

SILRES® BS: **Water repellence for optimized** **insulation materials**

WACKER

Creating tomorrow's solutions

Why moisture protection is key to energy-efficient insulation

Moisture is one of the greatest enemies of efficient thermal insulation. Once mineral insulation materials absorb water, their insulating performance drops significantly. At the same time, trapped moisture can damage the insulation itself, promote mold growth and accelerate the deterioration of the building envelope. The result: higher energy consumption, rising heating or cooling costs, reduced indoor comfort and an increased carbon footprint.

Improving the water repellence of insulation materials is therefore a key factor in energy-efficient and sustainable construction. Dry insulation systems can reduce a building's energy consumption by up to 30%, helping to lower CO₂ emissions while improving thermal comfort in both hot and cold climate zones.

In addition, moisture-protected insulation contributes to a healthier indoor environment by minimizing the risk of mold and condensation.

Effective insulation is therefore much more than an energy-saving measure. It helps extend the service life of buildings, reduces maintenance and renovation costs, increases property value and creates comfortable living spaces with a stable indoor climate. In other words: Keeping insulation dry means protecting both the building and the investment behind it. Insulation materials treated with SILRES® BS hydrophobization agents and GENIOSIL® coupling agents are safely and permanently protected against penetrating moisture.

Up to 30%

Dry insulation systems can reduce a building's energy consumption by up to 30%.

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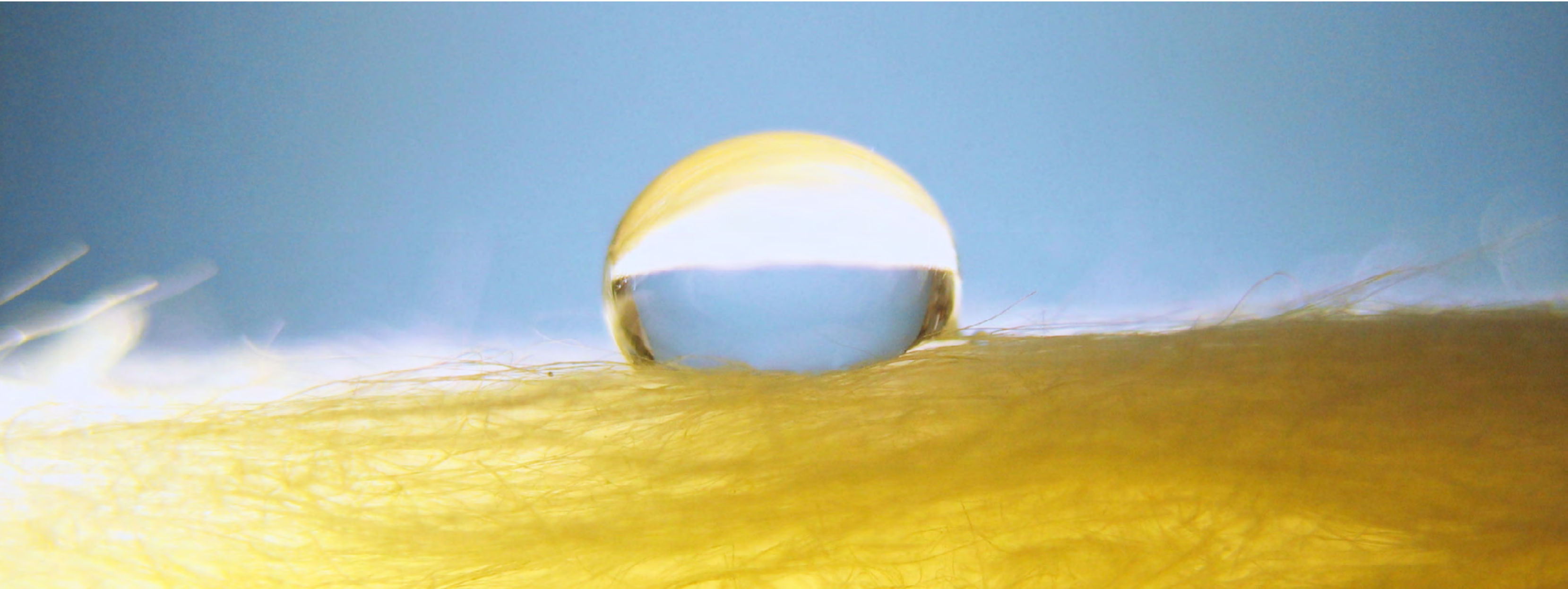
Insulation materials – one drop makes the difference

Mineral insulation materials provide basic properties like:

- Non-combustibility
- Mold and mildew resistance
- Minimal organic content
- Water vapor permeability

Overview of mineral insulation materials

	Thermal conductivity λ [W/(m•K)]	Main applications
Glass and stone mineral wool	0.035 - 0.045	• Insulation of residential, office and industrial buildings (roofs, walls, floors, EIFS) • Technical insulation
Expanded perlite and vermiculite	0.040 - 0.080	• Insulating filler (packed beds or filled insulating structural bricks) for private homes • Insulating panels (EIFS) • Insulating plasters or mortars • Absorbers for spilled liquids
Expanded clay	0.090 - 0.160	• Insulation of foundations (packed bed) for private homes • Insulating filler • Insulating concrete, plasters or mortars • Lightweight concrete
Aerated lightweight concrete	0.080 - 0.160	• Insulating structural building blocks for private homes • Insulating panels (EIFS)



Energy loss as a result of moisture

All mineral construction and insulation materials have a more or less hydrophilic character. Combined with the large pore volume of these materials, this results in a capillary water absorption increase of between thirty and several hundred percent.

Why should mineral insulation materials be kept dry by hydrophobic treatment?

- Evaporative heat loss of wet construction or insulation materials
- Higher thermal conductivity λ of humid compared to dry air
- Increased heat capacity of wet masonry

The thermal conductivity λ of a wet insulating material can easily be twice as high as that of the same material when dry (hydrophobized). For modern high-performance insulating materials, this is significant.

Other building physics challenges that can be mitigated by using silicones

- Mold and mildew growth
- Corrosion and frost damage
- Salt efflorescence



Optimize insulating materials with **SILRES® BS**

Impregnation with SILRES® BS offers the following advantages.

Performance benefits:

- Maximum reduction of capillary water uptake
- Minimal reduction of water-vapor permeability due to open pores
- Extensive penetration depth
- Adequate resistance to alkalinity
- Resistance to UV light as well as high or low temperatures
- Surfaces not rendered shiny or tacky, or yellowed
- Environmentally compatible
- Long-lasting protection

Environmental benefits:

- Energy savings
- Reduction of CO₂ emissions
- More comfortable indoor climate
- More sustainable use of construction materials due to longevity and durability

Application recommendations

Material

Glass and stone mineral wool

Perlite or vermiculite

Aerated concrete

Expanded clay

Industrial application

Spraying during fiberizing

Spraying or dipping

Integral treatment

Spraying or dipping



SILRES® BS –

Application recommendations

Insulation materials

	Hydrophobization agents								
Product	SILRES® BS 1042	SILRES® BS 5133	SILRES® BS 5137	SILRES® BS 1052	SILRES® BS 5138	SILRES® BS 5140	SILRES® BS 5160	SILRES® BS 16	SILRES® BS 46
Product group	Emulsion of reactive siloxane	Emulsion of reactive siloxane	Emulsion of reactive siloxane	Emulsion of nonreactive siloxane	Emulsion of nonreactive siloxane	Emulsion of aminofunctional siloxane	Emulsion of silicone resin precursor	Siliconate	Emulsion of polymethylhydrosiloxane
Applications									
Glass and stone wool	✓	✓	✓	✓	✓	✓	✓		
Blowing wool/loose-fill insulation				✓	✓	✓			✓
Expanded minerals (perlite/vermiculite/clay)	✓							✓	
Properties									
Solid content [%, approx.]	60	60	50	65	50	50	50	34*	50

* Active ingredient

In addition to the listed products, WACKER has products for the bulk treatment of ALC (aerated lightweight concrete) or AAC (autoclaved aerated concrete) in its product portfolio.

Advantages of SILRES® BS:

- The thermal conductivity can be permanently kept at a minimum
- Insulation and construction materials are protected from moisture-based damage
- The capillary water absorption can be drastically reduced
- Water vapor permeability – accidental water ingress can evaporate

GENIOSIL® – Application recommendations

GENIOSIL® coupling agents are used as adhesion promoters in bound mineral wool and act at the interface between the inorganic fibers and the organic binder.

Insulation materials		
	Coupling agents	
Product	GENIOSIL® APTE	GENIOSIL® GPTM
Product group	Silane	Silane
Applications		
Glass and stone wool	☑	☑
Properties		
Purity [%]	> 98	> 98

- Advantages of GENIOSIL®:**
- Enhanced fiber bonding increases mechanical strength
 - Compatibility with various binder systems ensures efficient production
 - Long-term durability extends product service life



Expertise coupled with a service network on five continents

Global technology leader in chemistry

WACKER is a world-leading and research-intensive chemical company, with sales of €5.5bn. Its products can be found in countless everyday items. The company’s portfolio comprises more than 3,000 products and ranges from tile adhesives to computer chips. Its main customers are in the automotive, construction, chemical, semiconductor, consumer goods, medical technology, pharmaceutical and photovoltaic sectors.

Innovation driven by sustainability

As a technology leader, WACKER promotes products and ideas that offer high value-added potential to ensure that current and future generations enjoy a better quality of life, based on energy efficiency and protection of the climate and environment.

Worldwide presence and customer partnership

With around 16,000 employees and four business divisions, WACKER operates 27 production sites, 22 technical competence centers, 14 WACKER ACADEMY training centers and 47 sales offices worldwide. Local experts support customers in developing region-specific products and optimizing complex production processes. The company positions itself as a reliable innovation partner that helps customers strengthen their competitive success.

Digital services for greater efficiency

Through WACKER e-solutions, customers gain access to online services and integrated processes for faster, more efficient project and order handling.

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27 Production sites **22** Technical competence centers **47** Sales offices

All figures are based on fiscal 2025.

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