 728, 721, 735, 287, AR555

Fast back to service times for cost effective and environmentally compatible architectural coatings

HIGH SOLIDS/ULTRA LOW VOC

Ancamine® 2712M, 2800, 2850, 2739, 2609

High-performance moisture barriers offering fast cure rates and low emissions to meet green housing requirements.

LET'S SHAPE A MORE SUSTAINABLE FUTURE TOGETHER!

Just add creativity and the right building blocks from your reliable and trusted partner.



STAY TUNED FOR FURTHER DEVELOPMENTS

We are currently working on an updated Life Cycle Analysis (LCA) as well as fully defining the Global Warming Potential values (GWP) of our eCO grades.

Furthermore, we have started the preparation to apply the **VESTA eCO** concept to other products in our portfolio.

In addition, at our Herne, Germany site we contribute to the Evonik Assessment of Greenhouse Gas Emission Reduction project.

Stay tuned for further developments!

DISCOVER MORE!

Further useful documents and information are available.

www.evonik.com/crosslinkers

GET IN CONTACT!

Our local sales representatives look forward to serving you.

www.evonik.com/crosslinkers-contact



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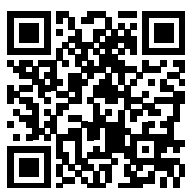
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07-2022/hg



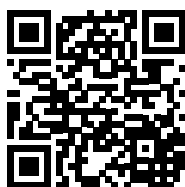
Join us on LinkedIn to stay updated about our latest solutions, webinars and more



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