



The technology behind INNOVIP – innovations for building envelopes

The evolution of thermal insulation



Straw



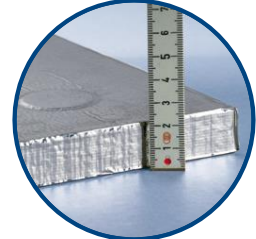
Fur



Fibreglass



Foams



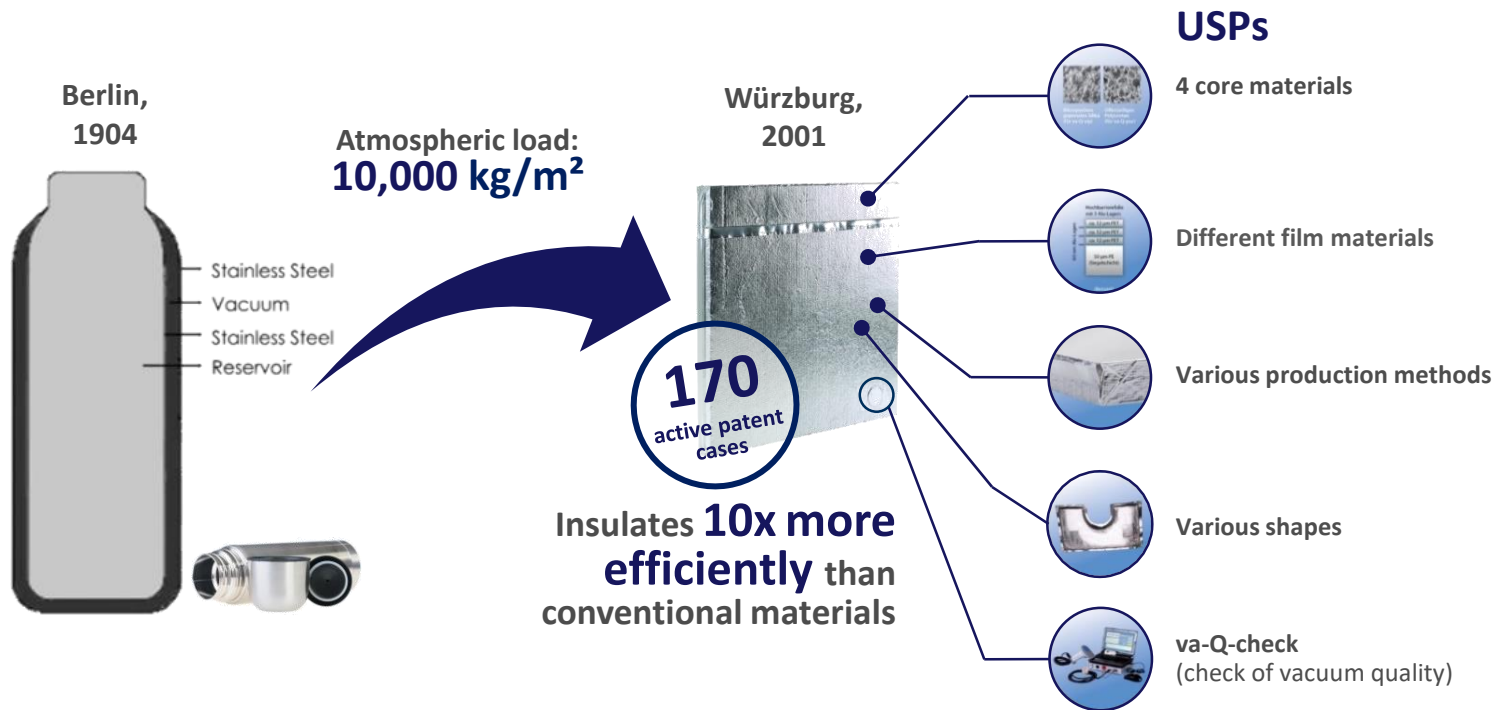
**Vacuum
insulation**

by nature

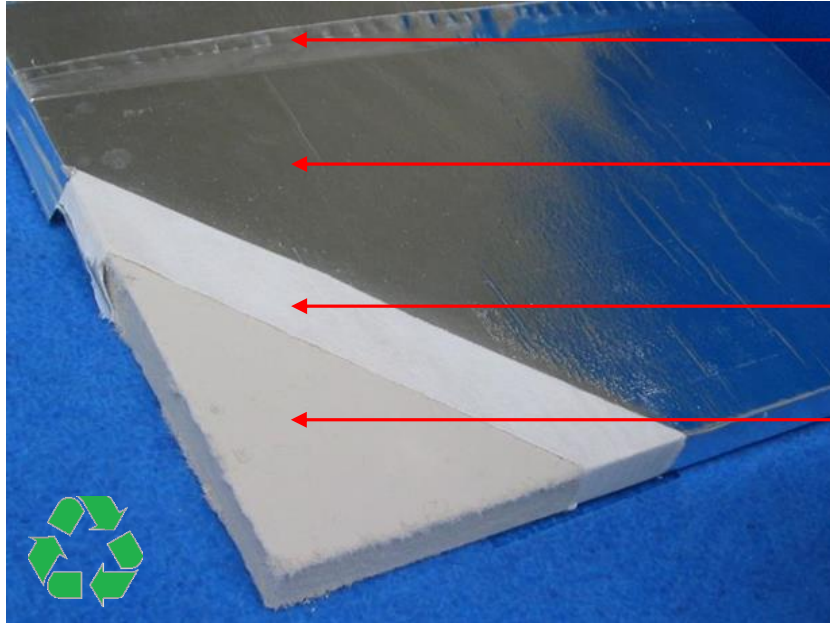
by technology

a 1000 year technology
limited by physics

Pioneering vacuum insulation panels (VIPs)



VIP composition



Sealing

High Barrier Envelope

Fleece for dust protection

Open porous core material

+ Optional cover layers

VIPs unique properties



Material	λ_D W/(m·K)	Required thickness for U-value of 0.28 W/(m²·K)
VIP	0.007	25 mm
Polyurethane	0.028	100 mm
EPS	0.032	115 mm
Mineral Wool	0.040	143 mm

Key figures:

Thermal conductivity measured value:

$\leq 0,0043$ W/(m·K)

Thermal conductivity design value (incl. aging and potential heat bridges):

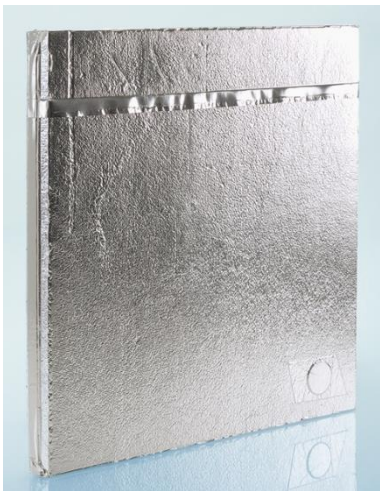
0,0070 W/(m·K)

Thermal conductivity not evacuated:

0,020 W/(m·K)

Silica board technology

$$\lambda = 0.0043 \text{ W/(m}\cdot\text{K)}$$



Silica powder technology

$$\lambda = 0.0035 \text{ W/(m}\cdot\text{K)}$$



Grand Tower Frankfurt



Source: gsp Städtebau für RIVA

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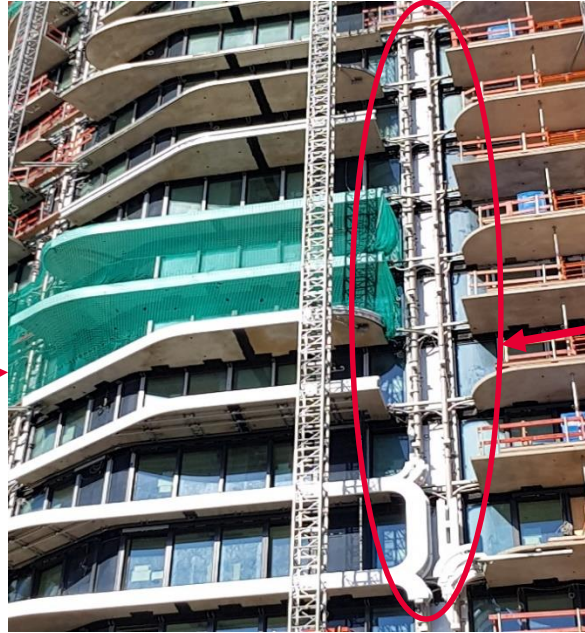


Source: gsp Städtebau für RIVA

Facts

- 172 m & 47 floors
highest residential tower in Germany
- 413 Apartments & penthouses
41 m² - 300 m²
- Construction:
February 2016 – June 2020
- Building Owner: gsp Städtebau GmbH
- Architect: Magnus Kaminiaz & Cie.

Grand Tower Frankfurt



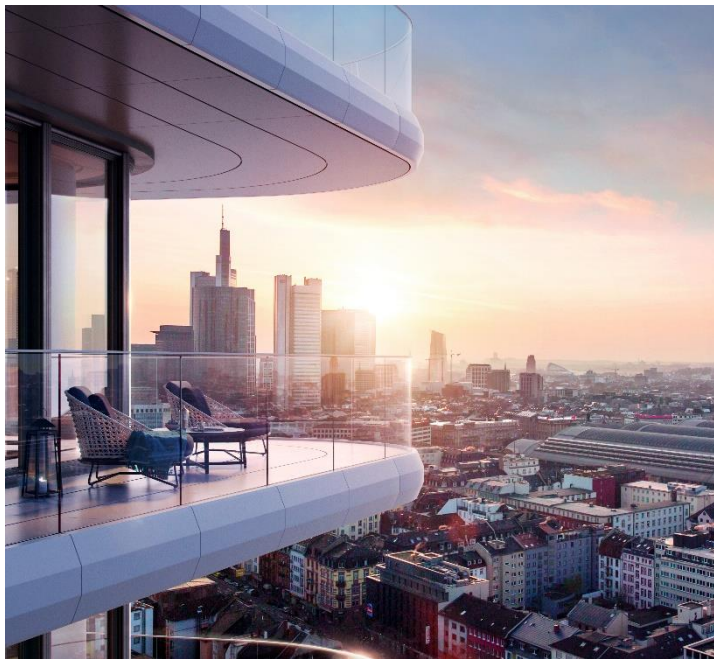
Vacuum
Insulation
Panels
inside

Grand Tower Frankfurt



Vacuum
Insulation
Panels
inside





Source: gsp Städtebau für RIVA

The math:

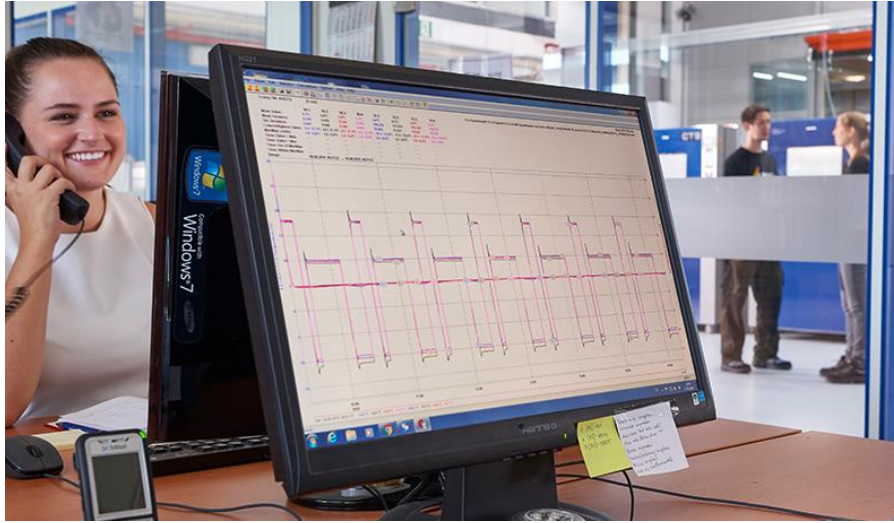
- 3 m² more space per floor
 - 47 floors in the building
 - 141 m² additional space in the building
 - 10.000 € average per m² in the building
 - 300.000 € additional costs for VIP
-
- €€€
 - Alongside high performance insulation!

Building the future – with vacuum insulation

- ✓ High performance insulation material
- ✓ Save valuable space
- ✓ Insulation, when space is limited
- ✓ Longevity
- ✓ Recycleable
- ✓ Harmless to health



Thank you for your attention!



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