

Historical farmhouse Pleiskirchen (Germany)

Brief description:

Interior insulation of a historical farmhouse

Location: Pleiskirchen, Bavaria

Building type: Detached house

Construction year: 1867

Renovation: 2012

Range of services: Interior insulation, renovation of facade and roof

Result:

A 150-year-old farmhouse was renovated in accordance with the original plans from the public records office. Before the renovation, the structure of the building was a 50-cm-thick, uninsulated brick wall. The renovation plan included an 8-cm-thick, purely mineral, open-pored interior insulation. The insulation consisted of the hydrophobic core material CALOSTAT® with a thermal conductivity of $0.019 \text{ W}/(\text{m}^2 \text{ K})$, embedded in a capillary-active layer of calcium silicate. The mean thermal conductivity of the panel is $<0.03 \text{ W}/(\text{m}^2 \text{ K})$.

This project involved collaboration from the Institute of Building Climatology at Dresden University and the Resource Efficiency Segment of Evonik Industries AG, Essen. Calsitherm Silikatbaustoffe GmbH supplied the technology that was used to embed the hydrophobic, vapor-permeable CALOSTAT® into a capillary-active environment made from calcium silicate. The aim is to examine the effective interaction of the products at a hygrothermal level. Extensive positive feedback has already been received from both the sensors and the

client, however. The client wanted the renovation work to retain the external appearance of the building and to provide maximum insulation and energy efficiency for the building on the basis of vapor-permeable, purely mineral interior insulation.

Insulation with hidden strength

“Before, we used to put the heating on in the evening and an hour later it would be quite chilly again. Last winter we could enjoy breakfast very comfortably without being cold at all.” Mario Schneider had interior insulation fitted in his 150-year-old farmhouse in Pleiskirchen in Upper Bavaria in autumn 2011. “Builders used to take a practical approach to construction, and this gave the buildings a nice look,” says the building preservation specialist. For this reason he was determined for the facade of his building to stay as it is.

Improving the thermal insulation of the building structure is likely the most promising way to significantly reduce the energy consumption of private and public buildings. After all, one third of the energy generated in Germany alone is used for heating. For Mr. Schneider, insulating his building was much more than a question of physical appearance. He was also looking for an alternative to conventional insulation materials, which have disadvantages that are all too often ignored. Disadvantages such as harming the health of fitters or emitting harmful vapors once installed, or acting as a fire accelerant underneath the rendering of facades—as recently happened in a large apartment block in Frankfurt.



On his construction site he used a new version of the well-established "Klimaplatte" interior insulation system produced by Calsitherm Silikatbaustoffe GmbH—the Xtra Klimaplatte PKS: a layer of Evonik CALOSTAT® coated with calcium silicate, which provides such good insulation that the thickness of the panel could be reduced by two thirds. This saves space. Other advantages of the insulation material: It is permeable, capillary-active, nonflammable (building material class A to DIN 4102), mold-inhibiting, non-water-soluble, resistant to pests, and ecological, posing no risk to health and inherently dimensionally stable, and therefore self-supporting.

"If facades that need to be preserved, perhaps because they part of listed buildings, are to be insulated from the inside with limited space, the Xtra Klimaplatte PKS is the perfect solution," says Tobias Hölscher, managing director of Calsitherm Silikatbaustoffe GmbH.

The Xtra Klimaplatte PKS also solves what has so far likely been the biggest problem in internal insulation: damp resulting from human breath or cooking forming condensation on the inside of the exterior wall if it is unable to escape. "An effective solution is to use capillary-active interior insulation systems that transport moisture outside and prevent condensation from forming," says Professor Manfred Hegger from Darmstadt University. He has performed research on the insulation system developed by Calsitherm. His colleague Dr. Rudolf Plagge from Dresden University also predicts big things for the future of the Xtra Klimaplatte PKS. The Dresden University of Technology is currently evaluating measurements taken from Mr. Schneider's building that he hopes will provide reliable information on the heat balance and the energy efficiency of the new interior insulation system.



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