GREEN COLORING ENERGIZED BY

Wood-Plastic Composites
Coloring with performance pigments

LANXESS
Energizing Chemistry
WOOD-PLASTIC COMPOSITES OFFER NUMEROUS ADVANTAGES

In successful use since the 1990s: Wood-plastic composites (WPC) are composite materials made of wood fibers and thermoplastics, and they are used in any number of home-and-garden applications. They look like wood, can be processed like wood but offer significant advantages over the natural material. They are highly weather resistant, can be manufactured in virtually any shape and generate very low maintenance costs.

When it comes to coloring WPC, Colortherm® and Bayferrox® inorganic pigments from LANXESS have proven to be very effective. Wood colors and earth tones can be reproduced so realistically with these pigments that the end products are virtually identical in appearance to natural wood.

The most important advantage of wood-plastic composites is their easy shaping. Whereas wood needs to be sawn, cut to size and coated, the extrusion of WPC produces a molded, colored part in a single step, reducing effort and costs. At 40 to 80 percent by weight, the content of the renewable raw material wood is relatively high, depending on the application.

Versatility is not the only advantage of this flexible material. Its plastic component, generally polyethylene (PE), polyvinyl chloride (PVC) or polypropylene (PP), lends the material mechanical properties that are superior to those of wood. For example, WPC is very dimensionally stable and weather resistant, and it can be sawn, sanded, planed and nailed just like wood. However, compared to wood, a WPC has the
advantage in outdoor applications of not requiring regular coating or impregnation and never splintering.

Be it parts of a roof gable or a complicated conduit for antenna cables, the composite material’s potential applications are virtually unlimited. Exterior applications include patio decking, fences, garden furniture, window frames, curtain walls and soundproofing elements; interior applications include furniture, window sills, doors, skirting and stairs.

- **A sustainable material**

As recycled plastic materials and wood byproducts can be re-used in the manufacture of WPC materials, they make a valuable contribution to conserving resources.

Inorganic pigments from LANXESS are not classified as dangerous substances and are safe for the environment. In chemical terms, they are virtually identical to naturally occurring iron oxides which are a component of common soil and have a neutral impact on the environment. With regard to their color, however, they are superior to their natural counterparts because of their higher purity and particle morphology. The processes developed by LANXESS Inorganic Pigments are environmentally friendly, operated according to the strictest safety requirements and subject to constant optimization. They ensure consistently high quality while at the same time conserving resources. All production sites are certified according to DIN ISO 9001 and ISO 14001 quality and environmental standards.
Wood-plastic composites primarily contain wood flour and, in most cases, thermoplastics. For outdoor applications, the wood content is about 50 to 70 percent, while up to 80 percent can be used for indoor applications. Other ingredients include bonding agents, heat stabilizers, UV stabilizers, lubricants and colorants.

Compared to organic colorants, inorganic pigments cost less while offering the advantages of high temperature stability and weather resistance as well as excellent migration resistance. As UV absorbers, iron oxides protect the plastic against degradation from UV radiation, which can significantly reduce the use of costly UV protectants. In many cases, the material is colored using masterbatches. However, pigments can also be added directly, a method associated with significant cost advantages in the manufacturing process.

The Global Competence Center Plastics helps customers to obtain the desired color tones by developing formulations which include LANXESS pigments.
COLORThERM® –
CUSTOM PIGMENTS
FOR WPC

The pigments used for coloring WPC must satisfy a number of exacting requirements: Given the short dwell times and relatively low shear forces in the processing equipment, they must have good dispersibility. The pigments must reach their final color strength quickly, display high heat stability, no migration, and exhibit high color stability and weather resistance in outdoor applications.

With Colortherm®, LANXESS offers a range of products developed specifically for the plastics industry that meet the demands of the WPC industry.

- Yellow hydrated iron(III) oxide pigments
  The heat stability of normal iron oxide yellow pigments is limited. For this reason, Colortherm® Yellow 10 and the hydrophobic version Colortherm® Yellow 20 are stabilized by an inorganic coating. Because they are heat stable up to 260 °C, they can even be used to color polymers processed at high temperatures.

- Orange-colored, stabilized zinc ferrite (Colortherm® Yellow 30) with a heat stability of up to 300 °C.

- Red iron(III) oxide pigments
  Manufactured at LANXESS by the Laux process, for the production of red pigments with very high heat stability.

- Black iron(II, III) oxide pigments
  On account of the narrow particle size distribution Colortherm® Black 318 and Bayferrox® 360 are particularly suited for coloring the WPC matrix.

- Iron oxide brown grades are pigment blends of iron oxide red, black and yellow.

- Extremely heat-stable brown and black mixed-phase pigments of the (Fe,Mn)₂O₃ system, marketed under the product names Colortherm® Brown 645 T, Colortherm® Black 303 T.

- Green chrome oxide pigments, brand name: Colortherm® Green.

Colortherm® pigments are characterized by good dispersibility in the WPC matrix. Most products are sold in micronized form, meaning with reduced agglomerates. All Colortherm® pigments are pre-tested in plastic to meet the high demands on the conformity of production. The products are described in detail in the brochure „Colortherm® Pigments for Plastics.“
LANXESS is a leading specialty chemicals group and operates in all the world’s key markets.

With its extensive portfolio, the company has focused on premium products. Its core business comprises the development, manufacture and sale of plastics, rubber, specialty chemicals and intermediates. In addition, LANXESS supports its customers in developing and implementing made-to-measure system solutions.

LANXESS has 17,500 employees worldwide working at 52 production sites in 31 countries.

The LANXESS Inorganic Pigments business unit is the world’s largest producer of synthetic iron oxide pigments and has production sites on five continents that meet the highest technical and ecological standards.

Crucial to the business philosophy of LANXESS Inorganic Pigments is its commitment to sustainability and responsibility in all its dealings with the environment, customers and society. Production processes are resource-friendly and, where emissions cannot be avoided completely, the waste products are cleaned to minimize their environmental impact before being released into the air or water. LANXESS is setting global industrial standards in this area.

However, sustainability means more than just environmental protection. It also means being a long-term and reliable partner to customers. That is why LANXESS Inorganic Pigments continuously invests to expand capacities and develop new products. The rising demand for its high quality Bayferrox®, Colortherm® and Bayoxide® products can only be met in this way in the long term.
Health and Safety Information: Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the LANXESS products mentioned in this publication. For materials mentioned which are not LANXESS products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets, product information and product labels. Consult your LANXESS representative in Germany or contact the Regulatory Affairs and Product Safety Department of LANXESS Germany. For business in the United States, please contact the LANXESS Product Safety and Regulatory Affairs Department in Pittsburgh, Pennsylvania.

Regulatory Compliance Information: Some of the end uses of the products described in this publication must comply with applicable regulations, such as those of the FDA, BFR, NSF, USDA and CPSC. If you have any questions on the regulatory status of these products, please consult your LANXESS representative in Germany, or contact the Regulatory Affairs and Product Safety Department of LANXESS Germany or — for business in the USA — your LANXESS Corporation representative, the LANXESS Regulatory Affairs Manager in Pittsburgh, Pennsylvania.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. The same applies to suggested formulations and recommendations. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as a health, safety and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our General Conditions of Sale and Delivery. All information and technical assistance is given without guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance and information.

Any statement or recommendation not contained in this brochure is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with industrial property rights such as patents covering any material or its use. No license is implied or in fact granted under the claims of industrial property rights such as patents.

Edition 09/2013

Bayferrox® is a registered trademark of Bayer AG, Leverkusen, Germany.
Colortherm® is a registered trademark of the LANXESS Group.