
Solid walls (brick and lightweight concrete) with calcium silicate as internal insulation

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Walls

What is the solution?

Internal insulation of 360 mm external staircase walls made of brick and lightweight concrete (110-230 mm outer layer of brick with holes, layer of concrete, and 10 mm interior plaster), using 50 mm calcium-silicate, lambda 0,067 W/(m K). The average U-value of the wall was reduced from 1,05 W/(m² K) to 0,65 W/(m² K) (calculated values).

Why does the solution work in terms of compatibility with conservation, moisture safety and energy improvement?

There was no sign of moisture-related damage after three winters, however these were mild winters compared to normal Danish winters. Energy saving was around 20 %, more if additional energy saving measures were implemented. Insulation can be removed as it is added as an extra layer to the existing construction. However, the existing wall may have to be repaired afterwards. The solution was chosen based on energy efficiency, not conservation compatibility.

Description of the context:

Internal insulation was used as part of the Copenhagen municipality policy to reduce energy use in buildings by 20 % by 2025, while keeping the appearance of dwellings unchanged and improving the indoor climate and comfort. Existing interior surface (rendering) was cleaned for any organic material before applying the insulation system to remove any remains of organic material before its installation. Wooden laths were applied at the inner surface to give the inhabitants the possibility to hang paintings or other things on the walls, without destroying the insulation.

Pros and cons of the solution:

So far, the solutions have worked for three (mild) winters (2015-2018). Long term behaviour remains to be seen. However, based on the experience from the test apartments, the municipality wants to apply internal insulation in the whole dwelling, consisting of 932 apartments (not decided yet). As the system is glued directly to the existing wall it is not easily removable and inspection of conditions behind the insulation is only possible by means of sensors installed together with the insulation.

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

Hourly based measurements (RH, temperature) from test apartments since autumn 2015.

Is there any related publication? If yes, please provide any available link or document for further reading

[https://www.hiberatlas.com/smarteredit/projects/205/Renovation with Internal Insulation and Heat Recovery in Real Lif.pdf](https://www.hiberatlas.com/smarteredit/projects/205/Renovation%20with%20Internal%20Insulation%20and%20Heat%20Recovery%20in%20Real%20Life.pdf)

Paper: Renovation with Internal Insulation and Heat Recovery in Real Life – Energy Savings and Risk of Mold Growth

[https://www.hiberatlas.com/smarteredit/projects/205/Energy savings and risk of mold growth in apartments renovated with internal insulation.pdf](https://www.hiberatlas.com/smarteredit/projects/205/Energy%20savings%20and%20risk%20of%20mold%20growth%20in%20apartments%20renovated%20with%20internal%20insulation.pdf)

Paper: Energy savings and risk of mold growth in apartments renovated with internal insulation