

External insulation combined with internal insulation

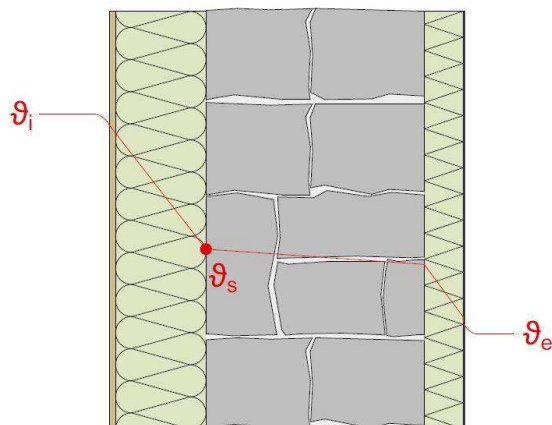
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Walls

What is the solution?

In some cases of facade refurbishment, the proportions and the building volume may only be changed minimally. In these situations, only very thin external insulation can be applied. In order to achieve a sufficient thermal resistance of the entire wall construction. The external insulation can be combined with internal insulation.

Cross section of the wall build-up, available pictures of the solution:



fictitious temperature curve in a wall, ©
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Why does the solution work in terms of compatibility with conservation, moisture safety and energy improvement?

The big advantage of a combination of external and internal insulation is the creation of a driving rain resistant facade. By applying insulation on the outside, the problem of driving rain can be significantly improved by appropriate plasters and paints. In this context it is important to use suitable materials. These materials must be highly water-resistant (w -value $\leq 0,5 \text{ kg}/(\text{m}^2 \cdot \text{h}0,5)$)

and at the same time as diffusion-open as possible ($S_d \leq 2.0$ m) in order not to block the flow of vapour diffusion to the outside. As a result, the ingress of moisture from outside as a reaction to driving rain is as low as possible. This is particularly important if internal insulation is installed. A further advantage is that a higher temperature is achieved at the transition layer, between the existing wall and the internal insulation. Raising the temperature reduces the relative humidity in the critical layer and therefore also the risk of mould growth.

Pros and cons of the solution:

The pros are the increased protection against driving rain which can be achieved by external insulation in combination with suitable plasters and paints. On the one hand, this is due to the water-repellent properties of the plaster and paint, on the other hand, the additional insulation contributes to driving rain protection. The insulation layer provides a soft buffer material between the existing wall and the surface plaster. This minimizes surface tensions and results in significantly reduced crack initiation. Increased surface temperatures in the boundary layer between the interior insulation and the existing wall reduce mould growth potential. Another advantage is a less effective area required due to smaller interior insulation thicknesses. The cons are the double working effort (inside and outside) and higher costs due to the renovation of the existing wall on both sides.

Type of data available (level of information, simulation):

This solution represents a general approach for wall renovation. In principle, it can be implemented with almost every insulation material. The general rules and approaches of the special solutions apply in turn and must always be assessed in connection with the existing wall.