

The mineral insulation solution for sustainable buildings

Insulation Redefined

AIRIUM

A TECHNOLOGY OF
 **HOLCIM**

Airium™ – mineral foam insulation

Improving the energy efficiency of buildings is among the biggest challenges of the 21st century. Approximately one-third of global energy consumption is currently used for heating and cooling buildings. Buildings generate close to 20% of global greenhouse gases during their use phase.

Holcim's answer is Airium™, an insulating technology that improves energy efficiency of buildings, from wall to wall and floor to ceiling: for example, block-filling, roof terraces, attics, sub-screeds and double walls.

How does it work?

Airium™ is made of a cement-based slurry, aqueous foam and mostly... enclosed and distributed air bubbles. It is the first mineral foam to offer a top-tier insulating performance, for an ideal thermal comfort, be it for cold temperatures or heat waves. Being mineral, it is also fully fire-resistant, completely recyclable, unfavorable to insects or rodents, and contains no added chemicals. Airium™ is also very easy to use, increasing the speed on jobsites and tightly filling any corner or shape.

"Airium is fully mineral and highly insulating. It really fits well with our willingness to differentiate and to meet with what we feel our customers are increasingly asking for: products which are healthier, safer and more sustainable."

Top executive in a major construction company in France



Living with Airium™

For healthy and safe insulation solutions

Rising energy bills, swings in room temperature, risk of fires or environmental impacts: these are just a few issues that can arise with popular home-insulation products.

Airium™ is an insulation alternative that brings comfort and peace of mind. Our revolutionary material is:

- **Effective:** helping you deal with temperature changes and acoustics.
- **Healthy and safe:** chemical-free with optimal fire protection: A1 per EU standards.
- **Sustainable:** the most durable, low-carbon and affordable insulation option.



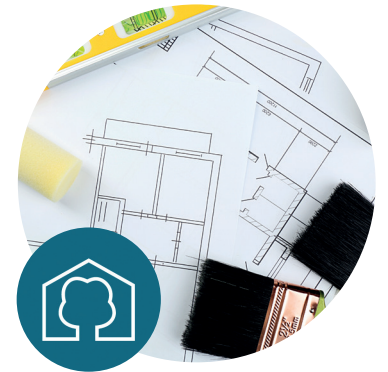
Building with Airium™

Go faster and avoid unnecessary hassle

Meeting tight schedules and regulatory targets, optimizing operations and margins while ensuring the health and safety of workers: all well-known struggles for builders and contractors.

Airium™ can make life on jobsites easier when it comes to insulation because it is:

- **Efficient:** build and insulate at the same time.
- **Hassle-free:** reduced transportation, storage and handling needs.
- **Easy to use:** flexible and adaptable material.



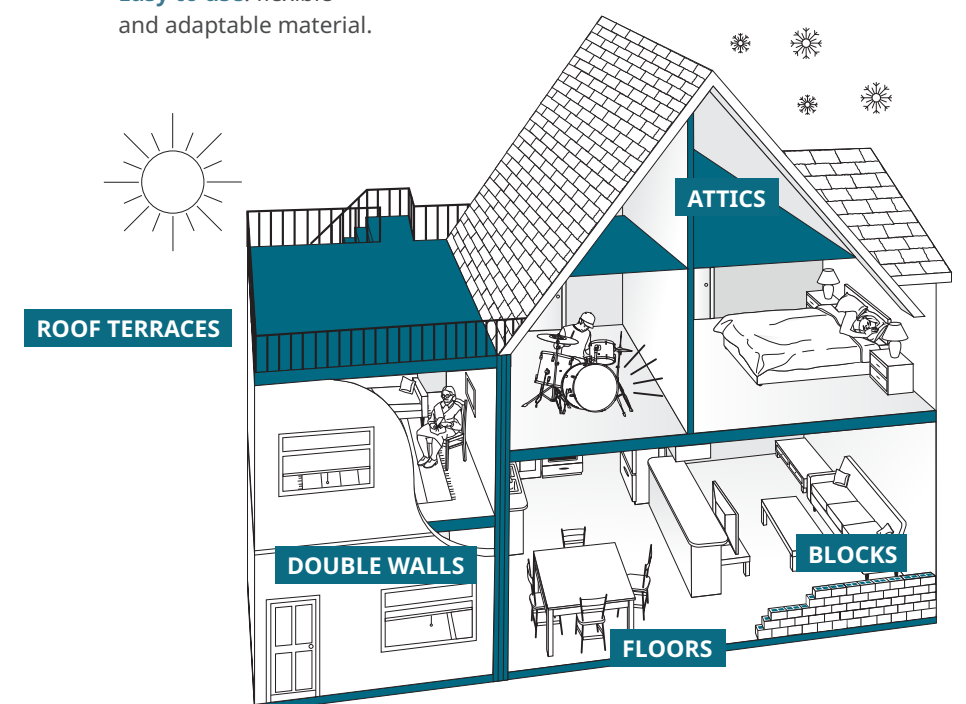
Designing with Airium™

Choose a local, mineral, long-lasting solution

Reaching ambitious energy efficiency targets in a sustainable way is key in any building an architect designs these days.

Airium™ provides insulation that is:

- **Ecological:** a low-carbon and recyclable material.
- **Healthy:** keeping the air chemical and mold-free.
- **Durable:** lasting more than 100 years.



A co-development agile approach

Airium™ is a technology platform with infinite possibilities. We have started to deploy Airium™ with partners on several applications. We believe the way forward is through partnerships; your ideas and insights are crucial for us to make the most of Airium™ on existing applications and to uncover many more applications of Airium™.

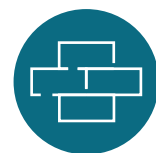
The approach of our team is pragmatic. We work in a collaborative way, adapting existing Airium™ experiences to your own project specificities, or co-developing new systems and applications with Airium™ inside.

Applications of Airium™



ROOFS

- Roof terraces
- Attics
- Precast roofing elements



WALLS

- Filled concrete blocks
- Filled precast wall panels
- Airium™ on site (in air layers or in lost formworks)



FLOORS

- Insulating layer below screeds
- Lightweight intermediary floors



OTHER APPLICATIONS

- Utilities
- Geotechnical projects



Roof terraces with Airium™

A smart and easy horizontal insulation

The current standard system to insulate roofs in Morocco is composed of various layers. The "Airium™ Thermochape" solution enables the replacement of the sloped concrete and the insulating material by one single layer. Builders and applicators can therefore build and insulate at the same time.

Using Airium™ for roof terraces helps save a lot of time during construction: a minimum of two days per week can be saved! Besides requiring less material, the material is produced through a single piece of equipment that is easy to operate from ground level.

The global system provides the insulation level required by the new regulation ($R=1\text{m}^2\cdot\text{K/W}$ for 10cm thick) in Morocco. The strength reached (1.3 MPa after 28 days) is more than enough for people to use the roof as a living space.



"This solution allows covering more space more quickly than other materials, and it's easier on a day-to-day basis for my workers."

Zouhair Ouchari, GM, Gama Etanche, Airium™ applicator in Morocco

Wall panels with Airium™

For healthy modular solutions

The Airium™ team is currently working on the development of concrete and Airium™-based wall panels and of hybrid wood/Airium™ systems to support our partners in the development of high performance, healthy buildings.

Modular Airium™ solutions offer significant advantages compared to conventional construction, from environmental benefits to time and cost savings, and better quality and construction management control.

Systems which could be considered with Airium™:

- Insulated precast wall panels
- Pre-insulated wood frame panels.

Attics with Airium™

Feedback from a home-owner

In December 2016, the Airium™ team carried out its first jobsite trial to insulate attics with Airium™.

The main advantages of Airium™ compared to standard blown insulated materials (rock wool, glass wool) include better thermal performance (about 10% better with a Lambda value around 37 mW/mK) and being anti-rodent and fire-resistant.

Two months later, here is the testimony of Christophe T., the owner of the house:

"I really feel the difference. I use less wood for heating, and an optimum temperature is obtained much more quickly in the house! The roof stayed covered with snow during three weeks in January. On the part of the house (extension) where no Airium™ was poured, the snow has melted immediately. I'm very happy about the product!"



Airium™ inside

Concrete blocks with Airium™



The combination of mineral foam and concrete block is simple and competitive, but it is also:

Highly insulating

- Additional square meters
- Summer comfort (thermal inertia)

Healthy

- 100% mineral
- VOC-free
- 100% recyclable

Tailored equipment

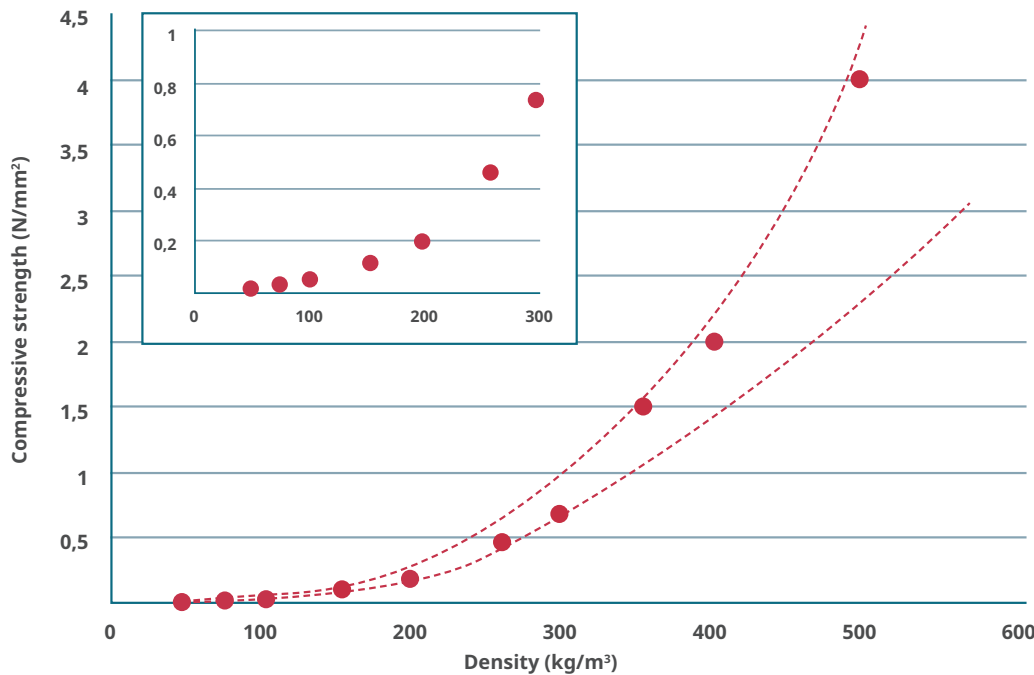
- A (fully) automated process
- High production capacity (above 15,000 blocks filled per day)

How Airium™ compares: (thermal simulation)

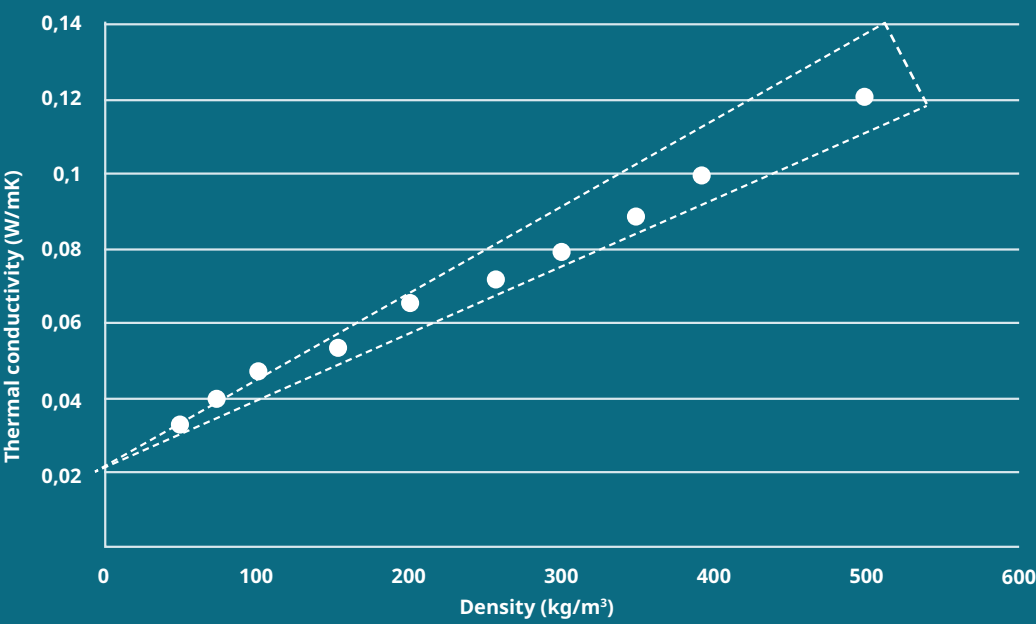
Block thickness	U-value without foam	U-value with Airium™
20 cm	1.17 w/Km ²	0.53 w/Km ²
36 cm	0.35 w/Km ²	0.23 w/Km ²
50 cm	0.23 w/Km ²	0.16 w/Km ²

Technical information on Airium™

Compressive strength vs density curve of Airium™



Lambda vs density curve of Airium™



Material	SI Units (EU)	USCS Units (US)
Composition	100% mineral	100% mineral
Properties		
Fire protection class	A1 (incombustible)	Incombustible
Thermal conductivity	35 to 60 mW/K.m	2.5 to 4 R-value/inch
R-value examples	3 to 4 (15cm) m².K/W	10 to 16 (4 inches) hr.ft², °F/Btu
Density	40 to 200kg/m³	3 to 13lb/ft³
Compressive strength	20 to 500 kPa	3 to 73 psi
Sound absorption (20cm width)	0.6	0.6
Water absorption (EN 1609)	4kg/m²	0.8lb/ft²
Vapor diffusion resistance	7	18 perm.inch
Shrinkage	0.4% m/m	0.4% m/m
Insect/mildew resistance	yes	yes
Application		
On-site foaming	yes	yes
Cavity filling	yes	yes
Production rate	5 to 30m³/h	177 to 1059ft³/h
Automated production	yes	yes
Curing		
Moisture content	50% RH	50% RH
Drying time (20°C/40% RH)*	24 h	24 h
Setting time (20°C)	<10 h	<10 h

*Depends on width/thickness



AIRIUM

Airium™ is a mineral insulation foam technology. It is fully fire-resistant, long-lasting and sustainable. It can fill any type of shape and cavity, either on site or in an industrial controlled environment. Airium™ can be used in a variety of applications – from blocks to roofs to floors – as it offers a wide range of possible compromises between insulation and structural performances.

Want to know more?

Get in touch with the Airium™ team on airium@holcim.com

Discover the epic quest for insulation on airium.com

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