

## **WinFur**

### **Use of furfurylated wood for the production of high-performance windows made of European timbers**

Project Start Month: November 2007

Project Duration: 36 month

## **Project Consortium**

### **Project Coordinator**

Prof. Dr. Holger Militz

Organisation1: Department of Wood Biology and Wood Products

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### **Project Partners**

Organisation2: Norwegian Forest and Landscape Institute

Raveien 9, 1431 Ås, Norway

Organisation3: Kebony ASA, formerly Wood Polymer Technologies ASA

Oscars gate 30, 0352 Oslo, Norway

Organisation4: Menck Fenster GmbH

Sinstorfer Weg 70, 21077 Hamburg, Germany

Organisation 5: SP Technical Research Institute of Sweden

Brinellgatan 4, 50115 Borås, Sweden

Organisation 6: TanumsFönster

Säm 1, 457 91 Tanumshede, Sweden

Organisation 7: Bordörren AB

Box 44, 33015 Bor, Sweden

## Project Objectives

The objective of the project is the industrial application of furfurylated wood in the window market. Furfurylation of European timbers results in strongly increased dimensional stability and bio-resistance which has the potential to relaunch wood products in frame constructions in Central Europe and strengthen the market position of wood windows in Scandinavia.

In order to achieve the main objective, the project is divided into three steps:

1. Fundamental research on wood species that have been not used in the modification process of Kebony would supplement the existing knowledge of wood furfurylation.
2. Window components of different designs made of furfurylated wood would be investigated.
3. Prototypes would be developed and certified.

## Project Approach

The project is divided into five workpackages, each led by the partner who is mainly involved in the present work. The overall supervision for the project has partner 1 (Department of Wood Biology and Wood Products) who is also responsible for authoring annual reports. The institute can exchange its extensive experience of wood modification with both industrial and research partners.

LIST OF WORKPACKAGES			
No	Workpackage title	WP Leader	Partners involved
1	Market analysis & legitimate and technical requirements for wooden windows in Germany and Scandinavia	Department of Wood Biology and Wood Products	Partner 1 Partner 2 Partner 5
2	Evaluation and optimisation of material properties	Norwegian Forest and Landscape Institute	All 6 partners
3	Investigation of component parts made of optimised material	Department of Wood Biology and Wood Products	All 6 partners
4	Assessment of prototypes and investigation	SP Technical Research Institute of Sweden	All 6 partners
5	Dissemination	Kebony	All 6 partners

While wood modification (Kebony) and window production (Menck, TanumsFönster/Bordörren, Bordörren) would be carried out by the SMEs, the Institute of Wood Biology and Wood Technology of Georg-August-University Göttingen, the Norwegian Forest and Landscape Institute and SP Technical Research Institute of Sweden would be in close cooperation to perform material characterisation and window testing concerning bio-resistance, weathering, gluability, coating, thermal conductivity and mechanical properties in order to fulfil the requirements for national and international certifications.

## Expected Project Impact

The main innovative challenge for WinFur is to adapt the process of furfurylation to the technical demands for wood properties in frame constructions. The expected results shall enable Kebony to optimise the furfurylation process according to wood species that have not been extensively studied yet and to the requirements of the window manufacturers.

Furthermore, the research data from Workpackages 1-4 shall facilitate a solid data base for certifications of wood species and prototypes which in turn consequently accomplish a successful market launch.

### Contribution to certification

The product standard for windows and outer doors (prEN 14351-1: 2005-09) has been recently passed by the CEN (European committee for standardization). The CE label provides a comparison of window properties and a categorisation into performance classes.

Germany has a voluntary certification for wooden windows named RAL which is highly respected on the European market. The association "Gütegemeinschaft Fenster und Haustüren" has a list of wood species that are approved to be used for RAL-certified windows and doors. The main objective, therefore, is the admittance of furfurylated wood on this list.

The Nordic P- and the NDVK (Norwegian Door and Window Control)-certificate are similar to the RAL - certification but adopted to the laws and regulations of the Nordic countries. The Nordic P-certificate is given exclusively by SP, the NDVK-certificate by The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology (SINTEF).

### Economic relevance

The past decade has seen considerable commercialisation in the wood modification sector, particularly in Europe. This reflects the revise in the legislation concerning the wood protection industry. There has especially been industrial implementation of thermal modification in Finland, France, Austria, Germany and the Netherlands. However, thermal modification results in high losses in wood hardness which consequently leads to problems with fasteners due to screw withdrawal resistance. In comparison, furfurylation does not show this drawback and therefore shows the potential as an excellent material in frame constructions.

WinFur is the ideal project for Kebony to bring furfurylated wood into the window market which produces a high added value. The material cost of wood takes approximately 15% of the total cost of a window. The price increase due to furfurylation shows therefore little effect on the sales price compared to other possible modified wood products.

Additionally, WinFur focus on two strong European window markets at the same time that are differently structured. Menck's cooperation in the project can be regarded as an entrance for Kebony to the central-European market (Netherlands, Austria and Switzerland). Analogical, can TannumsFönster's/Bordörren's activities seen as possible opening to the finish and danish markets.

The logical step after a successful implementation in the window market would be an extension to the door market where similar wood properties are desired.

Geared to long-term profitability, a break-through of furfurylated wood in frame construction can lead to set-up of new furfurylation plants. This contains the possibility that Kebony grants process licenses to other enterprises.

## Contact

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