VESTANAT®
Polyurethane crosslinkers
for liquid coating applications

VESTA – Developed in Germany.
Available globally.

EVONIK
POWER TO CREATE
About us

For more than 55 years Evonik’s Business Line Crosslinkers has been the reliable partner and solution provider in the field of isophorone chemistry. With global production sites, we are uniquely placed to satisfy our customers’ demands. Our portfolio of VESTA products showcases high performance materials that enhance the quality of our customers’ applications.

VESTA – Developed in Germany. Available globally.

Benefits at a glance

- Versatile product range
- Excellence in quality
- Securing reliability for coating formulations
- Global technical service and R&D

VESTANAT® products are a natural fit for high performance PUR coatings.

With its highly specialized product portfolio and broad expertise in crosslinker technology, Evonik is a major and essential provider of new solutions for liquid coating systems. Our strong competitive position is based on integrated technology platforms, innovation power and close cooperation with our customers.
Crosslinking makes the difference …

In a well-linked network, by connecting many individuals, a continuously stable performance can be assured and often even the positive extra can be achieved.

The idea of crosslinking can be applied in the field of coating systems. Single molecules have the potential to perform outstandingly, but crosslinked molecules surpass the level of superior performance.

VESTANAT® crosslinkers focus on aliphatic polyisocyanate crosslinkers that are light-stable. They are based on e.g. IPDI isocyanurate trimer, for the formulation of one- (1K) and two component (2K) polyurethane systems.

Based on a broad isophorone technology platform Evonik offers VESTANAT® crosslinking solutions that ensure the excellence of coatings.

Non-crosslinked coatings
Without crosslinking, a coating will be easily influenced by environmental impacts and will consequently lead to the damaging of the substrate.

Polymer chains
Open to environmental influences

Crosslinked coatings
Crosslinkers increase the stability of the coating and improve the resistance towards environmental impacts.

Crosslinked polymeric network
Building a protective structure

Resins, Additives, Solvents

Crosslinkers

Substrate
e.g. wood, plastic, metal

VESTANAT® Polyisocyanates; IPDI-trimer
VESTANAT® HT
Polyisocyanates; HDI-trimer
VESTANAT® HB
Polyisocyanates; HDI-biuret

These crosslinkers come along with ready-to-react isocyanate groups which can link with isocyanate reactive functionalities e.g. hydroxyl groups. To address the challenges of today and tomorrow we offer high performance crosslinkers for the use in high-end applications.

Polyisocyanate crosslinkers in 2K systems
- Combination with a resin component right before application
- Reaction starts immediately after mixing the polyisocyanate with the resin component
- Reaction leads to a 3D network with a high durability

Based on a broad isophorone technology platform Evonik offers VESTANAT® crosslinking solutions that ensure the excellence of coatings.

Blocked polyurethane crosslinkers in thermosetting 1K systems
- Contains blocking agents e.g. ε-caprolactam
- At ambient temperature: blocked polyurethane crosslinkers cannot react with the resin component
- At elevated temperatures: the blocking agent will be released and the isocyanate group can react with the resin

Evonik solutions for 2K systems
VESTANAT® T
Polyisocyanates; IPDI-trimer
VESTANAT® HT
Polyisocyanates; HDI-trimer
VESTANAT® HB
Polyisocyanates; HDI-biuret

Evonik solutions for 1K systems
VESTANAT® B
Blocked polyurethane crosslinker
VESTANAT® EP-DS
Waterborne blocked polyurethane crosslinker
**Selection of solutions**

<table>
<thead>
<tr>
<th>Crosslinker</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VESTANAT® T 1890</strong></td>
<td>Is a cycloaliphatic polyisocyanate crosslinker with a high compatibility. The crosslinker is used for light-stable and weather-resistant 2K PUR systems with improved physical drying properties and chemical resistance.</td>
</tr>
<tr>
<td><strong>VESTANAT® B 1358 A</strong></td>
<td>Is a blocked cycloaliphatic polyurethane crosslinker for the use e.g. in 1K automotive OEM primers generating excellent intercoat adhesion. It is characterized by an excellent balance of reactivity and storage stability.</td>
</tr>
<tr>
<td><strong>VESTANAT® HB 2640/LV</strong></td>
<td>Are aliphatic polyisocyanate crosslinkers based on hexamethylenediisocyanate for achieving weather resistance and light fastness. Blends of VESTANAT® HB 2640/LV or VESTANAT® HT 2500/LV combined with VESTANAT® T 1890 in 2K PUR paints improve drying performance, surface hardness, pot life and chemical resistance against environmental impacts.</td>
</tr>
</tbody>
</table>

**Benefits**

- Durability against environmental impacts
- High reactivity even at ambient temperature
- First-class chemical resistance
- Short curing cycles
- Excellent compatibility & high reactivity

**Selection of solutions**

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<tr>
<td><strong>VESTANAT® B 1186 A</strong></td>
<td>Is a blocked cycloaliphatic polyurethane crosslinker for interior BPA-NI* can coatings. According to FCN No. 1268, VESTANAT® B 1186 A is eligible for food contact applications. Please refer to FCN. No. 1268 or get directly in touch with us for further details.</td>
</tr>
<tr>
<td><strong>VESTANAT® B 1358 A</strong></td>
<td>Is a cycloaliphatic blocked polyurethane crosslinker to be used for exterior can coatings.</td>
</tr>
<tr>
<td><strong>VESTANAT® B 1481 ND</strong></td>
<td>Is a cycloaliphatic blocked polyurethane crosslinker to be used for coil coating formulations due to its low tendency to yellow during curing process.</td>
</tr>
</tbody>
</table>

**Benefits**

- All can- & coil coating applications can be served (food /non-food)
- 1K storage-stable approaches
- Improved sterilization resistance
- High flexibility

**Selection of solutions**

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<tr>
<td><strong>VESTANAT® EP-DS 1205 E</strong></td>
<td>Is a blocked polyurethane crosslinker based on cycloaliphatic VESTANAT® IPDI emulsified in water without any auxiliary solvents for combinations with anionic or nonionic waterborne OH-terminated resin dispersions.</td>
</tr>
<tr>
<td><strong>VESTANAT® EP-DS 1076</strong></td>
<td>Is a waterborne cationic, acetoneoxime blocked isocyanate crosslinker for combinations with cationic or nonionic stabilized waterborne hydroxylated resins. It can be used solely as a crosslinker or in combination with melamine resins.</td>
</tr>
</tbody>
</table>

**Benefits**

- Light-stability
- Co-solvent-free
- Water-based

**APPLICATIONS**

**Agriculture & Maintenance Automotive OEM & Car Refinish**

VESTANAT® polyisocyanate crosslinkers are used for the formulation of highly weather- and chemical resistant PUR coatings. VESTANAT® T 1890 imparts faster dry times, which result into remarkably short curing cycles even at ambient temperatures.

VESTANAT® HB/VESTANAT® HT products are used for weather-resistant and light-stable, solvent-borne 2K PUR systems with improved multifarious applications. These products are complementing Evonik Crosslinkers hardener portfolio for coating solutions.

VESTANAT® HB/VESTANAT® HT products are used for weather-resistant and light-stable, solvent-borne 2K PUR coatings that can be used in multifarious applications. These products are complementing Evonik Crosslinkers hardener portfolio for coating solutions.

**Can- & Coil Coating**

Blocked VESTANAT® polyurethane crosslinkers offer solutions for interior as well as exterior coating applications within the can- & coil coating industry. Highly flexible coatings with superior durability are easy to obtain, ensuring prime protection.

**Decorative & Industrial**

Unique VESTANAT® DS grades are sophisticated blocked waterborne crosslinkers. These products are available either for anionic or cationic 1K formulations for e.g. glass, metal or textile coatings.
Specialties

Crosslinker specialties adjust your coating systems according to your individual needs and add a unique touch to your formulation. Our versatile spectrum of specialty products complement your specific application requirements. Please contact us to elaborate on your tailor-made solution.

Extract of crosslinker specialties application fields:
- OEM applications
- Maintenance
- Industrial
- Wood
- Plastic coatings

Selection of solutions

VESTANAT® T 1890/100
- Is a solvent-free cycloaliphatic polyisocyanate crosslinker which can be used in 2K PUR systems e.g. for the manufacture of PUR resins or blocked polyisocyanates.
- Its broad solubility in all types of non-protic solvents gives our customers the chance to choose a solvent which fits best to the coating application.

VESTANAT® B 1358/100
- Is a solvent-free blocked cycloaliphatic polyisocyanate crosslinker which can be used in 1K PUR stoving systems.
- The solvent-free delivery form offers a great choice of possible solvents to be used with the benefit of the optimization of many paint formulations.

VESTANAT® EP-B 1358 DINP
- Is a cycloaliphatic blocked polyurethane crosslinker component supplied as a solution in diisononylphthalate for the combination with plastisols and organosols.
- It is specially developed e.g. for under-the-body coatings leading to a solid and resistant result.

VESTAMIN® A 139
- Is a liquid blocked crosslinker for polyisocyanate resins based on a cycloaliphatic diamine. The product exhibits a very low reactivity towards isocyanate groups. The fast crosslinking with polyisocyanate resins occurs under the influence of moisture by releasing the original diamine.

VESTANAT® EP-B 1581
- Is a cycloaliphatic blocked polyurethane crosslinker displaying high flexibility and low temperature cure.

OXYESTER® EP-HS 2272
- Is a linear polyester diol, developed primarily for the use in aliphatic PUR technology, especially as a VOC-reducing co-polyol in 2K PUR high solid coatings.

OXYESTER® T 1136
- Is a linear saturated polyester diol. It is mainly applied as a flexibilizing polyol in 2K PUR high solid paints or 1K stoving systems.

APPLICATIONS

Evonik’s Business Line
Crosslinkers is your perfect partner for innovative product developments and tailor-made solutions!
Competence network for coating solutions

Evonik works closely together with strategic partners. The employees look at the long-term requirements of the end customers and develop new technologies and products. These strategic partnerships are the key to future profitable growth and the continuous development of Evonik’s competences for the coatings market. However, sustainable growth is possible only on the basis of intensive cooperation with the customers.

Evonik’s Paints & Coatings Industry Team consisting of:

- Acrylic Monomers
- Adhesive Resins
- Coating Additives
- Coating Resins
- Crosslinkers
- Epoxy Curing Agents
- Functional Silanes
- Silica

Evonik brands for coatings

ACEMATT®  DYNAPOL®  SILIKOPON®
AEROSIL®  DYNASYLAN®  SILIKOPUR®
ALBIDUR®  EPLINK®  SILIKOTOP®
ALBIFLEX®  EPODIL®  SIPERNAT®
AMICURE®  HYBRIDUR®  TEGO®
ANCAIADE®  IMICURE®  VESTAGON®
ANCAMINE®  NANOPOX®  VESTAMIN®
ANCAREZ®  NANOCRYL®  VESTANAT®
ANQUAMINE®  NANOPOX®  VESTOPLAST®
ANQUAWHITE®  NOURYBOND®  VESTOWAX®
CUREZOL®  POLYVEST®  VISIOMER®
DEGADUR®  PROTECTOSIL®
DEGALAN®  SILIKOFITAL®
DEGAROUTE®  SILIKOPHEN®

One partner. Many experts.

Evonik for coatings
The coatings industry is one of the most important growth markets for Evonik. Integrated solutions become more important than simply deliveries of raw materials. The company is rising to this exciting challenge with an industry team for coatings that is active worldwide in order to reach the customers wherever they are and to understand their specific needs.
VESTANAT® Product range for liquid coating applications

**Polyisocyanate crosslinkers for 2K systems**

### VESTANAT® T Polyisocyanates; IPDI-trimer

<table>
<thead>
<tr>
<th>Physical form</th>
<th>NCO content</th>
<th>Viscosity at 23°C</th>
<th>Commercial availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>VESTANAT® T 1890 E</td>
<td>70 % in butylacetate</td>
<td>12.0 %</td>
<td>900 mPas</td>
</tr>
<tr>
<td>VESTANAT® T 1890 L</td>
<td>70 % in BuAc/Solvent naphtha (1:2)</td>
<td>12.0 %</td>
<td>1.700 mPas</td>
</tr>
<tr>
<td>VESTANAT® T 1890 M</td>
<td>70 % in K 30/Shellsol A (3:1)</td>
<td>12.0 %</td>
<td>4.000 mPas</td>
</tr>
<tr>
<td>VESTANAT® T 1890/100</td>
<td>100 % (pellets)</td>
<td>17.3 %</td>
<td>-</td>
</tr>
</tbody>
</table>

### VESTANAT® HT Polyisocyanates; HDI-trimer

<table>
<thead>
<tr>
<th>Physical form</th>
<th>NCO content</th>
<th>Viscosity at 23°C</th>
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</tr>
</thead>
<tbody>
<tr>
<td>VESTANAT® HT 2500 L</td>
<td>90 % in BuAc/Solvesso 100 (1:1)</td>
<td>19.6 %</td>
<td>550 mPas</td>
</tr>
<tr>
<td>VESTANAT® HT 2500/100</td>
<td>100 % (liquid)</td>
<td>21.8 %</td>
<td>3.000 mPas</td>
</tr>
<tr>
<td>VESTANAT® HT 2500 LV</td>
<td>100 %, low viscosity (liquid)</td>
<td>23.0 %</td>
<td>1.200 mPas</td>
</tr>
</tbody>
</table>

### VESTANAT® HB Polyisocyanates; HDI-biuret

<table>
<thead>
<tr>
<th>Physical form</th>
<th>NCO content</th>
<th>Viscosity at 23°C</th>
<th>Commercial availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>VESTANAT® HB 2640 E</td>
<td>75 % in butylacetate</td>
<td>16.5 %</td>
<td>150 mPas (25°C)</td>
</tr>
<tr>
<td>VESTANAT® HB 2640 EX</td>
<td>75 % in butylacetate/xylene (1:1)</td>
<td>16.5 %</td>
<td>150 mPas (25°C)</td>
</tr>
<tr>
<td>VESTANAT® HB 2640 MX</td>
<td>75 % in MOP-Acetate/xylene (1:1)</td>
<td>16.5 %</td>
<td>150 mPas (25°C)</td>
</tr>
<tr>
<td>VESTANAT® HB 2640/100</td>
<td>100 % (liquid)</td>
<td>22.0 %</td>
<td>10.000 mPas</td>
</tr>
<tr>
<td>VESTANAT® HB 2640 LV</td>
<td>100 %, low viscosity (liquid)</td>
<td>23.0 %</td>
<td>2.150 mPas</td>
</tr>
</tbody>
</table>

### Others

<table>
<thead>
<tr>
<th>Physical form</th>
<th>OH-value / Amin value</th>
<th>Viscosity at 23°C</th>
<th>Commercial availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXYESTER EP-HS 2272 *</td>
<td>100 % (liquid)</td>
<td>215 mg KOH/g</td>
<td>1.300 mPas</td>
</tr>
<tr>
<td>OXYESTER T 1136</td>
<td>107 mg KOH/g</td>
<td>4.000 mPas</td>
<td>Worldwide</td>
</tr>
<tr>
<td>VESTAMIN® A 139</td>
<td>100 % (liquid)</td>
<td>400 mg KOH/g</td>
<td>25 mPas</td>
</tr>
</tbody>
</table>

* EP = Experimental Product

### Blocking Agent Related Curing Settings

Depending on curing temperature and curing time different VESTANAT® crosslinkers are available.

**VESTANAT® B Blocked polyurethanes; Solvent borne**

<table>
<thead>
<tr>
<th>Physical form</th>
<th>NCO content</th>
<th>Viscosity at 23°C</th>
<th>Blocking agent</th>
<th>Commercial availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>VESTANAT® B 1042 E</td>
<td>63 % in butylacetate</td>
<td>NCO equivalent approx. 630 g/eq</td>
<td>Diethylmalonate</td>
<td>Worldwide</td>
</tr>
<tr>
<td>VESTANAT® B 1358 A</td>
<td>63 % in solvent naphtha</td>
<td>8.0 %</td>
<td>5.000 mPas</td>
<td>Methylisobutylketone</td>
</tr>
<tr>
<td>VESTANAT® EP-B 1358 DIMP *</td>
<td>40 % in diisononylphthalate</td>
<td>5.0 %</td>
<td>20.000 mPas</td>
<td>Methylisobutylketone</td>
</tr>
<tr>
<td>VESTANAT® B 1358/100</td>
<td>100 % (flakes)</td>
<td>12.5 %</td>
<td>-</td>
<td>Methylisobutylketone</td>
</tr>
<tr>
<td>VESTANAT® B 1370</td>
<td>60 % in BuAc/Xylene (3:1)</td>
<td>8.0 %</td>
<td>2.600 mPas</td>
<td>Acetoneacacetate</td>
</tr>
<tr>
<td>VESTANAT® B 1186 A</td>
<td>60 % in solvent naphtha</td>
<td>7.1 %</td>
<td>1.200 mPas</td>
<td>-caprolactam</td>
</tr>
<tr>
<td>VESTANAT® EP-B 1581</td>
<td>75 % in MOP-Acetate/Solvent naphtha (1:2)</td>
<td>10.0 %</td>
<td>3.500 mPas</td>
<td>Dimethylpyrazole</td>
</tr>
</tbody>
</table>

* * EP = Experimental Product

**VESTANAT® EP Blocked polyurethanes; Water borne**

<table>
<thead>
<tr>
<th>Physical form</th>
<th>NCO content</th>
<th>Viscosity at 23°C</th>
<th>Blocking agent</th>
<th>Commercial availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>VESTANAT® EP-DS 1076 *</td>
<td>35 % in water</td>
<td>3.0 %</td>
<td>400 mPas</td>
<td>Acetoneacacetate</td>
</tr>
<tr>
<td>VESTANAT® EP-DS 1205 E *</td>
<td>43 % in water</td>
<td>11.0 %</td>
<td>110 mPas</td>
<td>Methylisobutylketone</td>
</tr>
</tbody>
</table>

* * EP = Experimental Product

**Graphical Representation**

- Blocking agent related curing settings
- Temperature vs. Curing time
- Different curves for Blocking agents: -caprolactam, Dimethylpyrazole, Oxime, Diethylmalonate

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**EP = Experimental Product**
Let’s get in contact.
Comprehensive supply chain & technical service around the world

Our experts look forward to serving you

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