

## EVONIK INDUSTRIES AG

### Turnover

- 13.3 billion €

### Employees

- 34,000

### Branches

- Specialty chemicals

### Key materials

- Polyamides
- Polyphthalamide
- Polyetheretherketone

### Key bio-based products

- VESTAMID® Terra - bio-based polyamides

### Other products

- TROGAMID®
- VESTAKEEP®



# EVONIK

INDUSTRIES

### Company

Evonik, the creative industrial group from Germany, is one of the world leaders in specialty chemicals. Its activities focus on the key megatrends health, nutrition, resource efficiency and globalization. Reinforced with materials such as bamboo fibers, regenerated cellulose, or abaca, the bio-based polyamide molding compounds in 2010 about 80 percent of the Group's chemicals sales came from activities where it ranks among the market leaders.

Our business line High Performance Polymers is specialized in manufacturing customized products and systems. We have been producing high-performance plastics for over 40 years.

Evonik has recently added a group of bio-based polyamides to its VESTAMID® family. The polymers, sold under the VESTAMID® Terra brand name, are based on monomers produced partly or entirely from fatty acids. The most important source is currently castor oil, obtained from the seed of the castor oil plant, which is not used as food or animal feed, so its cultivation does not compete with that of food crops. Evonik is also forging ahead with the development of further polyamides from renewables based on palm kernel and rapeseed oils. One of the driving forces for the development of bio-based polymers at Evonik is the company's own demand for more resource efficiency and greater sustainability for the raw materials used.

In addition to polyamides based on renewable raw materials, Evonik has also been producing polyamide 12 and 612 compounds and polyamide 12 elastomers (PEBA) for about 40 years, and, more recently, polyphthalamide compounds all under the VESTAMID® brand name. Major manufacturers have been using all these materials for decades.

### Material

People assume that natural fibers automatically mean less convenience or worse performance. The natural fiber-reinforced VESTAMID® Terra proves that this is not the case. Reinforced with materials such as bamboo fibers, the bio-based polyamide molding compounds have outstanding mechanical and physical properties and are in no way inferior to other engineering plastics. Thanks to their lower carbon footprint than exclusively petroleum-based polyamides, VESTAMID® Terra products make a significant contribution toward conserving fossil fuels and reducing the greenhouse effect. This is something that has been confirmed by TÜV, Germany's Technical Inspection Association.

Demand for organic materials has increased significantly over the last few years, due to continuously rising prices of petrochemical raw materials and customer concerns regarding sustainable protection of resources. With VESTAMID® Terra we are respecting customers' wishes and offering a bio-based alternative for high quality polyamide components such as are used in sports equipment, electronics, and automotive construction.





## Products

Evonik currently offers three types of bio-based polyamides: VESTAMID® Terra DS is a 100% bio-based polyamide 1010, VESTAMID® Terra HS is a 62% bio-based polyamide 610, while Terra DD can be a 45% or 100% bio-based polyamide 1012 depending on the monomer source. Each type is available in several different viscosities as well as glass fiber-reinforced variants. Different natural fiber reinforced products are under development and can be supplied upon request. The DIN CERTCO organization for conformity assessment confirms the conformity of all VESTAMID® Terra grades.

VESTAMID® Terra molding compounds are semicrystalline and are thus distinguished by high mechanical strength and good resistance to chemicals and stress cracking. They also have high to very high heat deflection temperatures and a low absorption capacity for water, so that the good mechanical properties are retained even at high humidity. These compounds can be processed on all injection molding machines adapted for polyamide and are also suitable for filament production.

Bio-based polyamides can be used even for extreme applications. One polymer capable of particularly high performance is VESTAMID® HTplus a polyphthalamide (PPA) that permanently resists external temperatures over 180 °C. It is used, for example, as a charge air duct in turbochargers. In the Lotus Exige sports, for example, VESTAMID® HTplus reduced the weight of the charge air duct by half compared to the metal duct, and also improved the flow properties - saving fuel and minimizing CO<sub>2</sub> emissions.



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