

# VESTAMIN®

## CURING AGENTS FOR EPOXY RESIN SYSTEMS



vestamin®

vestamin® eCO

GO WITH THE ORIGINAL.

 **EVONIK**  
Leading Beyond Chemistry



## OUR VISION

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

## ABOUT US

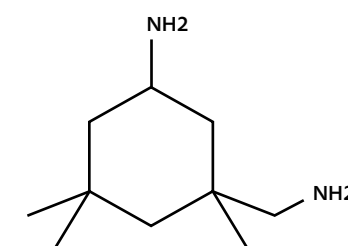
### PIONEER IN ISOPHORONE CHEMISTRY

Since inventing isophorone chemistry during our search for new ways to recycle and reuse acetone, Evonik's Crosslinkers business line has continued to develop high-performance isophorone-based products that improve our customers' applications.

For over 60 years we've been your reliable partner and solution provider. With our global production sites we are uniquely placed to meet your local market demands.

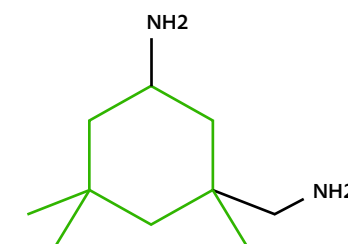
Now, following another important breakthrough we've boosted our broad portfolio of VESTA products with our new reduced emission eCO series for more sustainable solvents, composites and coatings.

TO HELP YOU ADDRESS TODAY'S MARKET  
AND ENVIRONMENTAL CHALLENGES CHOOSE  
THE SOLUTION THAT BEST MEETS YOUR  
PERFORMANCE AND SUSTAINABILITY GOALS.



**vesta**min®

The **classical VESTA grades** are based on  
**virgin fossil raw materials**



**vesta**min® eCO

The **eCO series** is based on  
**renewable raw materials**



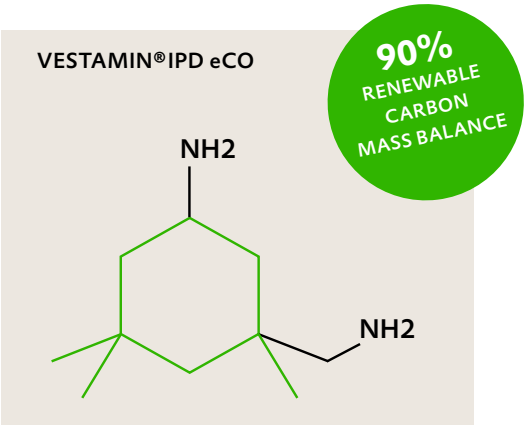
VESTAMIN® IPD eCO

eCO stands for Evonik's aim to eliminate CO<sub>2</sub> through use of renewable feedstock via mass balance approach.

MASS BALANCE APPROACH

Mass balance involves mixing virgin fossil and renewable raw materials into existing systems and production processes. The renewable amount is then allocated mathematically to specific products and is certified by a neutral third party to verify the use of renewable resources across all stages of production. Mass balance is a way to keep track of the renewable quantities throughout the process and to allocate them to specific products. It allows for large-scale production and enables cost-effective solutions that meet more stringent environmental and sustainability targets.

Mass Balance allows for instant CO<sub>2</sub> reduction in existing plants. Giving green drop-in solutions to our customers at the best possible price.



ESTABLISHED PERFORMANCE

- UV stability
- Chemical resistance
- Mechanical resistance
- Enhanced toughness
- NEW: LOWER CO<sub>2</sub>PROFIL

BENEFITS

- Drop-in solution
- No compromise in performance
- ISCC-certified

PRODUCT RANGE

Product			
	Delivery state	Characteristics	Applications
VESTAMIN® IPD/IPD eCO	liquid, 100%	Isophorone diamine, cycloaliphatic diamine	Main component for curing agent formulations, cold and heat curing of epoxy resin systems
VESTAMIN® TMD	liquid, 100%	Trimethyl hexamethylene diamine, aliphatic diamine	Main component for curing agent formulations, cold and heat curing of epoxy resin systems
VESTAMIN® PACM	liquid, 100%	4,4'-Diaminodicyclohexylmethane, cycloaliphatic diamine	Main component for curing agent formulations, cold and heat curing of epoxy resin systems

Specification					
Property	VESTAMIN® IPD/IPD eCO	VESTAMIN® TMD	VESTAMIN® PACM	Unit	Test Method
Purity	≥ 99.7	≥ 99.4	≥ 99.0 (sum 2-ring amines)	% by wt.	gas chromatography
Trans-trans-4,4' - PACM	-	-	17-24	% by wt.	gas chromatography
Appearance	clear liquid	clear liquid	clear liquid	-	visual
Color	max. 15 (APHA)	max. 15 (APHA)	max. 30 (APHA)	-	DIN EN ISO 6271
Water content	max. 0.2	max. 0.2	max. 0.1	% by wt.	Karl Fischer
Aminonitrile	< 0.15	< 0.15	-	% by wt.	gas chromatography
Secondary and tertiary amino compounds	< 0.15	< 0.15	-	% by wt.	gas chromatography
Saturated primary cyclic diamines	-	max.0.3	-	% by wt.	gas chromatography

General chemical and physical coefficients					
Property	VESTAMIN® IPD/IPD eCO	VESTAMIN® TMD	VESTAMIN® PACM	Unit	Test Method
Viscosity	19	7	29.6 (at 40 °C) *2	mm <sup>2</sup> /s	DIN 51 562, OECD 114
Molecular weight	170.3	158.3	210.3	g/mol	-
Amine value	660	710	535	mg KOH/g	DIN 16 945
H-active-equivalent	42.6	39.6	52.6	g/val	-
Solidification	8	- 80 *2	(15) *3	°C	OECD 102
Boiling pt. (1013hPa)	253	236	320 *2	°C	OECD 103
Vapor pressure (20°C)	0.02	0.04	≤ 0.01	hPa	OECD 104
Flash point	117	107	160	°C	DIN 51758
Relative density, d <sub>20</sub> <sup>4</sup>	0.92 *1	0.87	0.96	g/cm <sup>3</sup>	OECD 109

\*1 Mohr's balance    \*2 Internal method    \*3 The freezing point varies with isomer content, ranging from -17,7 to +65,4°C

Packaging, storage, safety and handling

**Packaging:** VESTAMIN® IPD/IPD eCO, TMD and PACM are available in non-returnable drums, non returnable IBCs, cans and road tankers. VESTAMIN® IPD/IPD eCO and TMD are also available in rail tank waggons.

**Storage:** The products are stable for at least one year when stored at temperatures below 25 °C without exposure to light and humidity. They are slightly hygroscopic and tend to form carbamates by reaction with atmospheric CO<sub>2</sub>. Therefore it should be stored free from moisture and carbon dioxide. VESTAMIN® IPD/IPD eCO and VESTAMIN® PACM tend to crystallize at temperatures below 15 °C. As partial precipitation can cause a change in the isomer ratio of the before mentioned products in the liquid phase, it is necessary to completely liquify the entire contents by warming (max. 60°C) and stirring.

**Safety and handling:** Please refer to our Safety Data Sheet/Material Safety Data Sheet.

# APPLICATIONS

## Construction

2K epoxy systems for several application (OEM and repair applications) methods on horizontal and vertical surfaces like chemical plants, power plants, aircraft hangars, parking garages, dairies, hospitals, breweries and other segments of the food processing industry, sewage plants, secondary containment as well as construction adhesives and anchoring



### Concrete Coatings

Protective and decorative thin layer application directly onto concrete

- 2K epoxy systems with special fillers offer**
- Low viscosity and good flow
  - Good wetting of the substrate
  - Wet operations (sprinkling quartz sand onto wet surface) enables different optical effects and non-slip properties

**VESTAMIN® provides**

- Very good adhesion
- High mechanical resistance
- Very good chemical resistance
- Smooth surface and good optical aspect

### Primer

Primer for ordinary and less absorbent concrete and floor surfaces

- Suitable 2K epoxy systems offer**
- Excellent wetting and penetration into the substrate
  - Adaptable reactivity (from slow to fast)
  - Processing above 5°C
  - Excellent uptake of sprinkled sand (for interlayer adhesion)

**VESTAMIN® provides**

- Permanent high adhesion strength
- Resistance to alkaline concrete media
- Pore sealing
- Homogenous surface for good adhesion

### Repair mortar/grout

Equalizing concrete structure for further flooring layers

- Suitable 2K epoxy systems offer**
- Low viscosity
  - High filler uptake
  - Good leveling

**VESTAMIN® provides**

- Good adhesion to primed surface
- Smooth and equalized surface
- Solid basis for next flooring layer adhesion
- Good mechanical and chemical resistance

### Self leveling flooring

Seamless flooring layer for medium duty traffic in warehouses etc

- Suitable 2K epoxy systems offer**
- Low viscosity
  - High filler uptake
  - Good leveling and flow properties

**VESTAMIN® provides**

- Smooth surface
- Surface defect free optical aspect
- Very good chemical resistance
- High mechanical resistance

### Mortar floor

Seamless flooring layer for heavy duty traffic in warehouses etc

- Suitable 2K epoxy systems offer**
- Low viscosity
  - Very high filler uptake

**VESTAMIN® provides**

- Excellent mechanical resistance
- High impact strength
- Very low shrinkage
- Excellent adhesion

### Sealer

On top of self leveling or mortar floor in order to provide special surface properties like anti-slip, special color effects or easy cleaning properties

- Suitable 2K epoxy systems offer**
- Low viscosity (partly solvenborne or waterborne)
  - Application in low dry film thickness

**VESTAMIN® provides**

- Excellent adhesion
- High mechanical resistance
- Good chemical resistance
- Good optical aspect and low yellowing

### Adhesive and anchoring systems

Durable connection between concrete and other construction materials

- Suitable 2K epoxy systems offer**
- Low viscosity
  - Good flow and wetting of concrete structures

**VESTAMIN® provides**

- Good mechanical strength
- Excellent adhesion to concrete substrates
- Frictional bond
- Durability

### Crack injection systems

For sealing cracks and frictional bonding of structural concrete structures and containments

- Suitable 2K epoxy systems offer**
- Low viscosity
  - Good flow and wetting of concrete structures
  - Fast cure

**VESTAMIN® provides**

- Good mechanical strength
- Good chemical and alkaline media resistance
- Frictional bond
- Durability



# APPLICATIONS

## Coatings



Two component epoxy systems for heavy duty corrosion protection on bridges, marine structures, pipes and tanks, chemical plants and water works in form of anticorrosive primers and high build intermediate layers

**Suitable 2K epoxy binder formulations offer**

- Low viscosity and high solid content
- Adaptable speed of cure (from slow to fast)
- Spray application

**VESTAMIN® provides**

- Excellent adhesion to metallic substrates
- Very good corrosion protection and durability
- Excellent chemical resistance
- High build capabilities

## Composites



Two component epoxy systems for rotor blades in wind energy installations, pipes in chemical processing and marine, leaf springs, pump cases, boat hulls and other marine structures, sport articles like ski, tennis rackets and surf boards, automotive applications and printed circuit boards

**Suitable 2K epoxy matrix formulations offer**

- Low viscosity
- Adaptable speed of cure (from slow to fast)
- Several application methods

**VESTAMIN® provides**

- High mechanical strength
- Good temperature resistance performance
- Resistance to impact stress
- Excellent chemical and corrosion resistance

## Doming



Two component epoxy systems for print finishing and crystal doming

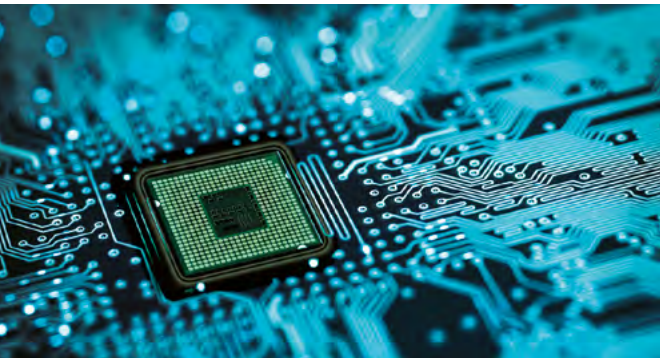
**Suitable 2K epoxy binder formulations offer**

- Low viscosity
- Adaptable speed of cure (from slow to fast)
- Low color index

**VESTAMIN® provides**

- Very good transparency and surface aspect
- Excellent mechanical resistance
- High chemical resistance
- Abrasion resistance

## Electrical & Electronics



Two component epoxy systems for encapsulation of electronic circuits and ignition coils, casings and switches

**Suitable 2K epoxy binder formulations offer**

- Low viscosity
- Adaptable speed of cure (from slow to fast)

**VESTAMIN® provides**

- High temperature resistance
- High impact strength
- High electrical resistance
- High chemical resistance



## Special applications

### Polyamides

Amorphous, transparent high performance polyamides for high-voltage switch castings, filter cups for water treatment, metering devices, inspection glasses, flowmeters, liquid-level indicators

**Suitable polyamides provide**

- Low molding shrinkage
- High viscosity

**VESTAMIN® provides**

- Crystal-clear optical transparency
- High mechanical stability
- High thermostability
- Good chemical resistance and electrical properties

### Chain extenders for PUR systems

PUR dispersions as well as solvent-free and solvent-borne thermoplastic PUR for wood and plastic coatings, printing inks, coatings for leather as well as artificial leather

**Suitable PUR dispersions and modified binders provide**

- Good compatibility with isocyanate prepolymers
- Good applicability

**VESTAMIN® provides**

- UV resistance
- Good resistance against hydrolysis
- Flexibility adjustable in a wide range
- Good abrasion resistance

**DISCOVER MORE!**

Further useful documents and information are available.

[www.evonik.com/crosslinkers](http://www.evonik.com/crosslinkers)

**GET IN CONTACT!**

Our local sales representatives look forward to serving you.

[www.evonik.com/crosslinkers-contact](http://www.evonik.com/crosslinkers-contact)

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02-2022/hg

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and more