

BIOFLEXI HDF - High density fibreboard from agricultural residual fibres for free-form design

The novel, flexible high-density fibreboard with slip-resistant and shock-absorbent properties consists of 80 % to 90 % straw, a natural, annually renewable agricultural residues. Since no additives containing formaldehyde or isocyanates are used in the production process, it is particularly suitable for indoor use and can also be recycled and composted. As a further highlight, its high flexibility makes it suitable for use in the free-form design of furniture and partition walls.

- Recyclable and compostable
- 80 - 90 % of the fibre is made of annually renewable raw materials which do not compete with food production
- No harmful additives
- Slip-resistant and shock-absorbent
- Free forms for interior design and furniture
- Inexpensive raw material (agricultural by-product)
- Manufacturing process based on proven methods used in the plastics processing industry



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Application

- Internal house finishing
- Furniture production
- Floor covering and underlayment
- Partitions

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Development Status

TRL4 - Validation

Patent Situation

DE 60 2014 021 496.7 granted
DE 30 2019 107 731.8/06
"Bioflexi"

Reference ID

14/001TLB

Service

TLB GmbH manages inventions until they are marketable and offers companies opportunities for license and collaboration agreements.

Background

Fibreboards are widely used in the furniture industry and for internal house finishing. This new type of high-density fibreboard is equally suitable for the production of free-form furniture and partitions as well as slip-resistant and shock-absorbent floor covering and underlayment respectively. No formaldehyde and isocyanate components are applied, making it the ideal solution for various indoor applications.

Problem

The disadvantage of using conventional wood fibreboards is that they are based on slow, non-annually renewable resources. Moreover, formaldehyde- or isocyanate-based resins are often used for the production of these boards. Both materials may pose serious health risks. Numerous conventional fibreboards are neither directly recyclable, nor compostable.

Solution

Scientists from Stuttgart University developed a flexible high-density fibreboard made of annually renewable raw materials, which can be produced on the basis of available manufacturing methods.

The fibreboard consists of 80 % to 90 % straw, a natural fibre and residual material which is available worldwide. Therefore, the raw material's price is very low, and the fabrication of the fibreboard is not competing with food production. The fibreboards can be made of wheat, maize, rice, oat, barley or rye straw. In case of applying rice straw, the fibreboards have an extra advantage of having a silicate concentration of up to 20 % of the dry fibre weight. Since silicate is a natural fire-retardant material, the material classification "particularly fire-resistant" according to the German DIN 4102-B1 standard can be fully met through adding minimal mineral-based flame retardant-additives.

An eco-friendly thermoplastic elastomer is used as a binder. The board can therefore be produced without formaldehyde and isocyanate contents, thus minimizing the health risks during the product's entire life cycle. At the end of its service life, the fibreboard may be also recycled or composted. This indicates that waste is hereby prevented twice: once during the production by using agricultural by-products and the second time by composting the product at the end of its life-cycle.

Another unique feature which sets the invention apart from conventional fibreboards, is the board's high flexibility, which makes it the ideal solution for designing free-form furniture and interior spaces. Based on proven production methods, the boards are shaped as desired and then fixed by veneer-layers. Due to the low raw material costs involved, this invention provides an attractive alternative for architectural free-form applications.



Flexibility of the fibreboard.



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Flexibility and coatability of the bio-based fibreboard Bioflexi® [image source H. Dahy, Uni Stuttgart].