

VIP-PROVE

Vacuum insulation for buildings in the practical application

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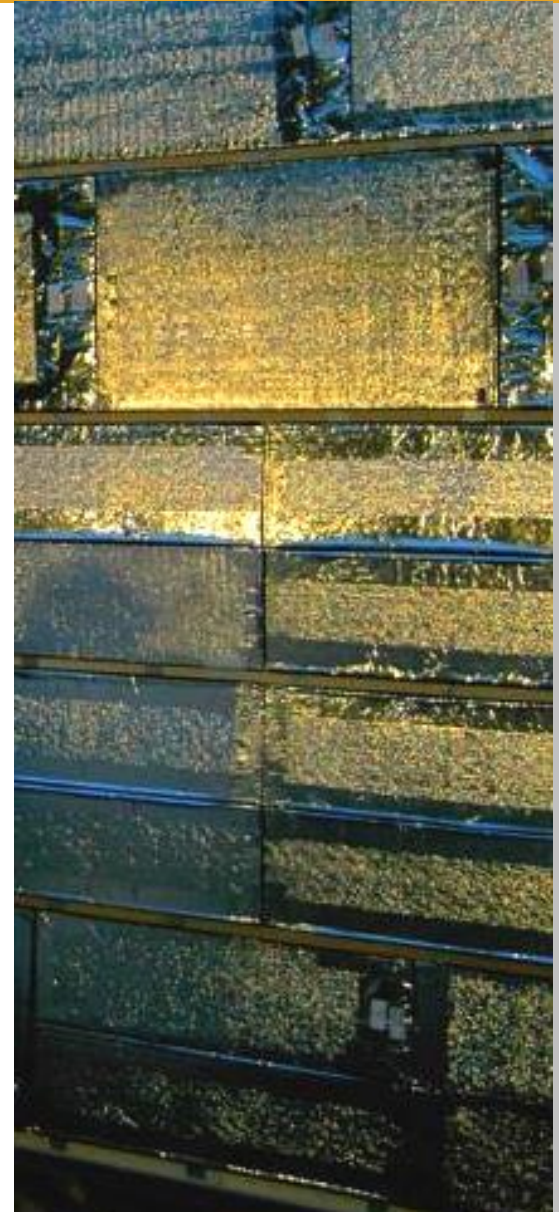
9th International Vacuum Insulation Symposium
17./18. September 2009, London





Outline:

- The project VIP-PROVE
- Objects of a monitoring program
- General findings



Project „VIP-PROVE“

- In the past basic research and first demonstration objects indicated that high performance thermal insulation based on evacuated insulation panels VIP also can be applied in buildings.
- A wide use however still is hindered by skepticism on the reliability in practice.
- Thus in order to improve the confidence on this technique in 2007 an accompanying research project was started, supported by the German Federal Ministry of Economics and Technology.

Project „VIP-PROVE“: 3 tasks

- Public relations, independent and neutral information, communication.
- Transfer of know how and experiences from the R&D into the education and advanced training.
- Monitoring:
The name of this project ‘VIP-PROVE’ indicates the intention: by describing, checking and monitoring of buildings, where vacuum insulation panels have been applied to, it should be shown that this technique is used in practice in a variety of application areas and that it is working quite well.

Scientific monitoring

24 objects:

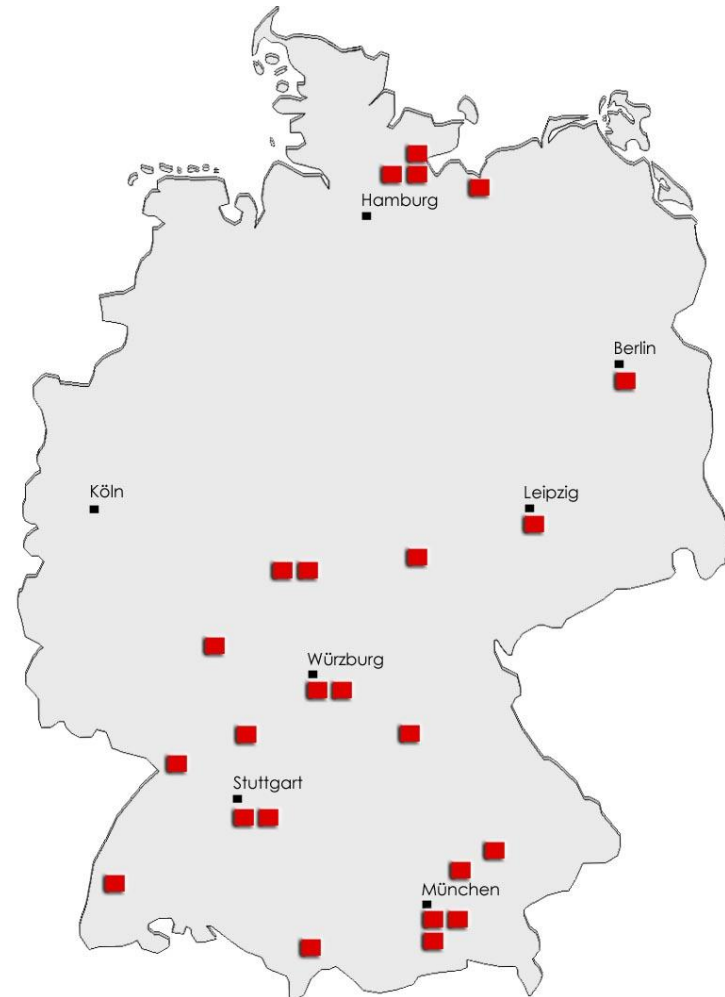
- 14 reconstruction
- 10 new buildings

Applications:

- walls (external, internal, core)
- floors
- ceilings
- roofs
- doors

VIP-manufacturers:

- lambdasave GmbH
- Porextherm GmbH
- Vaku-Isotherm GmbH
- Variotec GmbH & Co. KG
- va-Q-tec AG



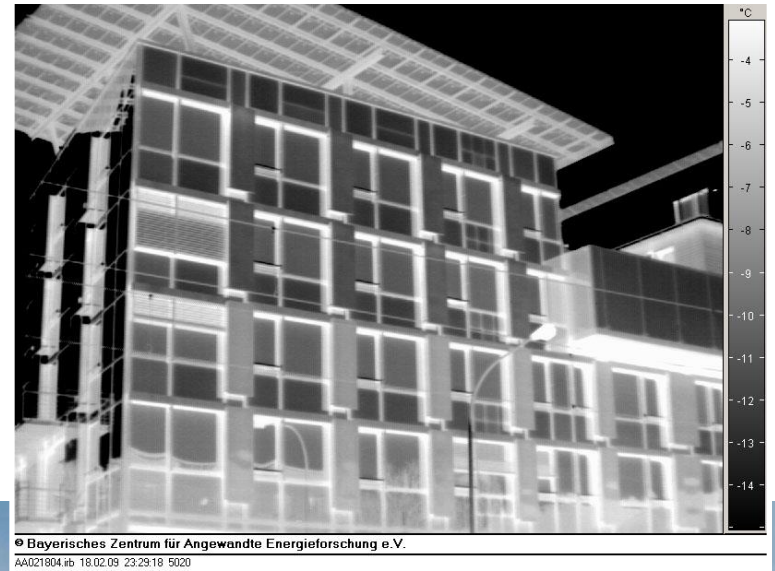


Objects in the monitoring program

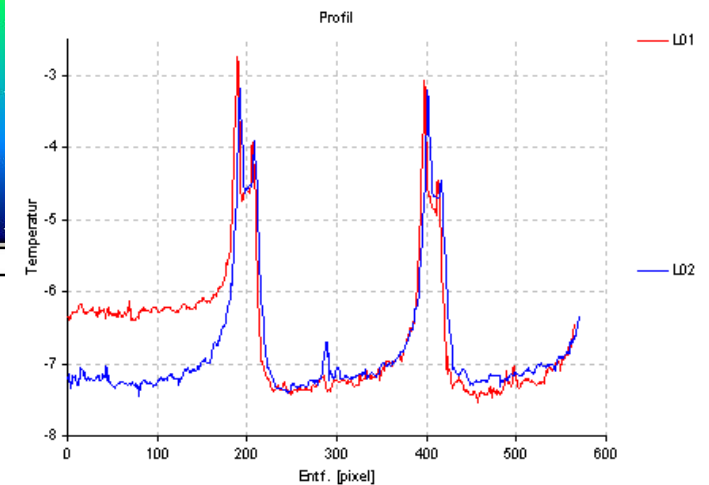
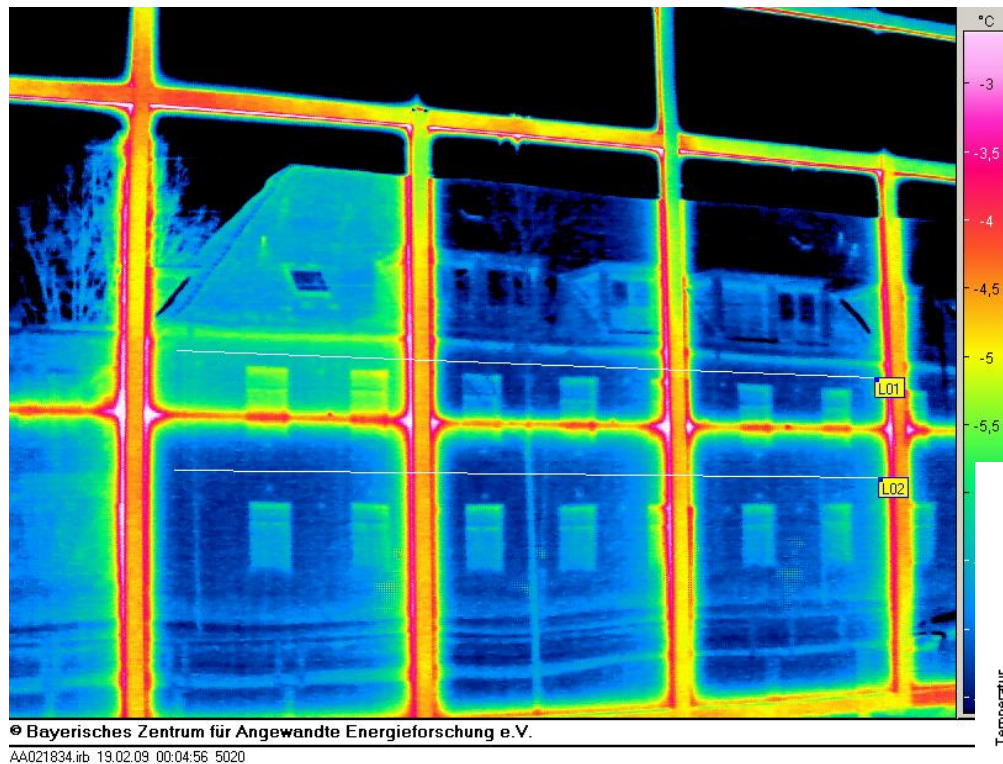


New Building - prefabricated cladding elements

VIP are covered by
external glass and
interior metal
sheets

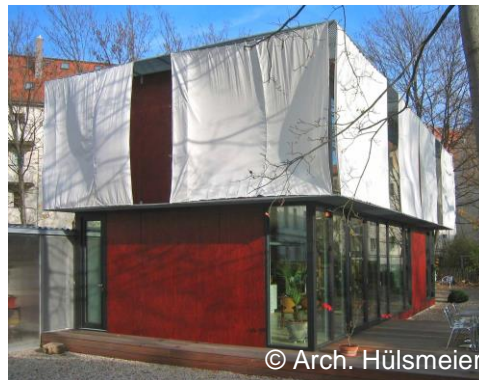


Main tool for the analysis: IR - thermal imaging



New Building - prefabricated sandwich elements

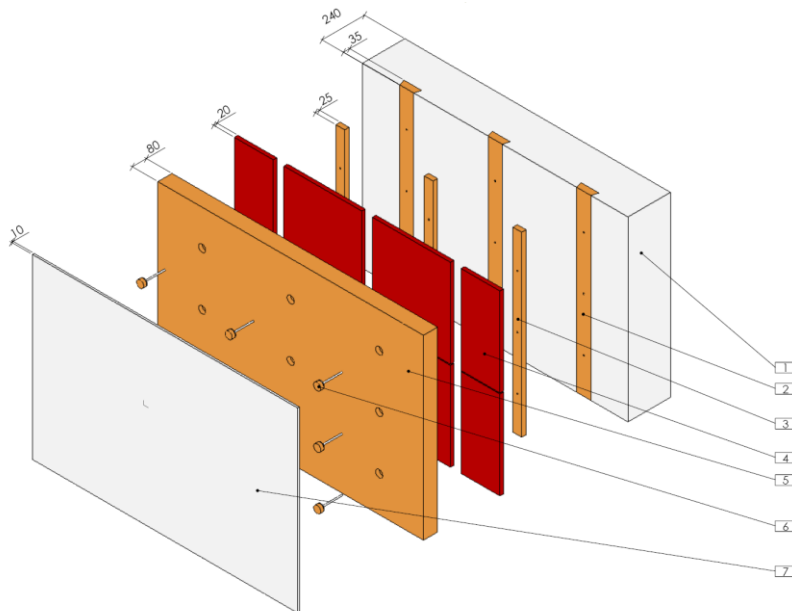
Roof- or wall
elements with wood,
concrete, metal or
glass fibre
reinforced plastics





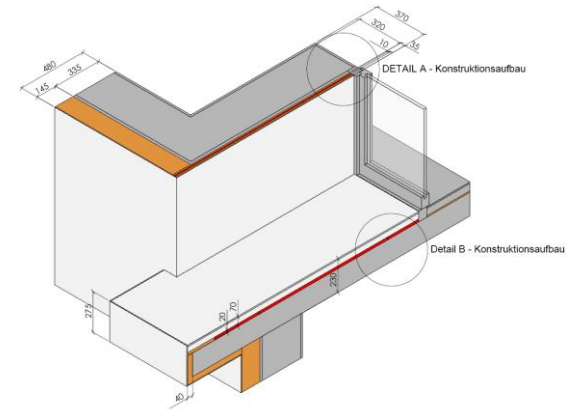
New Building - assembled on-site

- thermal insulation composite system (WDVS)
- curtain-wall facing



Reconstruction - external wall insulation

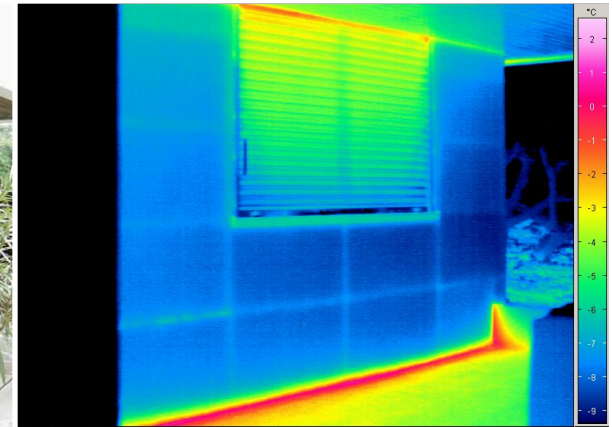
- thermal insulation composite system (WDVS)
- curtain-wall facing



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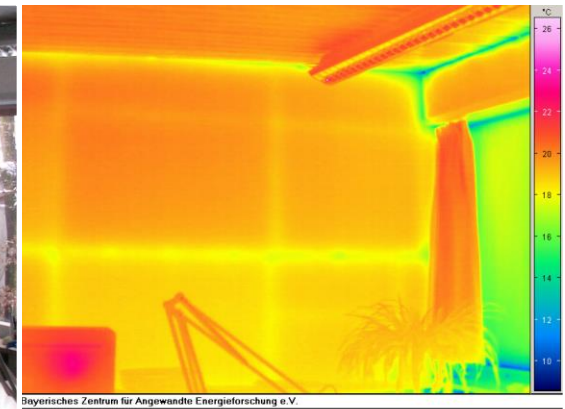
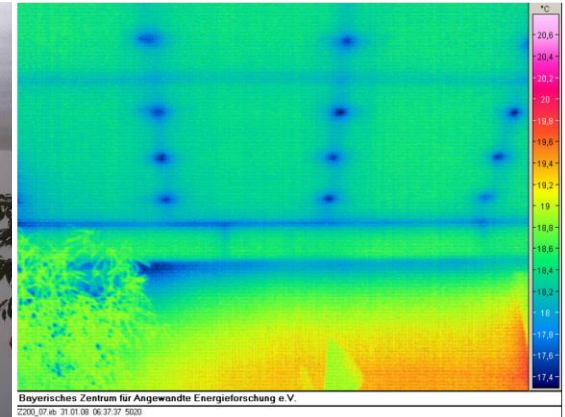
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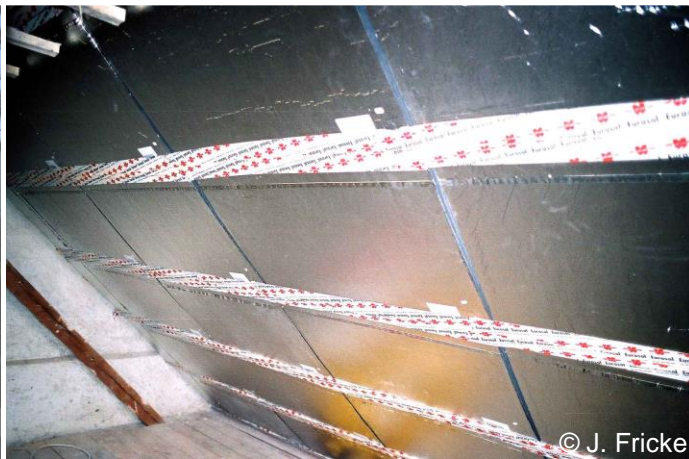
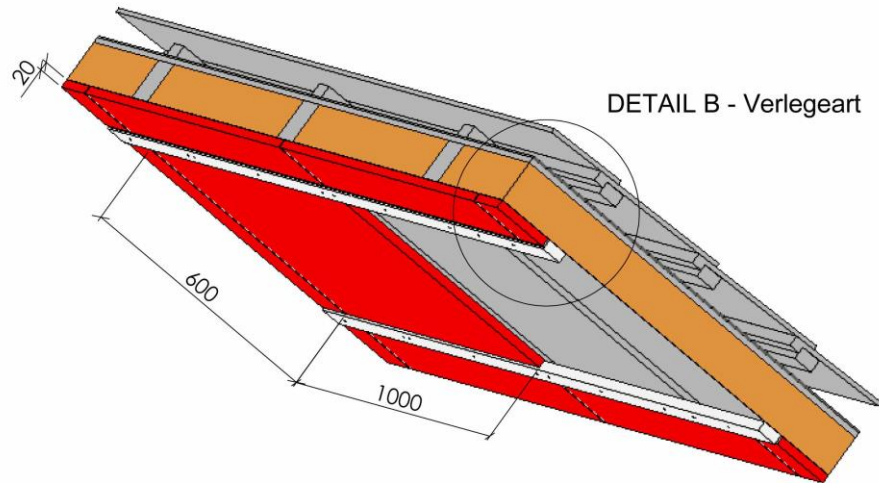
Reconstruction - internal wall insulation

- Prefabricated elements, VIP with or without lamination



Reconstruction - roof insulation

- VIP insulation under the rafters
- for insulation above rafters see the Solar Decathlon 2007 contribution of the TU-Darmstadt/Germany

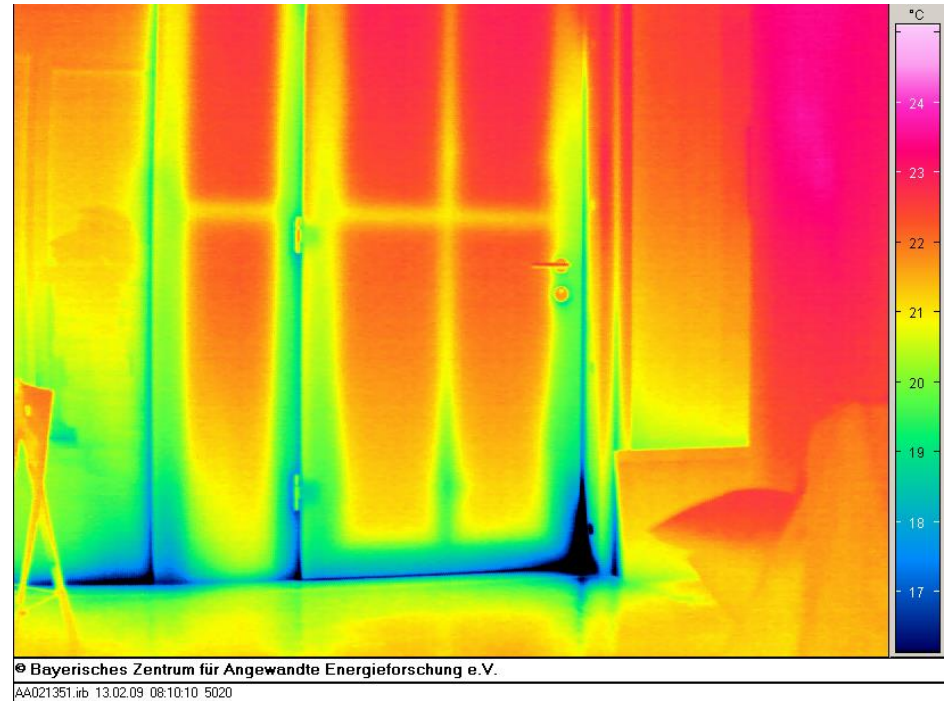


Reconstruction - floor insulation

- inside and outside application of VIP in floor insulation
- VIP with or without of lamination



Door insulation – interior room thermography



Detached house with office in Stuttgart

status: new building

year of construction: 2007 / 2008

heating demand: $< 15 \text{ kWh} / \text{m}^2$

application: over rafter insulation

VIP - surface: 10 m^2



Summary experimental findings I: analysis of **all objects (17)**

VIP area summed up: 4635 m²

VIP area investigated: 3622 m²

VIP area analyzed: 3231 m²

Surface temperature above upper limit of expected value:
268 m² = 8.3%.

Surface temperature below upper limit of expected value,
however conspicuous in comparison to adjacent panels:
139 m² = 4.3%.

Summary experimental findings I:

analysis of **all objects (17)** **three objects excluded**

VIP area summed up: 4635 m² → 3070 m²

VIP area investigated: 3622 m² → 2141 m²

VIP area analyzed: 3231 m² → 1806 m²

Surface temperature above upper limit of expected value:

268 m² = 8.3% → 21.2 m² = 1.2%.

Surface temperature below upper limit of expected value,
however conspicuous in comparison to adjacent panels:

139 m² = 4.3% → 45.7 m² = 2.5%.



Summary experimental findings II:

Up to now **no degradation** could be detected
(even for panels nearly 9 years in use).

→ Most critical point of the application of VIP in buildings
seems to be the **installation** on-site. Once installed VIP-
performance seems to be very reliable.

Mechanically more robust panels and well trained planners and craftsmen
are the key for even more reliable VIP-applications in buildings.

Thank you for your attention !

For more information see www.vip-bau.de !

Gefördert durch das



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