



Mariahilferstrasse

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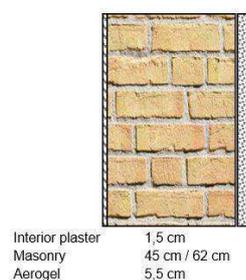
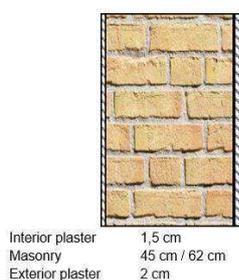
Aerogel high-performance insulating plaster system

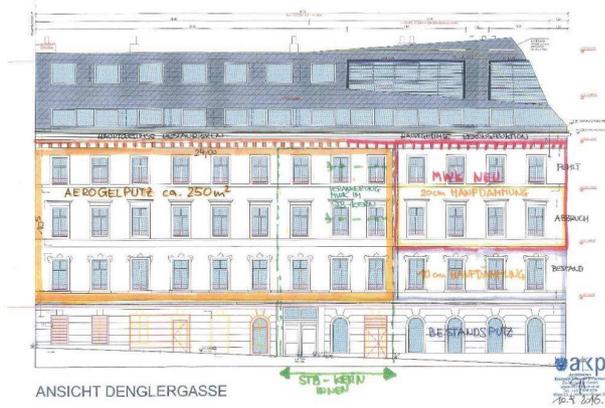
Walls

What is the solution?

In listed buildings, insulation on the inside is often not possible or desired for technical or organizational reasons and also entails system-related disadvantages compared to insulation installed on the outside. In this project, the application of the aerogel high-performance insulating plaster system on the existing masonry was carried out for the first time on a structured facade and in close cooperation between architects, plaster manufacturer and executing company. A layer thickness of around 5.5 cm was applied to approx. 205 m² of facade area. For this purpose, the old plaster first had to be chipped off and the pre-spray work carried out before the aerogel plaster was applied by machine and in a single operation. After completion of the draught parts, cornices etc. (also with aerogel plaster), the coating was applied.

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





Plan with view from Denglergasse showing the part of the façade, which was insulated with the aerogel high-performance insulating plaster “AEROGELPUTZ” (Trimmel Wall Architekten ZTGmbH)



Damaged façade, © Trimmel Wall Architekten ZTGmbH



Application of the aerogel plaster, © Trimmel Wall Architekten ZTGmbH



Wooden frame as an indicator for the plaster thickness, © Trimmel Wall Architekten ZTGmbH



Impressions from the work on the aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



Impressions from the work on the aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



Impressions from the work on the aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



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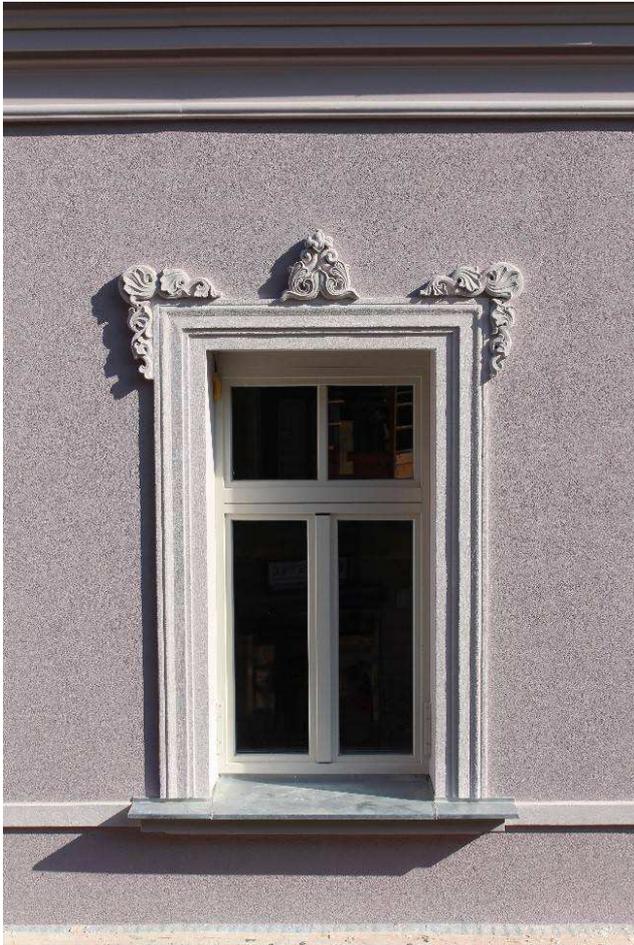
Impressions from the work on the aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



Impressions from the work on the aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



Impressions from completed aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH



Impressions from completed aerosol insulated façade, © Trimmel Wall Architekten ZTGmbH

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

The aerogel high-performance insulating plaster is mineral and open to diffusion, making it suitable for exterior use. Aerogels are solids of amorphous silica, highly porous with an air content of over 90 percent by volume. The air-filled pores are only a few nanometers in size, which means that the resistance to the transfer of heat (energy) is very high. The high standards of an energy-efficient building were met, even though the measured heat transfer coefficient does not fully correspond to the calculated values. A supplementary evaluation by means of long-term monitoring will be carried out during the first years of operation. From a heritage point of view, the visible result is the successful renovation of a historic building in which it was possible to create the external appearance in such a way that there is no difference between the old building and the reconstruction.

Description of the context:

Vienna has a total of almost 35,000 buildings constructed before 1919. About half of this building stock is characterized by articulated facades worthy of preservation. In order to protect urban ensembles from demolition or deformation, there are various protection mechanisms to preserve them in the

sense of the local townscape. In this project the demonstration of the aerogel high-performance insulating plaster system took place in the course of the reconstruction and revitalization of a building built before 1872, which was severely damaged as a result of a gas explosion in 2014. It was shown in an exemplary manner how the adaptation of grown urban structures to the requirements of a modern energy-efficient building stock can succeed. The primary objective was to test the new technology in refurbishment. On the one hand, the technical feasibility and practicality of such a renovation solution was to be demonstrated, and on the other hand, a high visibility and multiplication effect was to be conveyed.

Pros and cons of the solution:

The renovation of buildings with historic structures requires innovative concepts in order to meet both design requirements and technical and economic considerations. The Aerogel high-performance insulating plaster system provides a new alternative for the application area of renovation of old buildings with facades worthy of preservation. Aerogel plaster is an option that is available on the market and has been tested in projects to achieve the balancing act between preserving the external appearance and simultaneously meeting energy efficiency standards and is therefore particularly suitable for the renovation of historic buildings. As a comparatively new technology, it is all the more crucial to transport the practicality demonstrated in the project to the market. In this project, on the one hand the high structural and design requirements were fully met because all the original proportions of the façade could be retained. On the other hand, heat flow measurements showed that the expected thermal performance was not achieved. The heat transfer coefficients determined from the measurement are significantly higher than the values expected from the building physics calculation. The most probable cause lies in the assumptions underlying the calculation for the thickness of the plaster or the thermal conductivity of the plaster. The following hypotheses can be made for the cause of the deviations: The plaster thickness of the aerogel plaster has a significant influence on the thermal resistance of the entire wall structure due to its low thermal conductivity. Even small deviations in the layer thickness have a significant effect on the results of the U-value calculation. Similarly, the thermal conductivity of the aerogel plaster has a major influence on the resulting U-value. The prize factor for Aerogel high-performance insulating plaster also needs to be taken into account, though this was not a focus of the project.

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

The building is well documented, also regarding heat flow measurements of the facade and an energy consumption and comfort monitoring.

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

https://www.hiberatlas.com/smarteredit/projects/62/akp_MAH182_201704_Aerogel-Hochleistungsdämmputz.pdf

Folder on aerogel high-performance insulating plaster system.

Link to best practice example (Hiberatlas):

<https://www.hiberatlas.com/en/mariahilferstrasse--2-62.html>