

Zukunft Bau

Summary report

Title

Damage-free improvement of the building stock with expanded cork granulate and blow-in technology for double-shell masonry - measurement of moisture content of bulk materials in cavity masonry

Occasion / starting position

In the energetic renovation of existing buildings with two-shell masonry filling the existing cavity is used with a bulk insulation to improve the thermal resistance. The effectiveness of this measure depends on the distribution of moisture in the insulation material. Suitable measuring instruments for material moisture measurement in bulk cork and expanded clay under these special conditions are being sought.

Subject of the research project

Of the commercially available devices for material moisture, the microwave measurement method MOIST Endo from HF Sensor GmbH and the stray field capacitor from Ahlborn GmbH are the most suitable for a non-destructive long-term measurement under the conditions of a double-shell, cavity-filled masonry. In specially manufactured containers, material samples of bulk cork or expanded clay are introduced and conditioned by various, defined moisture additions. By repeated measurement of the moisture profiles in the specimens, the time setting of a uniform moisture distribution is checked. After equilibrium has been established, the appropriate calibration curves can be constructed from the gravimetrically determined absolute moisture content of the samples and the associated measurement signals of the probes used. In a two-plate thermal conductivity meter the moisture-dependent heat conductivity is measured for each bulk material. This creates the possibility to conclude from the measurement signal of the applied probe on the heat transfer resistance of the bed. The development of a material moisture method for salt-doped substances via the determination of the thermal conductivity would be recommended.

Conclusion

A reproducible measurement of the absolute moisture content of the hydrophobic bulk materials used as thermal insulation is only possible in the hygroscopic moisture range. In the overhygroscopic area, the material moisture distribution changes during the long term due to segregation processes in the bulk material. It is not possible to specify a safe reference value for the probe signal. The stray field capacitor has sufficient sensitivity to provide reproducible results even in the hygroscopic wet zone. However, the resolution in depth is insufficient for use in cavity masonry.

Key data

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