

## 7<sup>th</sup> International Vacuum Insulation Symposium

- Applications of Vacuum Insulation for Buildings
  - IEA Annex 39 Subtask B

Gregor Steinke  
Institute of Energy  
University of Applied Sciences  
FHBB  
Basel / Switzerland

Content:

IEA / ECBCS Annex 39  
Subtask B

Key aspects  
Applications of VIP in Buildings

Application examples

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## HiPTI – High Performance Thermal Insulation

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IEA / ECBCS Annex 39 – Subtask B

International research team

Sweden, Netherlands, Germany, Switzerland (lead)

Final report published September 2005:

Vacuum Insulation in the Building Sector

Systems and Applications

Practice-report (20 built examples), properties of VIP, recommendations, economic aspects

Download: <http://www.vip-bau.ch/>

## A challenge for the building sector

- increasing thermal insulation standards for buildings
- required space
- technical aspects
- design aspects



## VIP – the solution?

- thermal conductivity 4-8 times better than conventional insulation
- thin constructions
- space saving
- ...but high costs



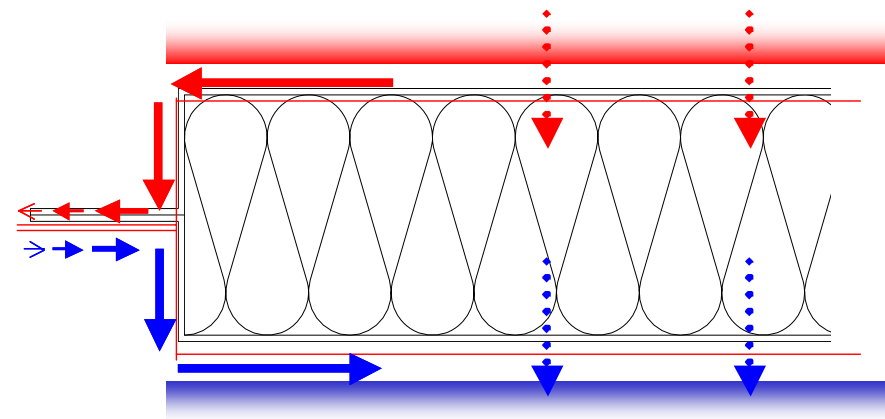
## Key aspects for applications in buildings

- key players  
architects + building owners
- thermal conductivity
- design rules
- reliability and durability
- cost



## VIP- thermal conductivity

- center of a new panel
    - $\lambda_{\text{cop}} = 4\text{-}5 \text{ mW}/(\text{m}\cdot\text{K})$
  - thermal bridge 'edge effect'
    - $\Delta\lambda \approx 1\text{-}2 \text{ mW}/(\text{m}\cdot\text{K})$   
for metalized films
  - influence of adjacent layers
  - ageing (pressure increase)
    - $\Delta\lambda \approx 1\text{-}2 \text{ mW}/(\text{m}\cdot\text{K})$  after 25 yr  
(for a VIP 100 x 50 x 2 cm)
- $\lambda_{\text{eff}} = 6\text{-}8 \text{ mW}/(\text{m}\cdot\text{K})$





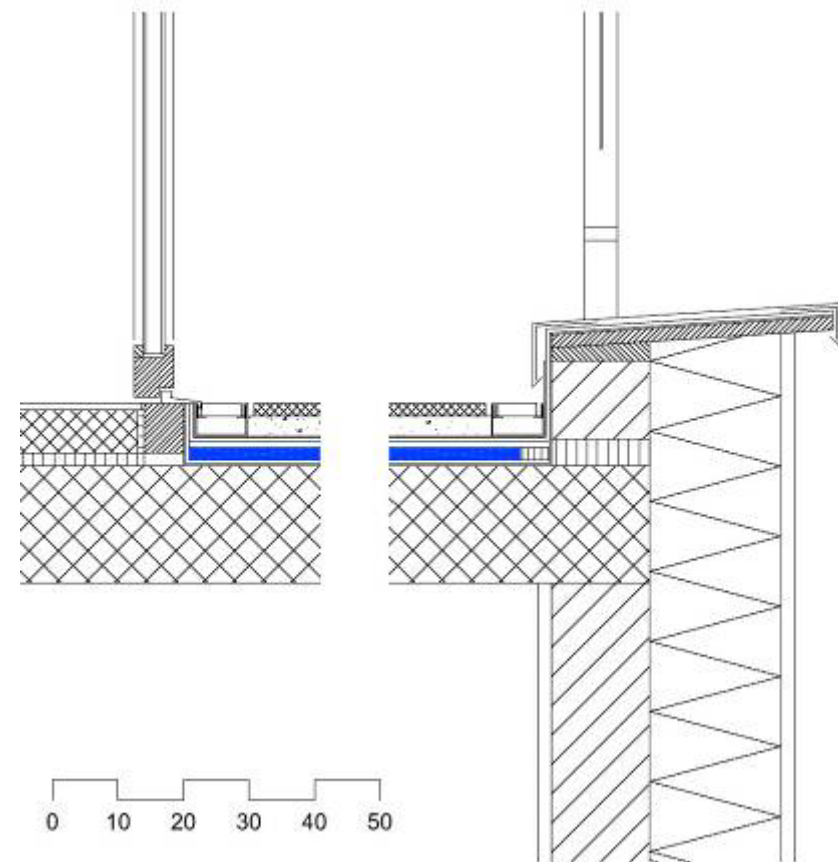
## Design rules and recommendations

- early information of all concerned
  - planning and installation
- ‘edge effect’ → panels as square and large as possible
  - min. 50 x 50 cm
- tolerances in size (+ 2 / -5 mm) and thickness ( $\pm 1$  mm)
- protection from mechanical damage
- vapour-tight insulation system → building physics
- replaceability of VIP / building component
- inspection of correct functioning

## Flat roof terrace with VIP

- commonest use in CH
- avoids high steps between interior and terrace

Multifamily houses in Kerzers / CH  
3-D Architekten





## Flat roof terrace with VIP

- exact laying plan
- protective layer
- dry conditions



## VIP composite system

- 20 mm VIP + 80 mm PU
- apartment and office block in Munich / D  
Architect Martin Pool  
Construction: energie-tib

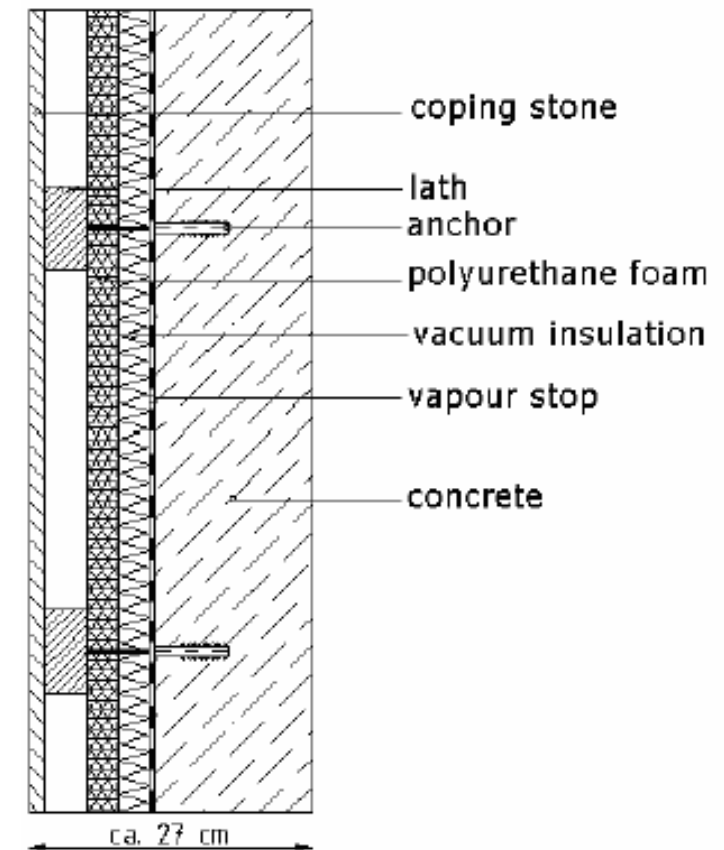


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## Prefabricated concrete elements with VIP

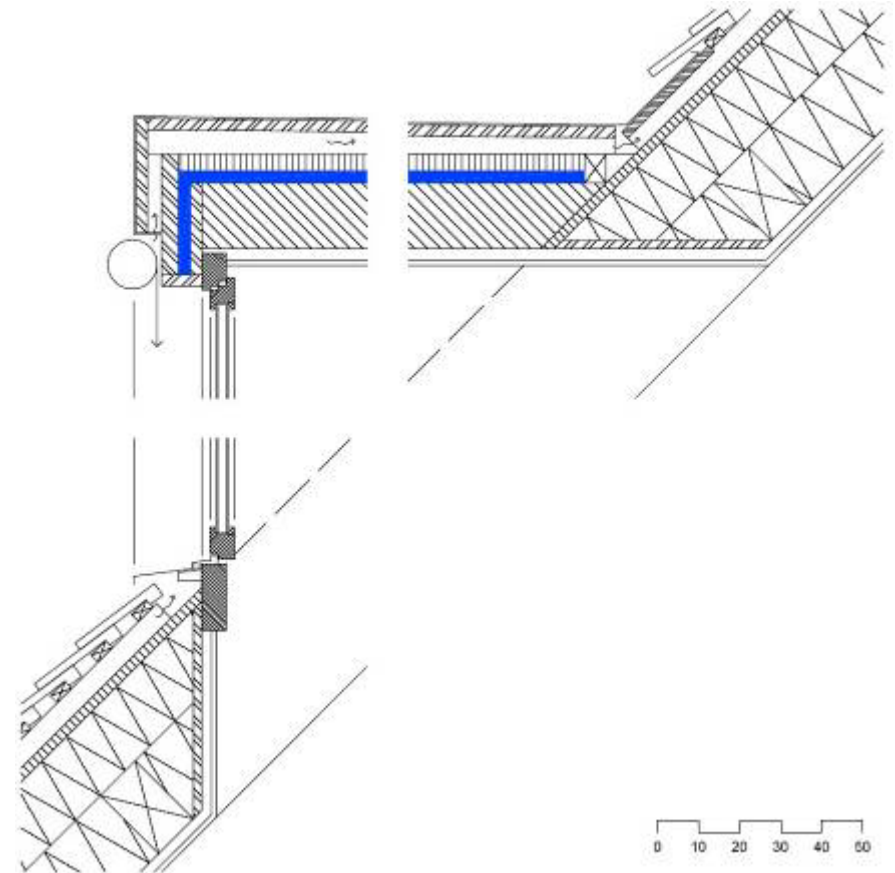
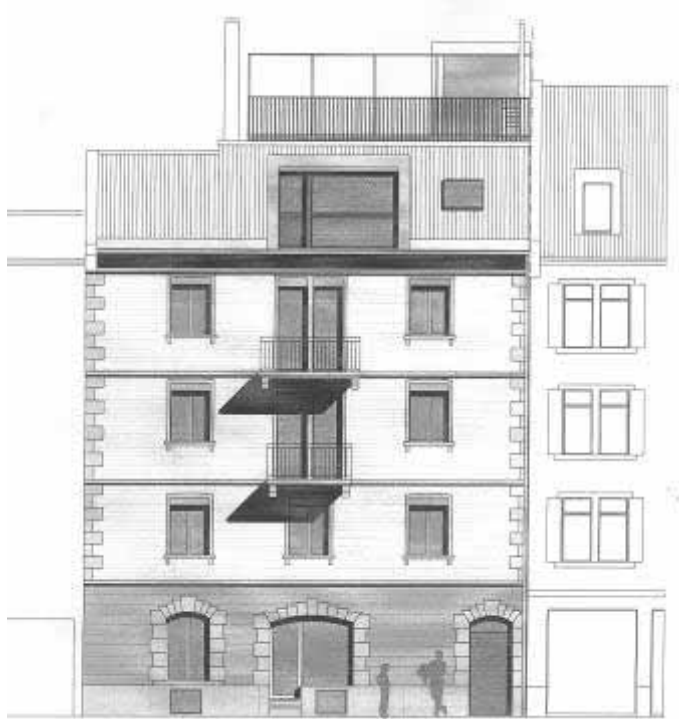
- 30mm VIP + 2 x 20mm PU
- fibre-reinforced anchors
- office building with an apartment in Ravensburg / D  
Architect: weinbrenner.single  
Construction: Hangleiter GmbH & Co KG





## Prefabricated dormer window with VIP

- renovation of an old building in Zurich CH  
Architect: Viridén + Partner AG



## Prefabricated dormer window with VIP

prefabrication and installation of the element



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## Prefabricated dormer window with VIP



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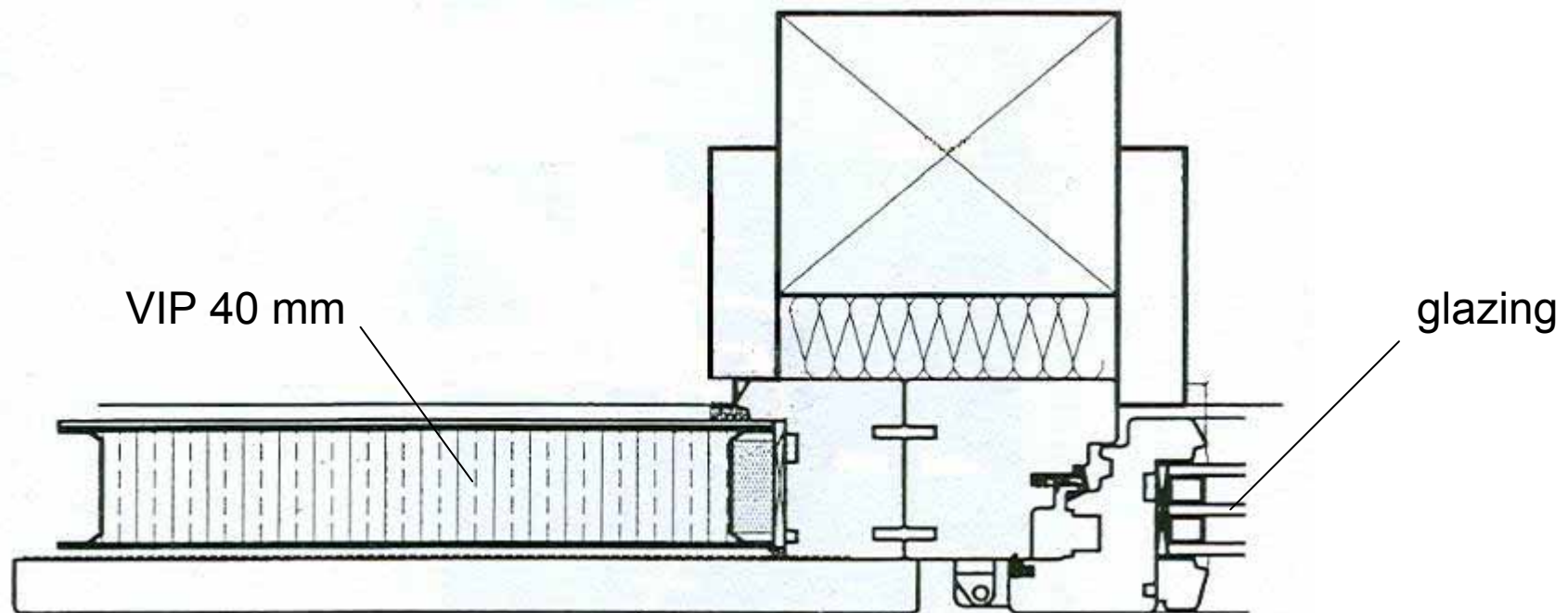
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## Prefabricated vacuum building panels

- 5 terraced houses in Binningen / CH  
Architect: Feiner Pestalozzi / VIP-construction: Häring AG



## Prefabricated vacuum building panels





## Prefabricated vacuum building panels



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Department

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VIP have become a feasible and important means for energy efficient building

Thank you for your attention!