

Historical half-timbered house

Herne (Germany)

Brief description:

Heating renovation of a historical semidetached half-timbered house

Client: Staudt family

Heating supplier/technical planner:

think-E-Energy GmbH, Essen

Executing companies:

Elbo-therm GmbH & Co. KG, Borken, interpico UG and Wolany Elektrotechnik, Essen

Construction year: 1840

Renovation: 2015

Location: Herne in North Rhine-Westphalia

Range of services: Replacing the storage heater with think [RED] energy® low-temperature thermal walls insulation on rear side with CALOSTAT®, a niche heater, and heating strips.

Description of property:

- Half-timbered house with brick infills
- Heated area, before, approx. 200 m²
- Heated area, after, approx. 275 m²
- Calculated energy consumption, before, approx. 100 kWh / (m² a)
- Predicted energy consumption, after, approx. 85 kWh / (m² a)
- (dependent on particular heating use).

Facts and figures–renovation:

Even before the client acquired the idyllic semi-detached house with large gardens on the outskirts of Herne in early 2015, it was clear that sustainable renovation work was required, with care taken not to spoil the historical timber framing. This would involve removing the old storage-heater system and replacing it with a modern heating installation. After extensive research, the client was faced with a choice: either to lay a new water-bearing pipe system through the structure of the building and install an oil tank or a gas connection in the cellar or to try out the efficient, innovative think [RED] energy® low-temperature radiant heating system for controlling the temperature of enveloping surfaces and building units, insulated with CALOSTAT®.

Once they had weighed up all the facts, the Staudt family had no trouble deciding on the think [RED] energy® low-temperature radiant heating system. They report that the investment costs for the new radiant heating were significantly lower than those of the more expensive gas or oil variant. There was also less risk of damage as less interference with the building structure is required. What really closed the deal, however, was that the new heating system would reduce the client's heating energy consumption by roughly 15 %, even without energy innovation, making it a sustainable solution for the environment and for his wallet. The client was impressed by the technical aspects of the system, as the heating energy mainly heats the building units and the furniture in the form of infrared radiant heat, rather than having to generate convection currents in the air. To prevent energy escaping into the exterior masonry in the areas where the radiant heating system borders with an outside wall, these heating elements are insulated with CALOSTAT®.



CALOSTAT® is an insulation material that has been specially developed for the construction sector. The permeable, nonflammable, and self-supporting panel mainly consists of the purely mineral raw material silicon dioxide. It is non-reactive with regard to other composite materials, resistant to environmental influences such as mold, fogging-free, and—unlike the majority of conventional fossil insulating materials—recyclable. It allows the diffuse dissipation of heat into the exterior wall to be stopped almost completely. CALOSTAT® is particularly suitable for installation at higher temperatures as unlike conventional insulation materials its thermal conductivity and the related insulation performance are barely affected by temperature. In addition, the low-temperature radiant heating system based on infrared thermal radiation is a fundamental part of the “HEIZUNG 4.0®” energy strategy.

This strategy supports the expansion of private solar module systems on roofs or as free-standing systems close to areas where energy is in particular demand, which the client can easily retrofit at any time. As standard, the strategy therefore involves a significant increase in independent power generation and accompanying independent power consumption.



Figure 1

The low-temperature radiant heating system—insulated with CALOSTAT® on the rear side—is shown integrated into the stud frame from the inside of the exterior wall.

Evonik Resource Efficiency GmbH

Business Line Silica
Rodenbacher Chaussee 4
63457 Hanau

www.calostat.com
calostat@evonik.com