

## **University of Debrecen Faculty of Engineering**

### **Building Physics Laboratory Thermal engineering research group**

The Thermal Engineering Research Group was established in 2012 at the Department of Building Services and Building Engineering, Faculty of Engineering, University of Debrecen.

Head of the Laboratory and the research group: Dr. Ákos Lakatos, Deputy Head of Department associate professor.

Members: Dr. Szodrai, Ferenc senior lecturer, Kovács, Zsolt PhD Student, as well as students (BSc, MSc thesis workers approx. 40 pcs, Scientific student workers (9 pcs) Talent UD students (2 pcs).

Earlier the following professors and researchers were taking part in projects:

Prof. Dr. Kalmár, Ferenc, Dr. Csáky, Imre, Dr. Budai, István, Dr. Csík, Attila (HAS – INR), Dr. Csarnovics, István (UD-FST-DEP), Prof. Dr. Umberto Berardi (Ryerson University, Toronto, Canada), Dr. Anton, Trník (Constantine the Philosopher University, Nitra, Slovakia).

The aim of the research group is:

Nowadays, the thermal insulation of buildings is an extremely important task. The most commonly used thermal insulation materials are plastic foams and fibrous thermal insulation boards. Today, the testing of super thermal insulation materials such as airgel and vacuum thermal insulation panels is also extremely important. With the subsequent thermal insulation of the buildings, not only the heat transfer of the flat surfaces is reduced, but also the effect of the thermal bridges (at the connection elements of the structures, window frames, wall corners, etc.) is significantly reduced. Depending on the type of building, the latter can be a large part of the total loss. Another effect of post-insulation is a shorter heating season, which further increases the potential for energy savings. In our laboratory it is possible to test thermal insulation and building materials with the following equipment.

The following measurements can be executed in the laboratory:

- Thermal conductivity measurements
- Moisture sorption measurements
- Measurement of combustion heat
- Measurement of thermal transmittance of wall structures
- Measurement of thermal resistance of wall structure.
- Differentiated Scanning Calorimetry – Cp measurement

- Thermal conductivity measurements



Netzsch 446 HFM

- Moisture sorption measurements



Venticell and ClimaCell equipments

- Measurement of combustion heat



Cal2 Eco Bomb calorimetry

- Measurement of thermal transmittance of wall structures



Hukseflux equipment

- Measurement of thermal resistance of wall structure.

ISO 8990:1994: Thermal insulation — Determination of steady-state thermal transmission properties — Calibrated and guarded hot box

- Differentiated Scanning Calorimetry – Enthalpy and Cp measurement

