

Dear reader,

On 26 April, the second training module of WOTIM was arranged by Innventia in Stockholm. The purpose of this one-day workshop was to report on the progress of the project and review the markets, manufacturing technologies and requirements for wood-based thermal insulating materials. The workshop also covered the possibilities of foam forming processes and samples were showcased during the day. To this second training module participants from the Training School on Nanocellulose shaping within COST Action FP1205 "Innovative applications of regenerated wood cellulose fibres" were invited. Over 50 persons were participated to the workshop. The discussions were lively with many questions addressing the speakers. With this newsletter we will give you a summary of the workshop. The presentations at the training module are available at the website [www.wotim.eu](http://www.wotim.eu). The WOTIM project will be concluded by the end of this year. Please save the date for the final training module and conference which will take place in Espoo, 30 November 2016. A draft programme is presented in the end of this newsletter. More detailed information will soon be published on website [www.wotim.eu](http://www.wotim.eu).

*Petri Jetsu, VTT  
Project Coordinator*

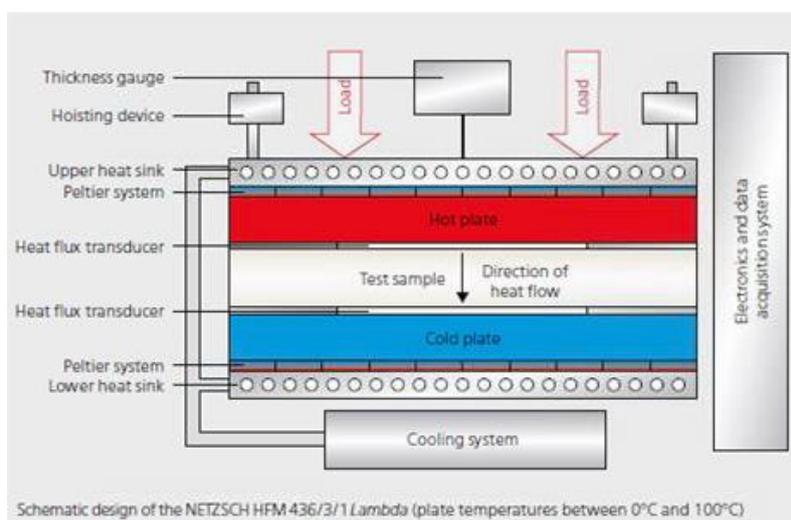
## Summary of the second training module

### Basics for thermal insulation

In this presentation the following issues were taken up pointing out the needs for extended use of insulations:

- Regulations in EU
- What is thermal conductivity?
- How the thermal conductivity is measured?
- How to certify a lambda value?

The measurement system for thermal conductivity was explained. Two methods exist Heat Flow Meters, HFM and Guarded Hot Plate device, GHP.



*Scheme of an HFM, Heat flow meter*

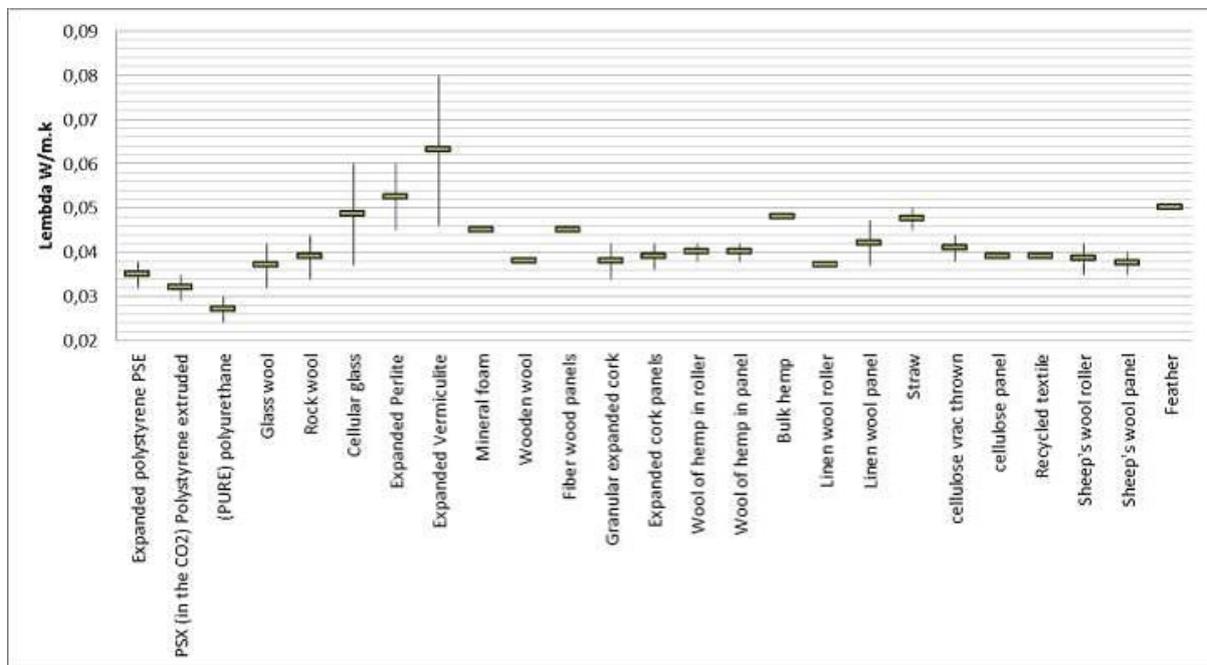
## Insulation Materials; Markets and Trends

This section discussed the issues of what the market wants and how to put a new material on the market. The analysis of the performance of today's insulation materials clearly points out the strong correlation to the density of the material. For the future newly developed materials should, compared to the state of the art, bring:

- Improvement by at least 25% of the insulation properties at component level;
- Reduction by at least 20% of the total costs compared to existing solutions;
- Improvement by at least 20% of durability at component level;
- Respect of sustainability principles;
- Improvement in indoor air quality;
- Proof of high replication potential both in new built and renovation in Europe;
- Easier implementation;
- At least a 15% reduction of the energy spent during the whole life cycle of a building;
- Contribution to standardisation and certification activities.

A lot of the discussion focused on what aspects of the insulation board was seen as most important. Issues like price, fossil-free, fire-resistance, humidity resistance, sound absorption etc. was brought up.

The different types of insulation materials and their processes were gone through. The market is dominated by Expanded Polyurethane and Rock and Glass Wool while Wood fibre based insulation products are niche products. This dominance cannot be justified only based on the performance regarding thermal conductivity. Thus the possibilities of using fibre based insulation products depend on the specific use and performance as well as price and facilities/equipment for installation.



*Thermal conductivity of materials*

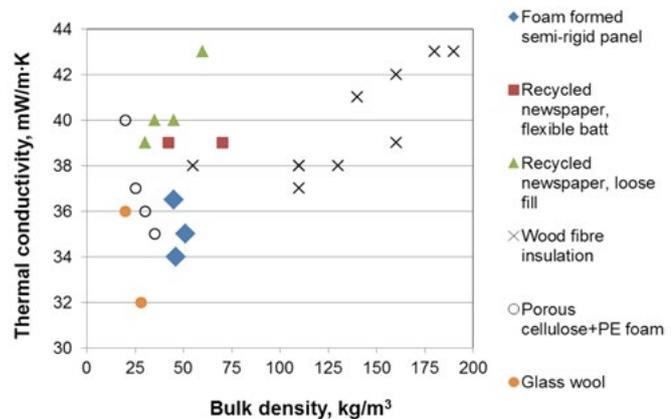
## Basics and status of foam forming

The thermal insulation properties for the foam formed insulation products WOTIM were discussed in relation to the range for commercial cellulosic materials. With regard to the thermal conductivity the foamed products perform quite well.

In conclusion it could be stated that for the foamed products the thermal conductivity is lower than with current products. Air flow resistance and mechanical properties depend highly on fibre/pulp selection while mechanical properties can be adjusted with additives. Further development of foam formed materials includes the addition of fire retardants as well as decrease of the water up-take.

The foam forming technology and its main process phases for different applications was gone through.

Different materials produced with foam forming were displayed on an exhibition and caused a lot of interest and discussion.



## Third training module and final workshop - Thermal insulation and acoustic materials based on the cellulose

Agenda for the final training module in Espoo, 30 November 2016:

### Thermal insulation

- Insulation material markets and trends
- Commercial cellulose based insulation materials and manufacturing processes
- Comparison of foam formed insulation materials against commercial wood-based insulation materials
- Spray-on cellulose based thermal insulation foams
- Sustainability, cost efficiency and performance of developed insulation material in building applications

### Acoustic materials

- Acoustic material markets and commercial cellulose based acoustic materials and manufacturing processes
- Comparison of foam formed acoustic materials against commercial acoustic materials
- Spray-on cellulose based acoustic materials
- Design driven development of cellulose based materials