


VINNAPAS®

VINNAPAS® | EXTERNAL THERMAL INSULATION COMPOSITE SYSTEM | THERMAL INSULATION RENDER

ENERGY EFFICIENT FACADES IN HOT CLIMATES

LET'S SAVE ENERGY!

The operations of buildings account for 30% of global final energy consumption and 26% of global energy-related emissions.¹ A large part of this is caused by heating and cooling. As global warming increases, the use of air conditioning systems are on the rise, too. This increases energy consumption, which in turn fuels global warming. 

External insulation helps break this vicious cycle by making buildings energy efficient and creating a pleasant indoor climate. External thermal insulation composite systems (ETICS²) and thermal insulation renders/plasters (TIR) are proven solutions for insulating building envelopes.

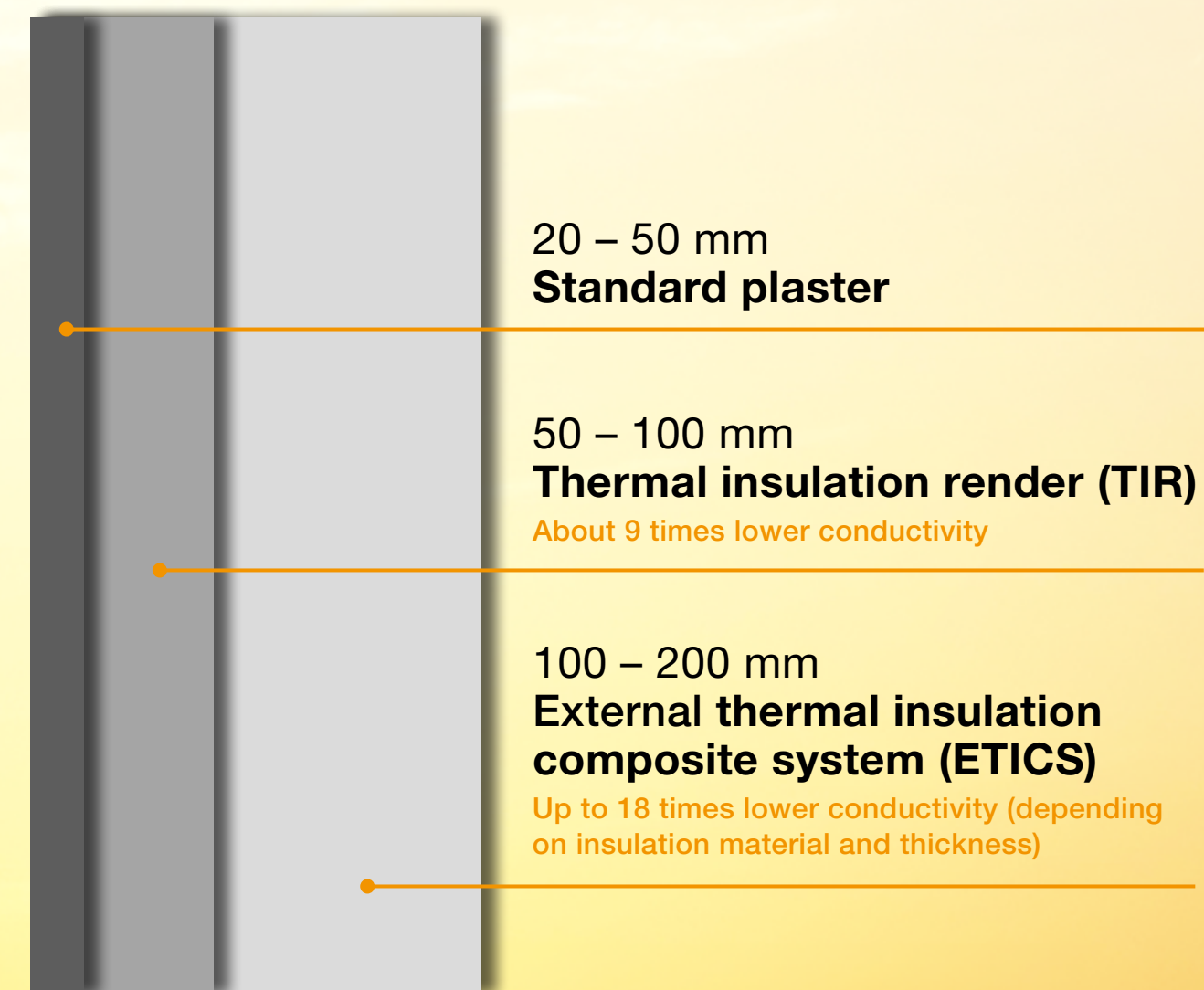
In hot climates, ETICS can save around 59% of the energy needed for cooling. This is the result of WACKER's model house study in Dubai – supervised by Dubai Central Laboratories.

¹ Source: www.iea.org/energy-system/buildings

² ETICS is also called EIFS (Exterior Insulation Finishing System) in some regions

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External Insulation Achieved via ETICS or TIR



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INSULATION MAKES THE DIFFERENCE

Up to 40% of the total heat in a house escapes through the exterior walls, depending on the construction. Exterior wall insulation is considered to be the most effective technology for protecting buildings against continual ambient fluctuations.¹

Insulation with ETICS provides additional benefits:

Environmental Benefits

Over their life cycle, ETICS reduce energy consumption and greenhouse gas emissions far more than is needed for their production, construction and recycling. The carbon payback period of typical ETICS is less than two years.²

Better Indoor Climate

We spend over 90% of our lives inside buildings. ETICS reduces the impact of summer heat waves.

Noise Reduction

ETICS reduces the noise transmission from outside that is caused by traffic, etc.

Value Upgrade

Energy-inefficient buildings suffer from decreasing value. ETICS preserves and can even increase the properties' value. Additionally, as ETICS are applied on the outside, they do not reduce the usable and rentable floor space.

Durability

ETICS have demonstrated their robustness and durability in practice. When installed and maintained correctly, their life cycle is anticipated to match that of the building. ETICS-on-ETICS application makes it possible to upgrade previously insulated facades to meet the needs of the future.

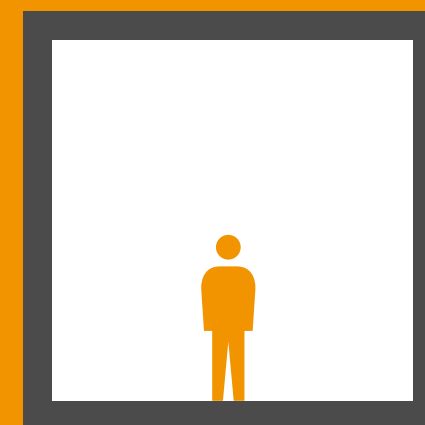
Better Building Physics

ETICS provide continuous insulation of external walls, avoiding thermal bridges.

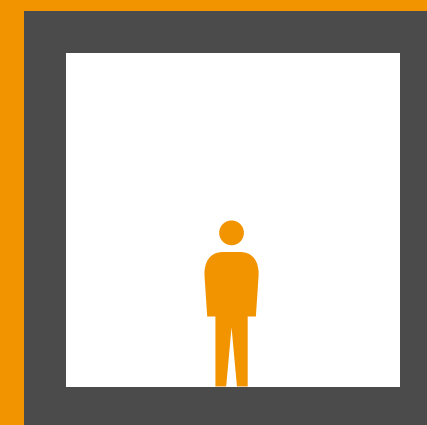
¹ www.mdpi.com/2673-7264/3/1/3 ² www.ea-etics.com/etics/benefits/

Insulation Effect of Different Building Materials

Minimum thickness needed for a U-value of $\leq 0.24 \text{ W/m}^2\text{K}$



ETICS w EPS
($\lambda 0.032$)
Thickness needed:
13 cm



Insulation render
($\lambda 0.077$)
Thickness needed:
31 cm



AAC Block
($\lambda 0.145$)
Thickness needed:
58 cm



Brick wall
($\lambda 0.4$)
Thickness needed:
160 cm



Concrete wall
($\lambda 2.0$)
Thickness needed:
800 cm

Thermal Imaging of an Inside View for an Uninsulated (Top) and an ETICS-Insulated (Bottom) Building



■ cool ■ warm

Concrete frame constructions create thermal bridges, which allow high temperatures to heat up the interior space. These thermal bridges can only be avoided with a continuous insulation system like ETICS.



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ETICS: SYSTEM AND ROLE OF VINNAPAS®

Adhesive

The insulation must be attached to the exterior wall. A polymer-modified, cementitious dry-mix mortar is used for this purpose.

Insulation Board

The most commonly used material for thermal insulation panels is expanded polystyrene or mineral wool. Other suitable materials include phenolic resin or natural materials like hemp or cork.

Base Coat

To enhance the impact resistance of the system, a polymer-modified base coat in which the fiber mesh is embedded is applied on top of the panel. The polymer ensures secure adhesion, improves mechanical stability and protects against the elements.

Fiber Mesh

An alkali-resistant glass-fiber mesh is embedded into the mortar. It provides high tensile strength and thus helps increase the mechanical stability of the system.

Water-Vapor Barrier

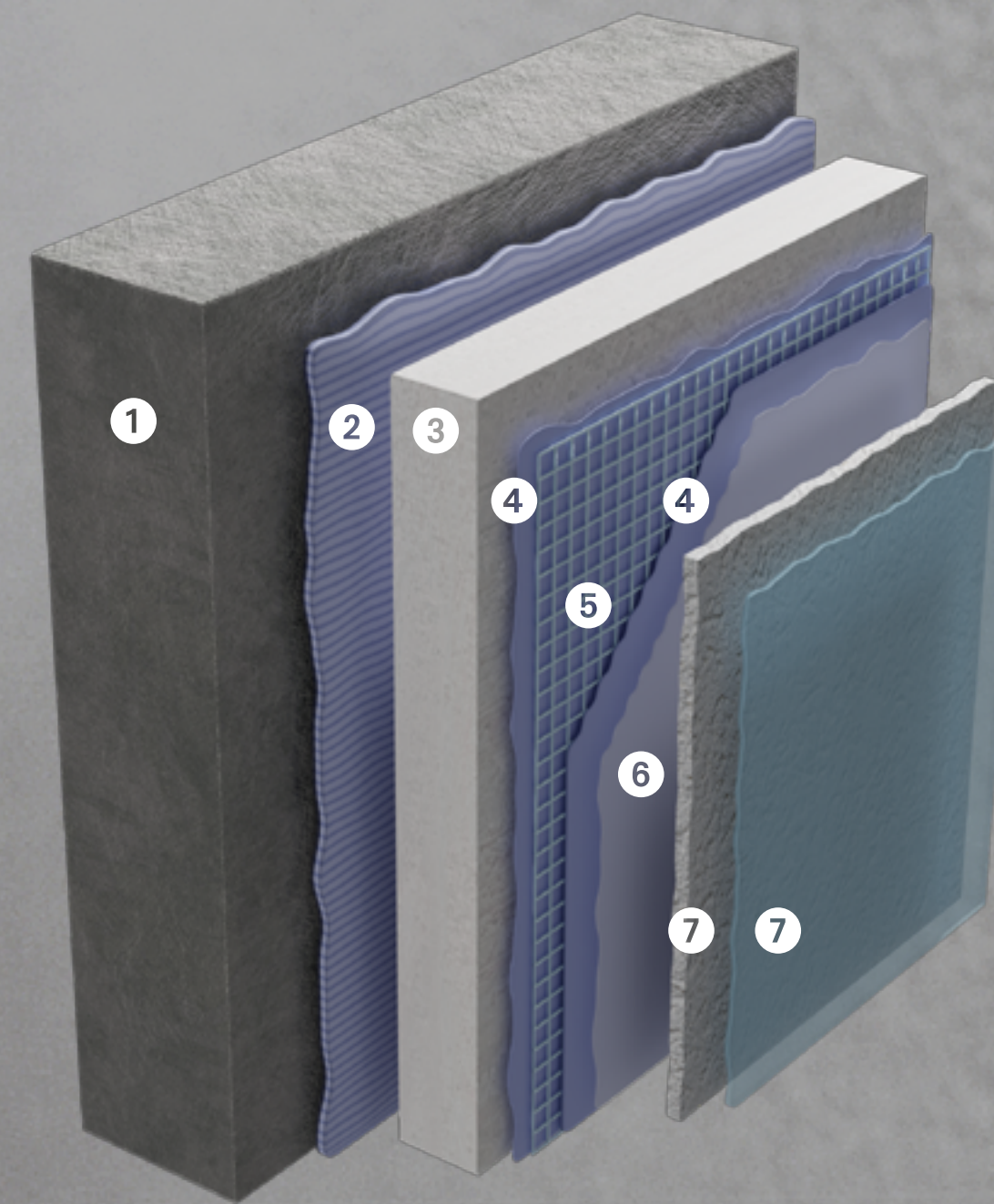
To prevent moisture from penetrating the system, the use of a primer may be recommended as a water vapor barrier on top of the base coat. This helps prevent water absorption.

Render and/or Top Coat

Several options are available for the final layer. One solution could be a cementitious render in combination with a paint finish.

Additional Mechanical Fastening

Anchors may provide additional mechanical fastening depending on the windload and other parameters.

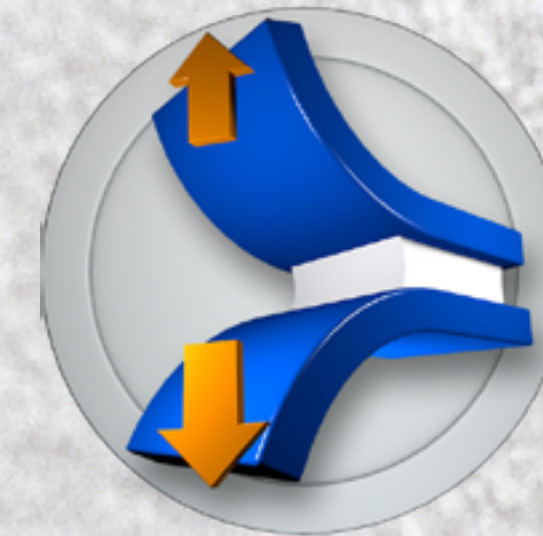


- 1 Masonry
- 2 Adhesive
- 3 Insulation board
- 4 Base coat
- 5 Fiber mesh
- 6 Water-vapor barrier
- 7 Render and/or top coat*

*Cementitious render + paint
*Skim coat/wall putty + paint
*RTU render (not pigmented) + paint
*RTU render (pigmented)
*Adhesive + brick slips / tile

Benefits of VINNAPAS®

VINNAPAS® polymer binders are used in the following layers: primer, adhesive, base coat, water-vapor barrier, render and/or top coat. To the whole system they add:



Adhesion



Flexibility



Hydrophobicity



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HOW TO SAVE ENERGY IN HOT CLIMATES

ETICS are well established in climate zones with cold winters. But what about climate zones where cooling, not heating, is the energy guzzler? To find out, WACKER launched a model house study in cooperation with Dubai Central Laboratories (DCL).

Together for Sustainability

In 2017 the United Arab Emirates launched its Energy Strategy 2050, which aims to reduce the country's carbon footprint by 70%. Dubai Central Laboratories plays an important role in this strategy, defining standards, implementing quality control for sustainable living and acting as a stakeholder in establishing green building codes in the region. Together with DCL, WACKER had the opportunity to prove that ETICS can help reduce energy demand and therefore the carbon footprint of the building stock in hot climates like in Dubai.

Setup of the Study

To obtain reliable data on the value of ETICS in hot climate zones, two identical houses were built and monitored over a period of 12 months. One was insulated with an external thermal insulation composite system (ETICS). The other house was uninsulated. Air conditioning in both houses was programmed to run continuously to a preset interior air temperature of 23°C.

Data Collected

For a period of 12 months, data were collected on the following:

- Energy consumption
- Interior temperature and humidity
- Atmospheric temperature and humidity
- Noise

Both houses were built according to traditional architectural standards ...



"The cheapest kind of energy is the one we do not use at all. ETICS are an effective way to reduce energy waste at the lowest price."

Ahmad Alsalami

Principal building studies specialist at
Dubai Municipality

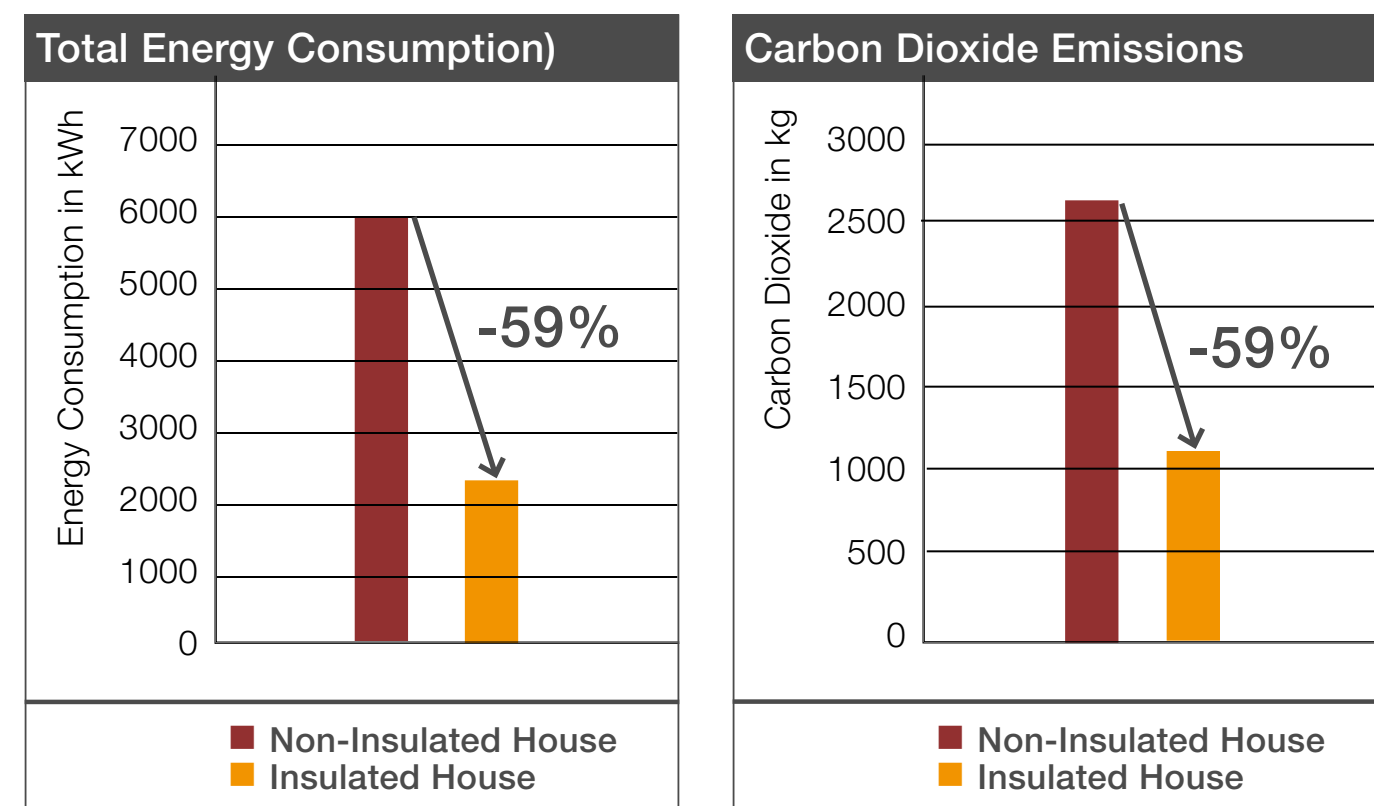


ETICS REDUCE ENERGY AND CO₂ EMISSIONS BY OVER 50%

The data collected were assessed after twelve months. The results showed the benefits of an ETICS on several levels.

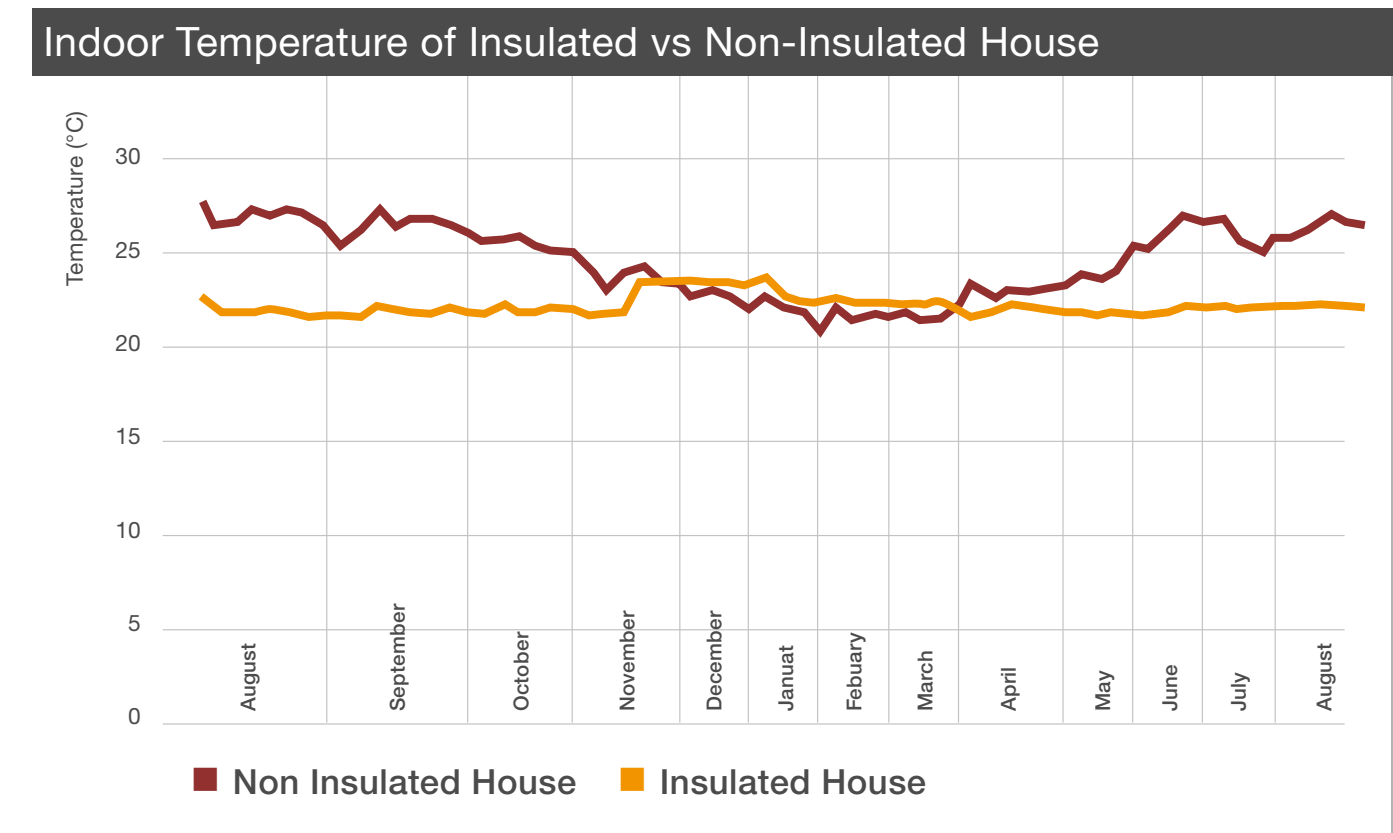
1 Over 50% Reduction in Energy Consumption and Carbon Emissions

Insulation brought both energy consumption and carbon emissions down by **59%**.



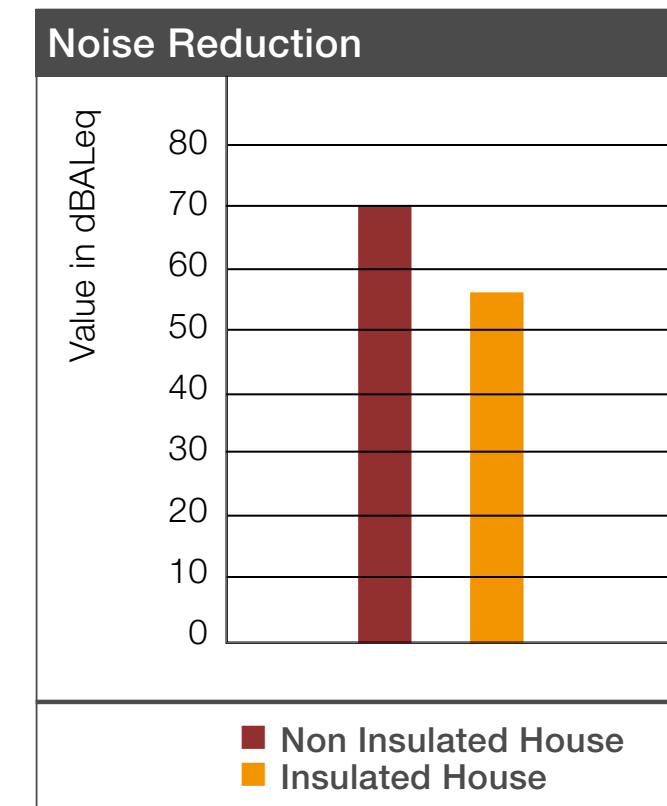
2 More Comfortable Climate

Air conditioners in both houses were preset to an interior air temperature of 23 °C. In the insulated house, the temperature remained more constant, creating a pleasant living environment. The temperature inside the non-insulated house repeatedly increased up to 28 °C. 📍



3 Substantial Noise Reduction

Indoor noise was reduced **from 70 dB to 57 dB**. 55 dB is a decibel level corresponding to moderate sounds like the sound of a normal conversation or that of music playing in the background, i.e., on the low end of the decibel scale. 70 dB is the maximum level of noise you should be exposed to during a normal day. When looking at the intensity, 70 dB is perceived as 31.6 times louder than 55 dB.



Noise level monitoring (dBA) (according to ISO 1996-2:2017 Part 2)



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SAFE AND SOUND: INSTALLING ETICS

ETICS are very efficient and durable when installed correctly. The following are among the most important considerations:

System Conformity

The ETICS producer needs to make sure that all components perfectly fit together and comply with local standards.

Fastening

Depending on local requirements, mechanical fastening with anchors is recommended in addition to the adhesive.

Installation on the Job Site

Training and quality control on the job site are crucial to ensuring that ETICS is installed properly.

Fire Safety

The choice of insulation material needs to meet local fire regulations.

Durability will be further extended by adhering to the recommendations of the specific ETICS producer:

- Ensure correct water dosage and sufficient material per square meter to guarantee adequate adhesion strength.
- Execute connections and details properly to prevent any water ingress.
- If the wall is exposed to direct sunlight or temperatures outside the range of 5-30°C, protective tenting is advisable.
- The entire substrate for the ETICS must be mechanically stable.
- Application of primer may be recommended.
- Position the glass-fiber mesh in the upper third of the base coat to withstand external impacts.

 [Professional renovation with ETICS/EIFS](#)

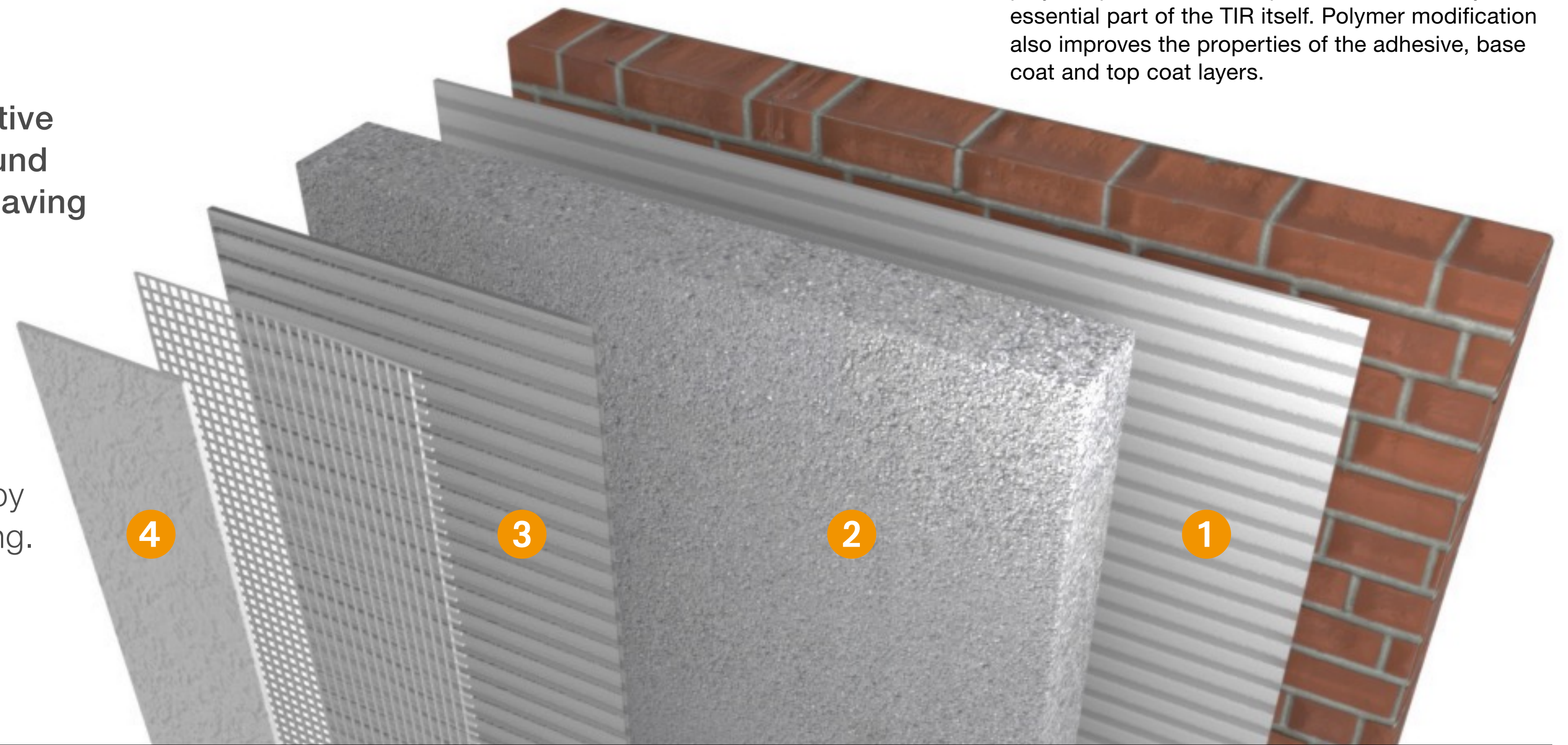


INSULATION INCLUDED: TIR

Thermal insulation render/plaster (TIR) is a good alternative for insulating external walls. TIR is a special mineral-bound render/plaster with numerous lightweight components having low thermal conductivity. These could be expanded polystyrene (EPS), expanded glass or clay based on perlite, vermiculite, foam glass, etc.

A thermal insulation render/plaster has insulating properties. Compared to a standard render/plaster, a TIR lowers the thermal conductivity by about a factor of 9 (ETICS does so by factor 18). It therefore reduces the energy demand for cooling. A TIR is also open to diffusion and offers acoustic comfort.

A thermal insulation render/plaster is applied in combination with other components. VINNAPAS® polymer powders and dispersions are not only an essential part of the TIR itself. Polymer modification also improves the properties of the adhesive, base coat and top coat layers.



Benefits of VINNAPAS® in TIR



Improved compressive strength



Adhesion



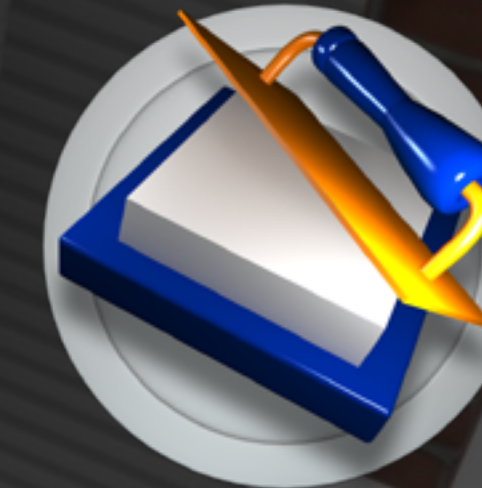
Flexibility



Water-vapor permeability



Hydrophobicity



Good workability



FAST AND FLEXIBLE: TIR APPLICATION

TIR is a fast and easy method for insulating residential and non-residential buildings. Also, it is highly suitable for insulating monument protected facades or to create complex designs such as round shapes. Thermal insulation render/plaster can be applied, where complex designs such as round shapes or limited space make ETICS less applicable. Thermal insulation render/plaster can be applied in the interior and exterior, by hand or by machine. A layer is usually up to ~10 cm thick.

After application, the TIR forms a seamless, homogenous layer that is flexible and levels out any unevenness. It can be used either with a base coat or can be combined with a finish-coat plaster to protect it from mechanical damage and weathering.

Video:
[Thermal Insulation Render for Thermal and Acoustic Comfort](#)



In certain cases, use of a primer is recommended in order to increase the adhesion strength of the surface. A layer of adhesive mortar is advisable for the following:

- Substrates with high water uptake. Porous concrete, for example, might draw water out of the TIR system too early
- Very slippery substrates. On concrete or wood walls, the TIR could slip after application



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TECHNICAL CENTERS

GLOBAL SUPPORT

Worldwide we operate 16 technical centers for construction polymers to provide dedicated technical support to our customers. At three technical centers in Europe and Asia, we run EOTA chambers for testing ETICS under conditions that mimic real-life exposure. This allows our customers to draw conclusions about the weathering performance of their system and to certify the ETICS according to local standards.



Walls are prepared with a complete ETICS.



The wall is then subjected to defined hygrothermal cycles for a defined period of time in an EOTA chamber.



Afterwards, the system is inspected to detect failures such as cracks. Adhesion strength is tested here. Water absorption or impact resistance can also be tested.

We also conduct the following tests according to the European standard EAD 040083-00-0404, formerly known as ETAG 004:

- Bond strength
- Hard-body impact test
- Capillary water absorption
- Resistance to perforation
- Water-vapor permeability
- Hygrothermal behavior





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Experience training that is perfectly matched to your needs. Take courses that, along with an in-depth grasp of theory, give you a thorough practical understanding. Each of our 13 training centers is affiliated with a technical center. You can take what you learn at a morning seminar and apply it in the lab that very afternoon.

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Knowledge is the engine driving progress and development. Knowledge grows. It changes the world and offers all of us new opportunities and prospects. If we share it. This is the clear guiding principle behind WACKER ACADEMY. Laboratory work is where solutions to questions take root. Dialog gives rise to ideas for new products.



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Our product portfolio ranges from silicones, binders and polymeric additives all the way up to bioengineered pharmaceutical actives. Rounding these out is hyperpure silicon for semiconductors and solar applications.

Innovations That Improve Quality of Life

Resource scarcity, climate change, urbanization: the challenges of our time demand new responses. In our search for solutions, we invest some 3.5% of our annual sales in research and development. With their emphasis on using energy efficiently and protecting the climate and our environment, our products are already improving quality of life for people all over the world.

Global Knowledge for Local Markets

When you work with WACKER, you have 100 years of chemistry expertise at your disposal, with access to the research findings and best practices of our experts throughout the world. Our knowledge base consists of a network of 26 technical centers, 13 training centers and our basic research center.

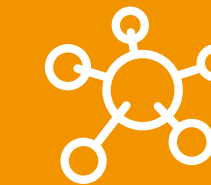
And most importantly: we are there wherever you need us – worldwide. Our local specialists know your markets and speak your language. Working with them, you will find innovative solutions that win over your customers and make you more competitive.

Follow us:

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All figures are based on fiscal 2022.



Silicones and Polymers

3,200 specialty products from organic and inorganic chemistry



Global Market Leader

In building-protection silicones, in the production of cyclodextrin and cystein and in dispersions and dispersible polymer powders based on vinyl acetate-ethylene (VAE).



Globally Active

- Sites worldwide
- Headquartered in Munich
- 27 production sites in Europe, Asia and the Americas
- 26 technical centers
- 13 WACKER ACADEMY training centers
- 47 sales offices



Employees: 15,700



Total Sales

€8.2 billion



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WACKER

Wacker Chemie AG
Hanns-Seidel-Platz 4
81737 Munich, Germany

www.wacker.com/contact
www.wacker.com

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