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Biomass façade insulation for existing buildings

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Retrofit of Rotlintstraße 116-128 in Frankfurt, Main, Germany



before retrofit

- ▶ 7 apartment dwellings in 3 blocks of houses
- ▶ After retrofit: 61 apartments with about 3800 m² living area
- ▶ Four to six storeys

Owner: ABG Frankfurt Holding, Frankfurt

Design and construction management: faktor10, Darmstadt

Structural engineering and fire protection: bauart Konstruktions, Lauterbach

Scientific monitoring and energetic assessment: Institut Wohnen und Umwelt (IWU)

Funded by:

and

Measures at the buildings

26 cm insulation under the floor



Mounting the suspension



Hollow space of 26 cm for
cellulose insulation



Heat distribution within the
insulation

New passive house windows



Mounting of the passive house windows in front of the existing walls with a thermal separation out of Purenit



Sealing for airtightness on the existing outer plaster

Measures at the buildings

New attic floor out of wooden light weight constructions



The old roofs were dismantled

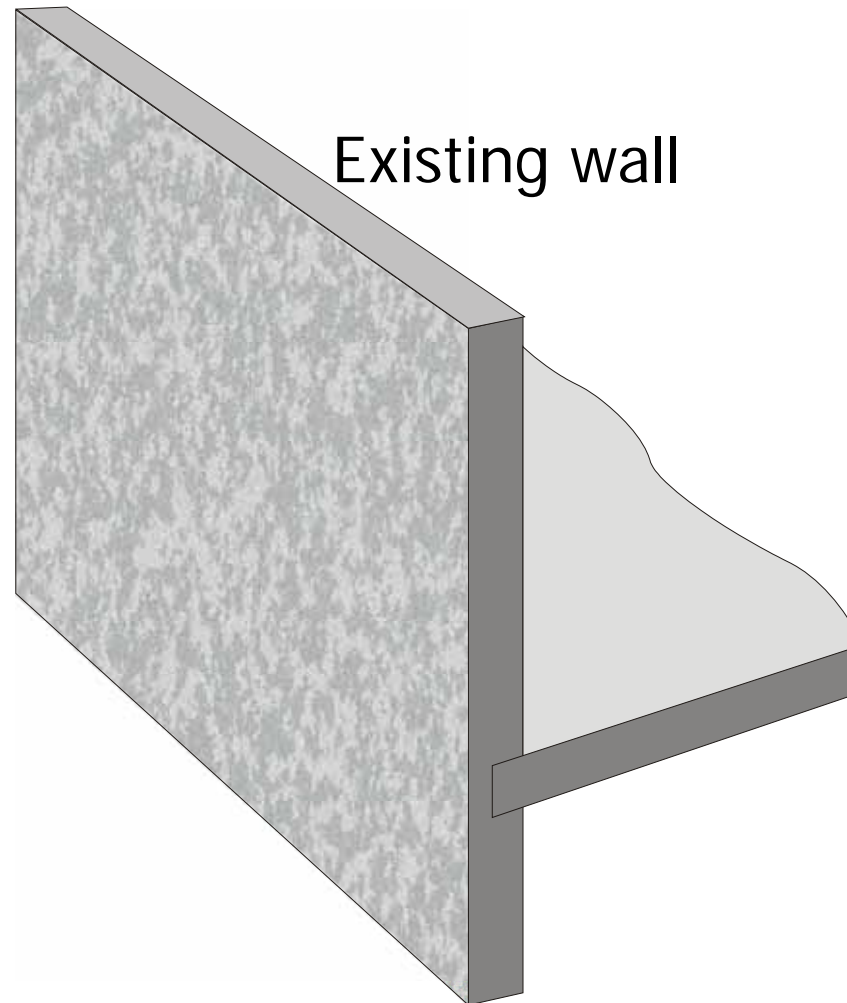


View on the light weight construction before closing and blowing-in the cellulose in the hollow space (40 cm)

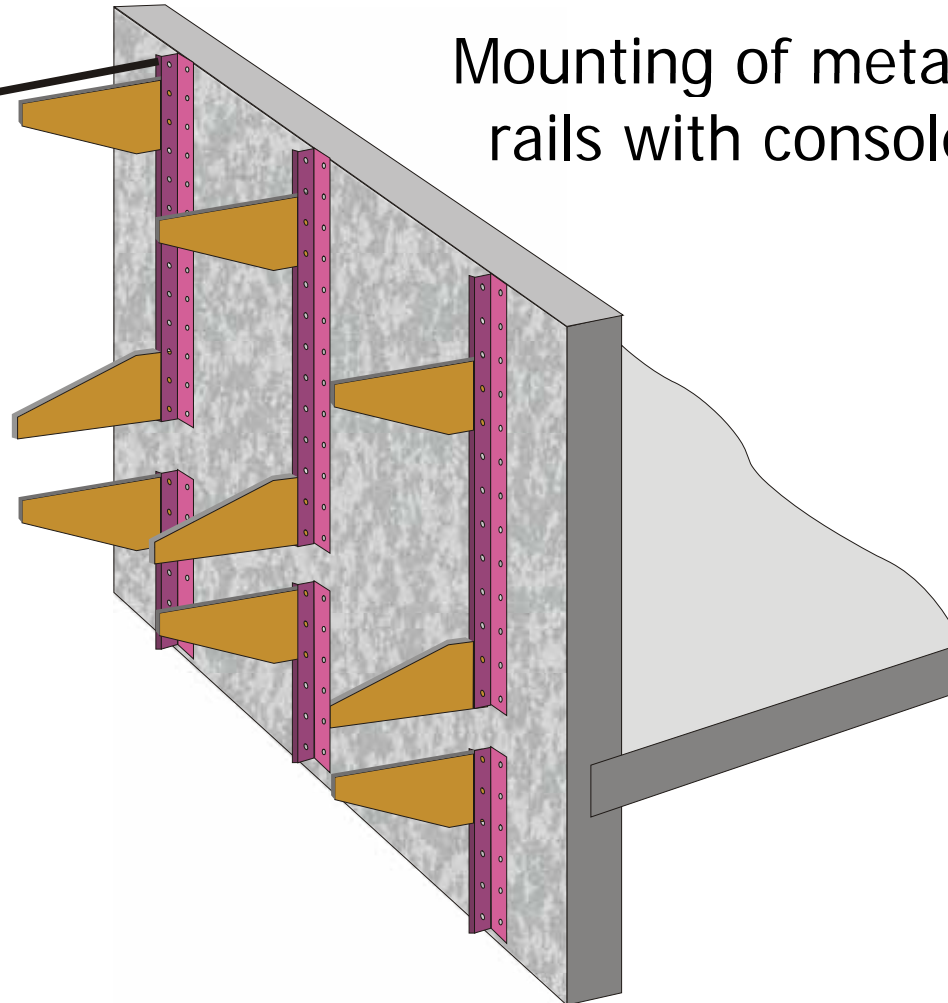
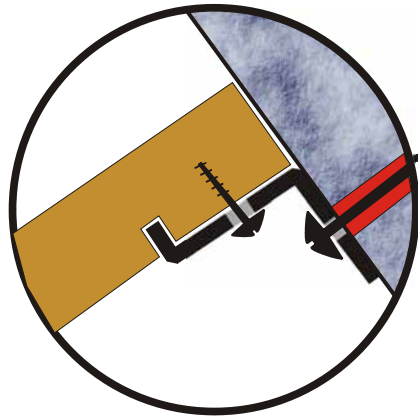


Filling the elements with cellulose

Façade construction principle



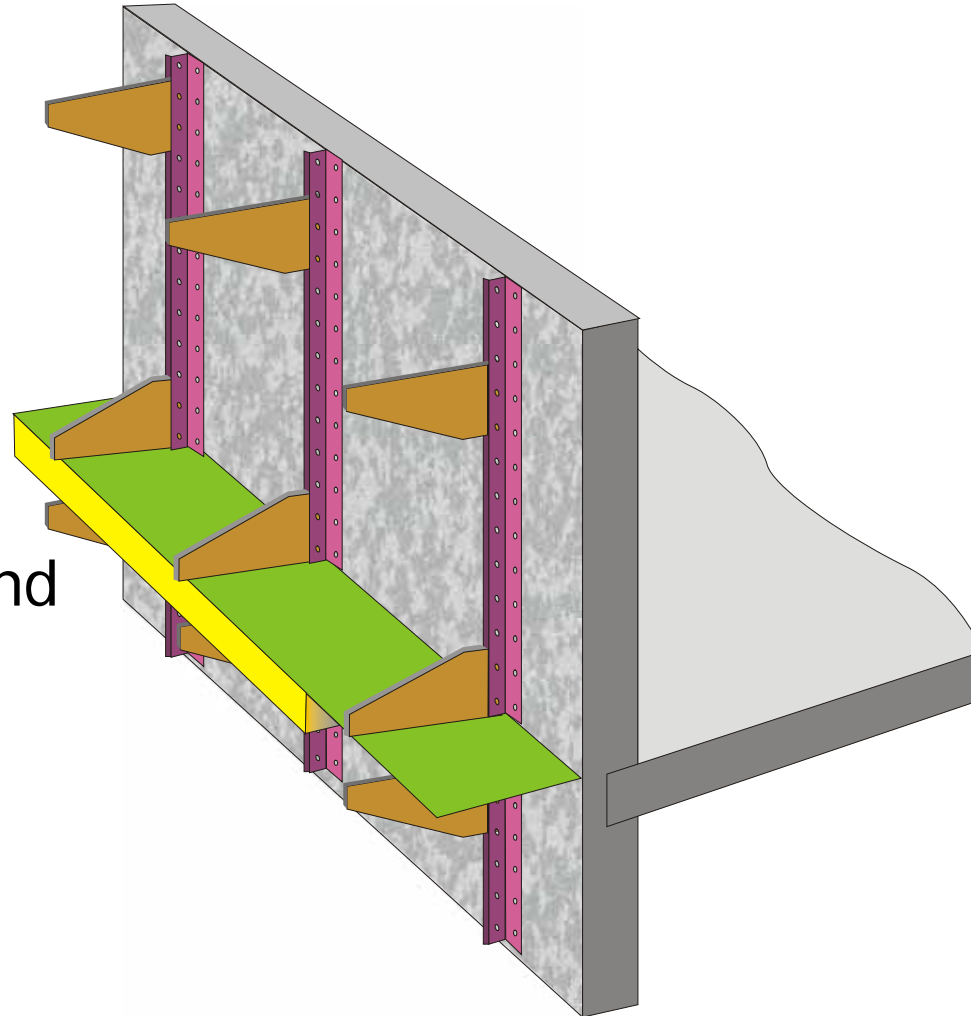
Façade construction principle



Mounting of metal
rails with consoles

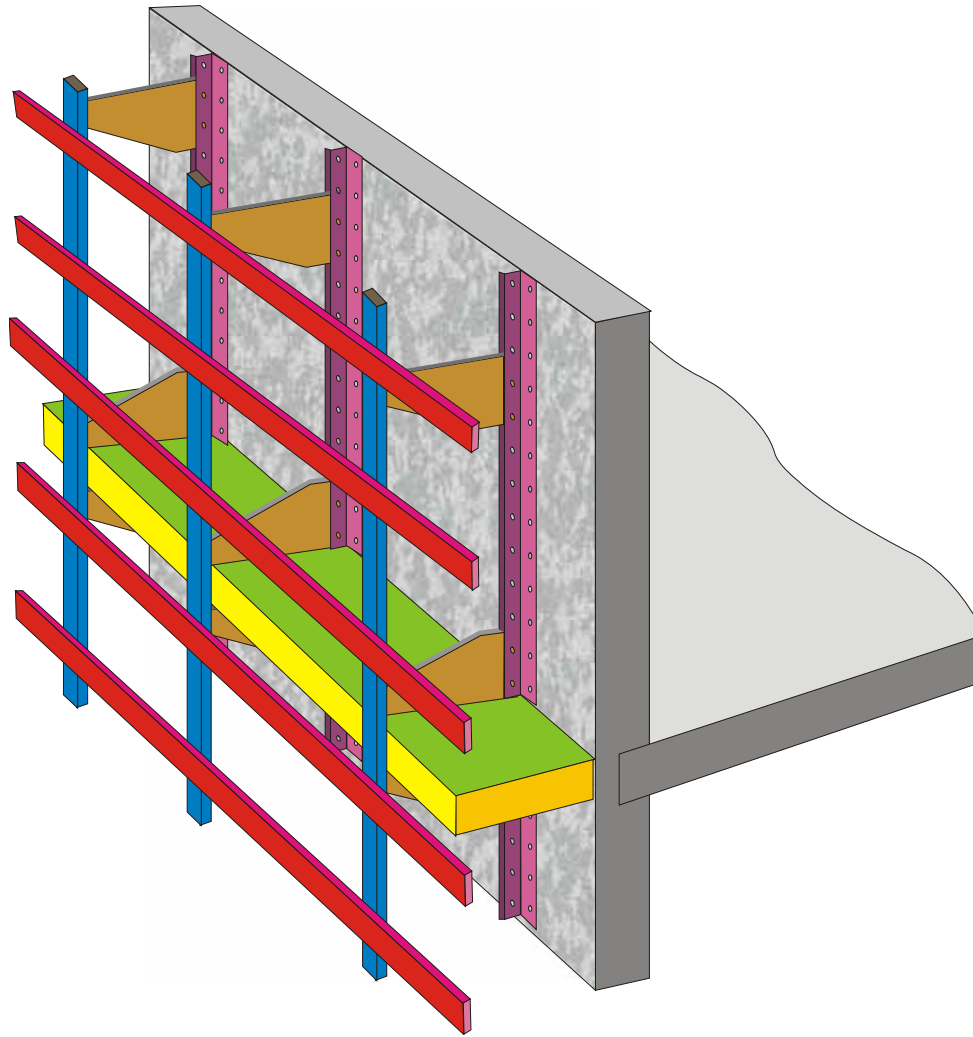
Façade construction principle

Separation of the
floors with fire
protection boards and
fiber insulation



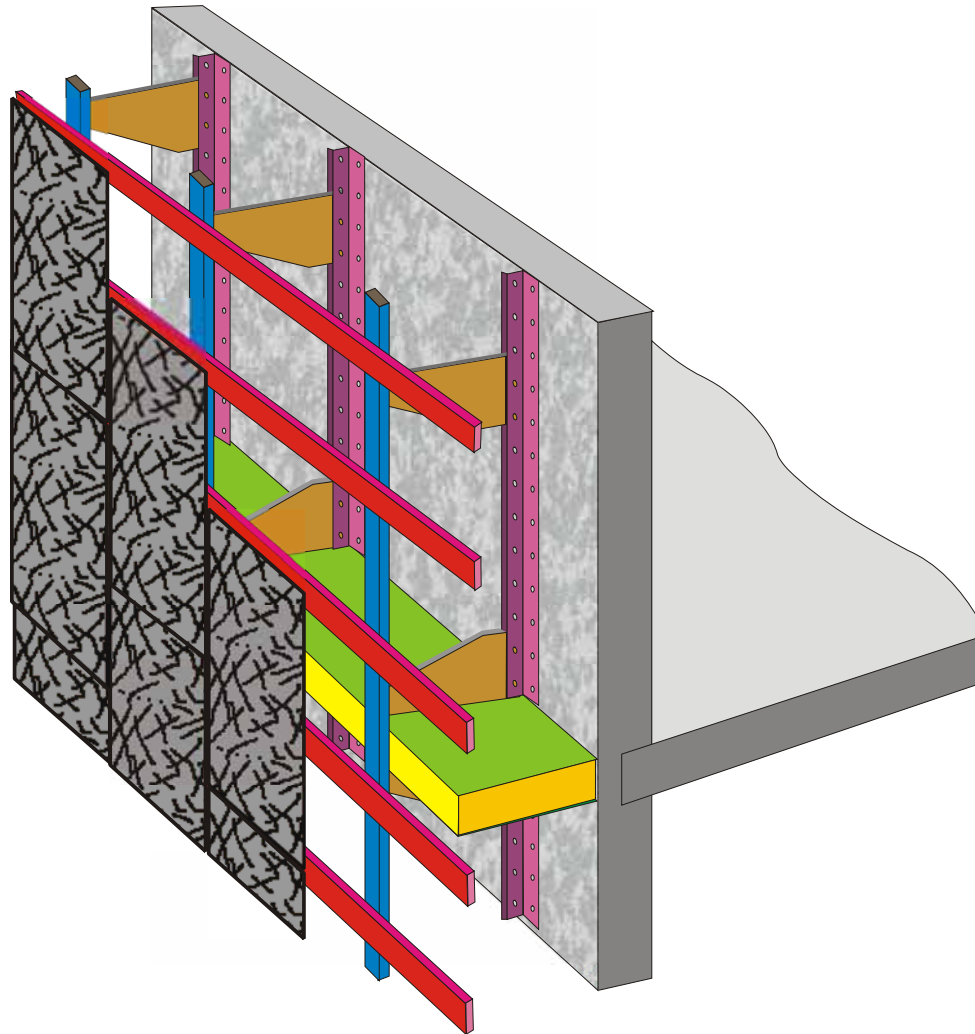
Façade construction principle

Mounting the
substructure of
vertical square
timber and
horizontal planks



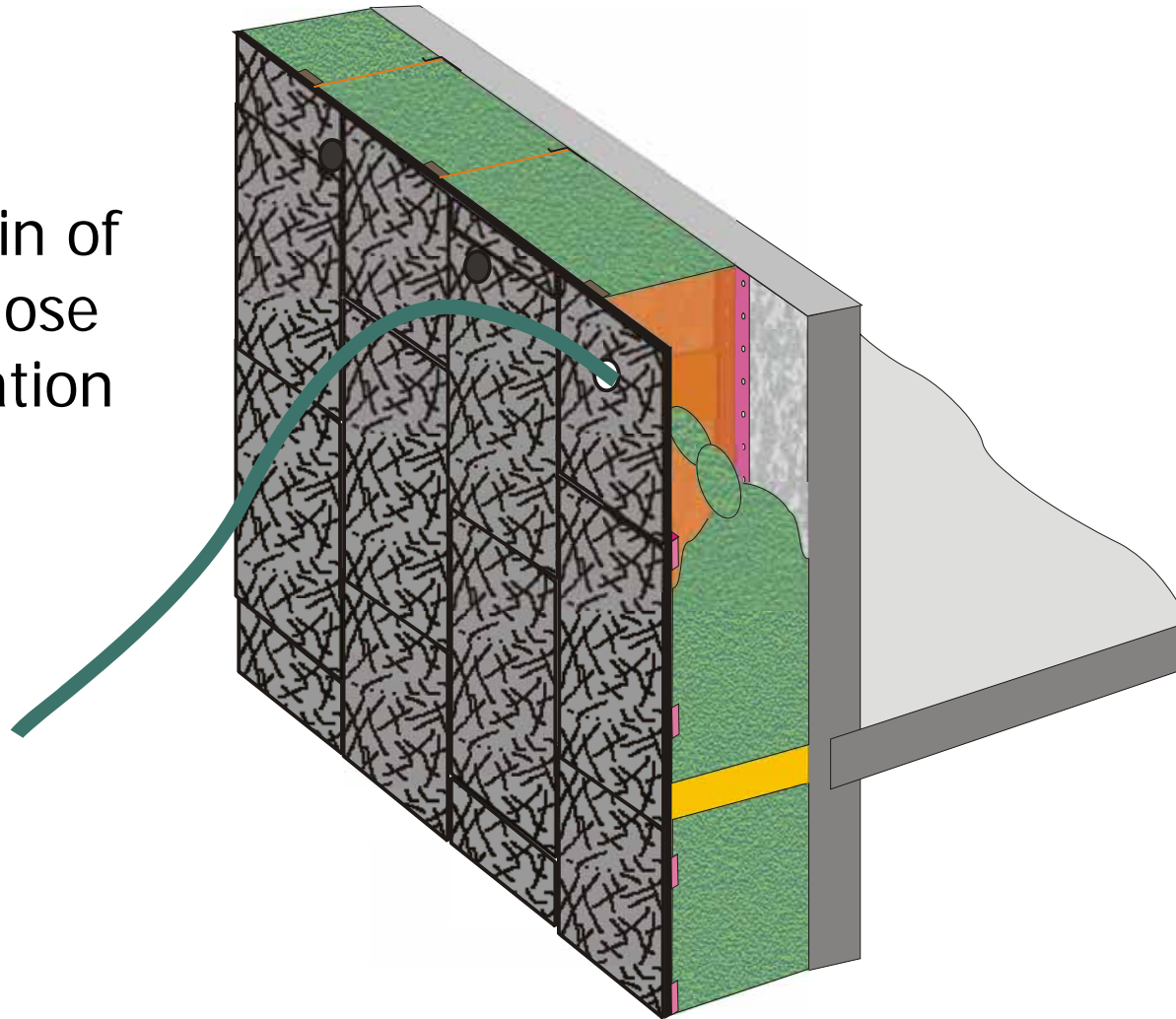
Façade construction principle

Mounting of
wood wool
panels



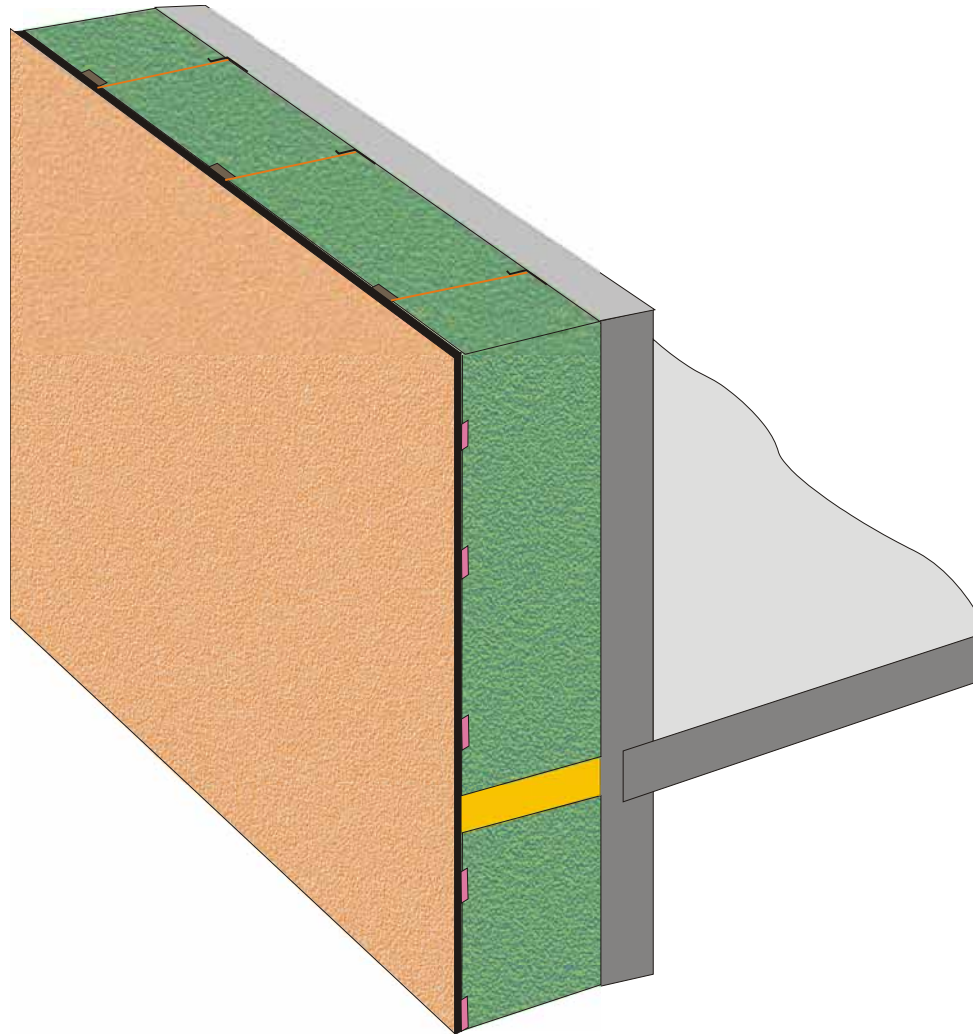
Façade construction principle

Blow-in of
cellulose
insulation



Façade construction principle

Adding plaster on
the outside



Realization of façade construction



Mounting of the metal rails with the consoles (27 cm)

Realization of façade construction



Separation between the floors

wooden planks (2.5 cm)

Realization of façade construction



Mounting a “box” around the window



Fibre insulation of the window frame

Realization of façade construction



Wood wool panels (3.5 cm) as
substructure for plaster



Mounting brackets for the
shading on the insulation

Realization of façade construction



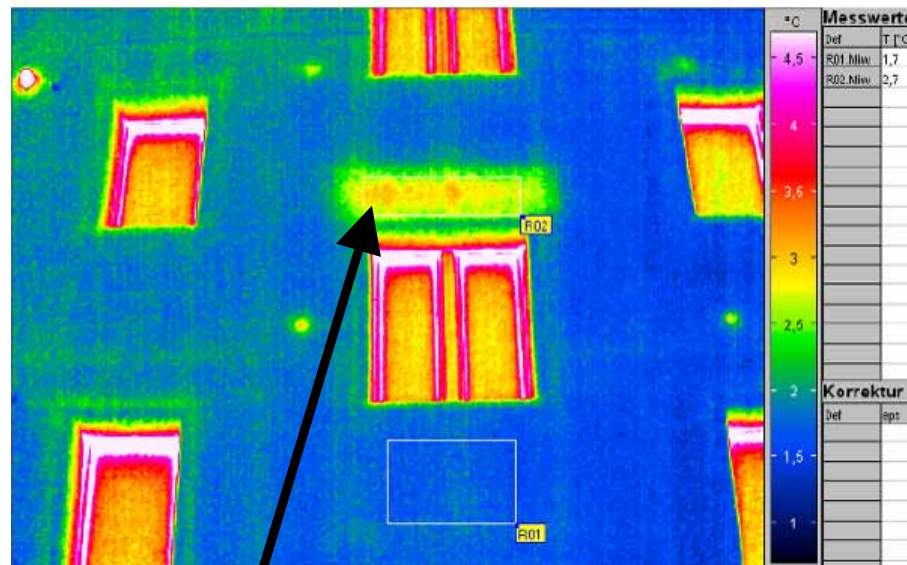
Mounting of balconies

View on the façade before the mounting of the balconies

U-value of the façades: $0.13 \text{ W}/(\text{m}^2\text{K})$

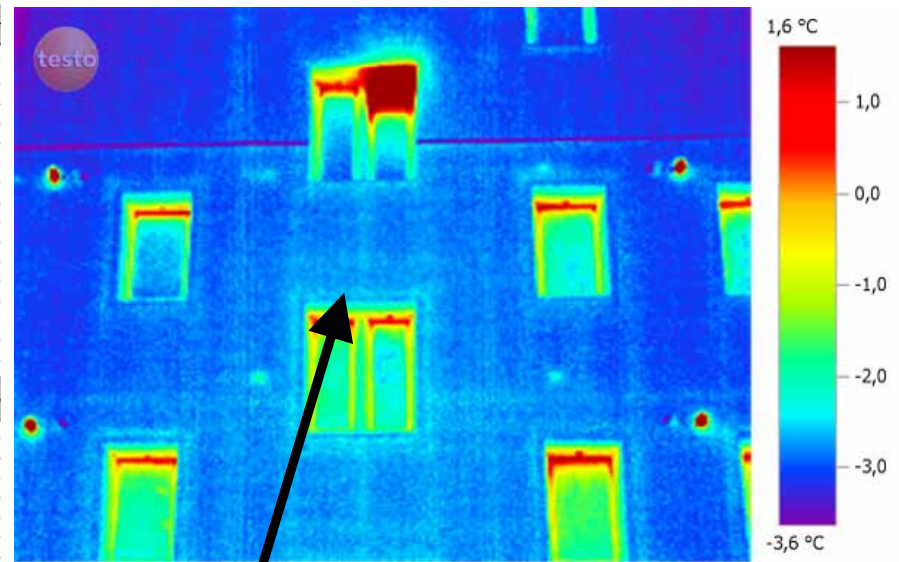
Thickness of total construction: 34 cm

Quality assurance of the façade



Feb 2010

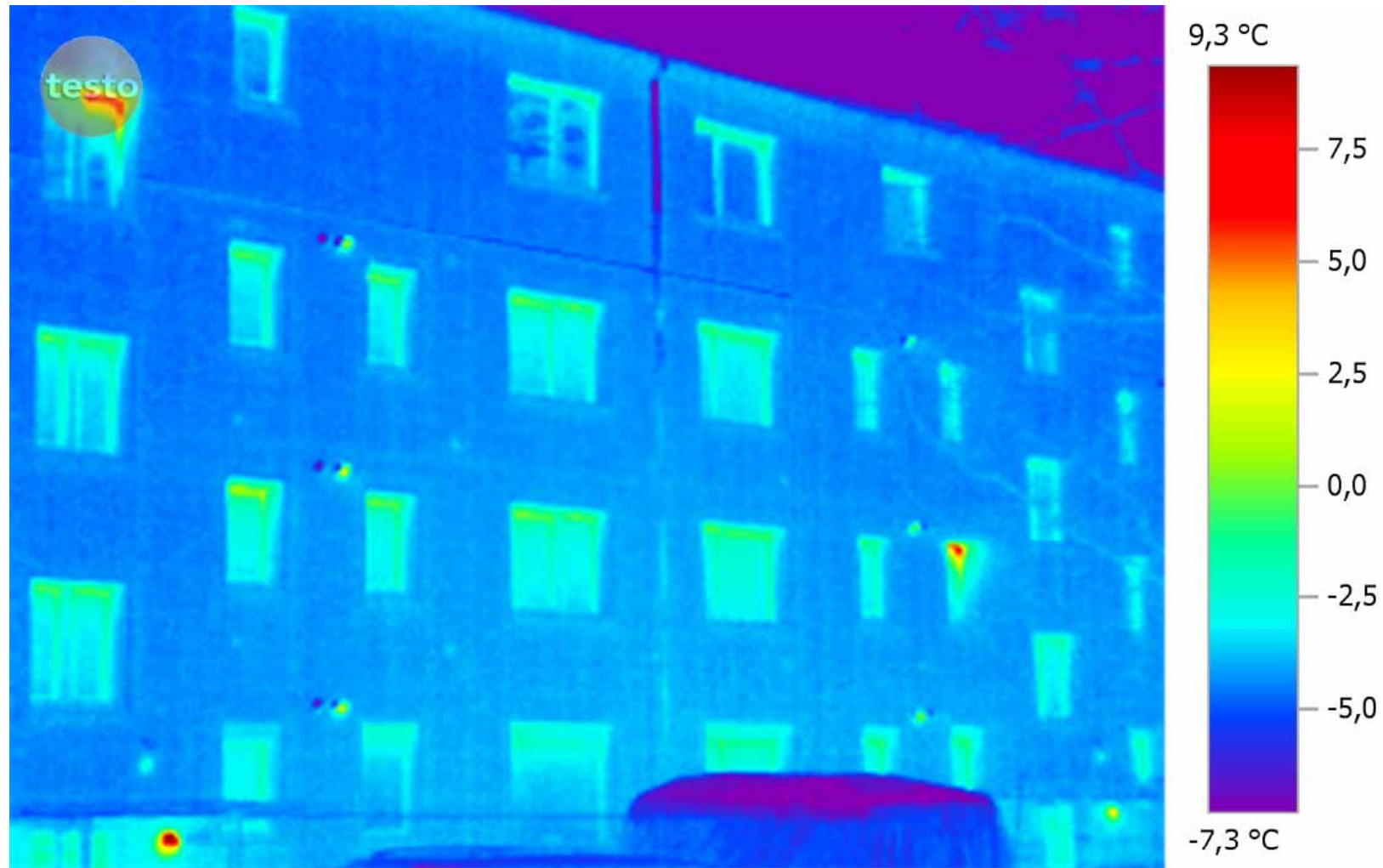
Directly above some windows
some hollow spaces were not
insulated



Jan 2011

After subsequent blow-in of
cellulose through window
reveal

Quality assurance of the façade



Results of the refurbishment

- ▶ 7 dwellings were nearly totally insulated with recycled cellulose in timber constructions
- ▶ The buildings are reaching the demands for passive houses
- ▶ Heat supply to more than 80 % from renewable sources (rapeseed co-generation and thermal solar systems)
- ▶ Zero-Emission for heating, domestic hot water and auxiliary electricity



Thank you for your attention

Further information about the project at www.iwu.de

