



Natural air-handling ceilings

Direct heating without a central heat generator.

Humidity regulation. Inexpensive. Healthy.

*Efficient and healthy heating with
automatic control of indoor humidity*

 **ArgillaTherm[®]**
Natural Clay Climate Systems



THE NATURAL AIR-HANDLING CEILING



Modern heating via the ceiling saves energy and equipment costs and also ensures a comfortable room climate.

With the ArgillaTherm natural climate ceiling, heat transfer is almost 100% through heat waves. All objects in the room are thus heated evenly, without creating unhealthy air and dust swirls.

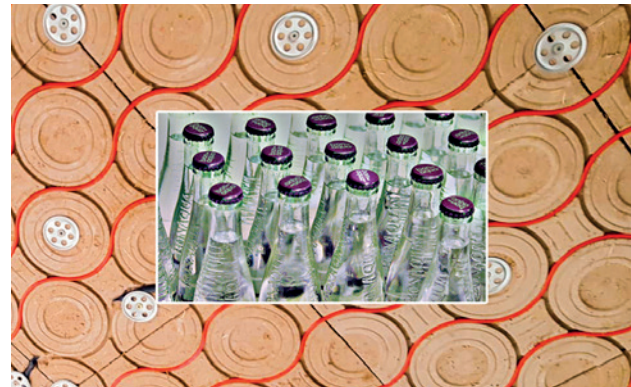


THE INNOVATIVE CENTREPIECE



The centrepiece of the system is **patented high-performance clay modules**. Charging the modules at night with moisture that evaporates during the day creates a noticeable cooling effect during the summer months.

In winter, the clay minerals prevent dry heating air, as they naturally balance the humidity. This makes the ArgillaTherm clay climate system unique, extremely energy-saving, very efficient and healthy.





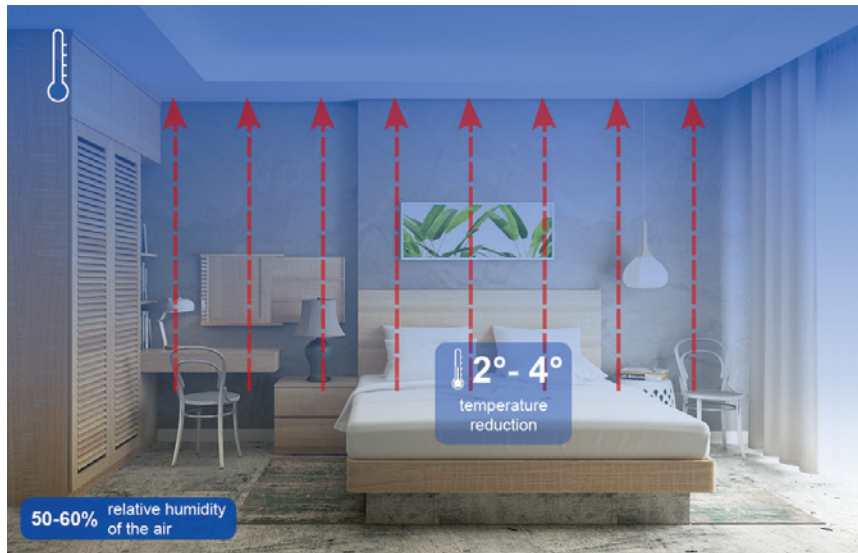
WARMING COMFORTABLY LIKE WITH SUNBEAMS



During heating, warm heating air does not rise. The heat is transferred only via heat waves. All objects in the room are thus heated evenly, without unhealthy air and dust swirls. The natural climate ceiling prevents dry heating air. A blessing for people with allergies and asthma!



PASSIVE COOLING THROUGH NIGHT-TIME VENTILATION



During the summer months, the high-performance clay modules can store a great deal of moisture through night-time ventilation, which is then released back into the room during the day through evaporation. This creates evaporative cooling, which leads to noticeable cooling of the room air (100 g/m² generate 60 watt hours).



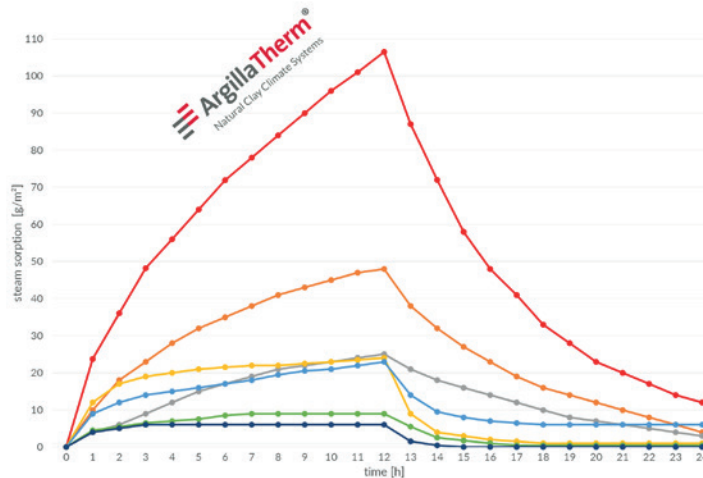
EXTREME SORPTION VALUES

The outstanding capabilities of the ArgillaTherm high-performance clay modules were impressively demonstrated by the measurements carried out by MFPA Weimar at Bauhaus University.

Even compared to clay plasters they achieve twice the value!



Examined at the Bauhaus University Weimar



◆ ArgillaTherm high-performance clay modules

◆ Average value of 7 clay plasters

◆ Lime-cement plaster

◆ Calcium silicate board

◆ Lime plaster

◆ Machine gypsum plaster

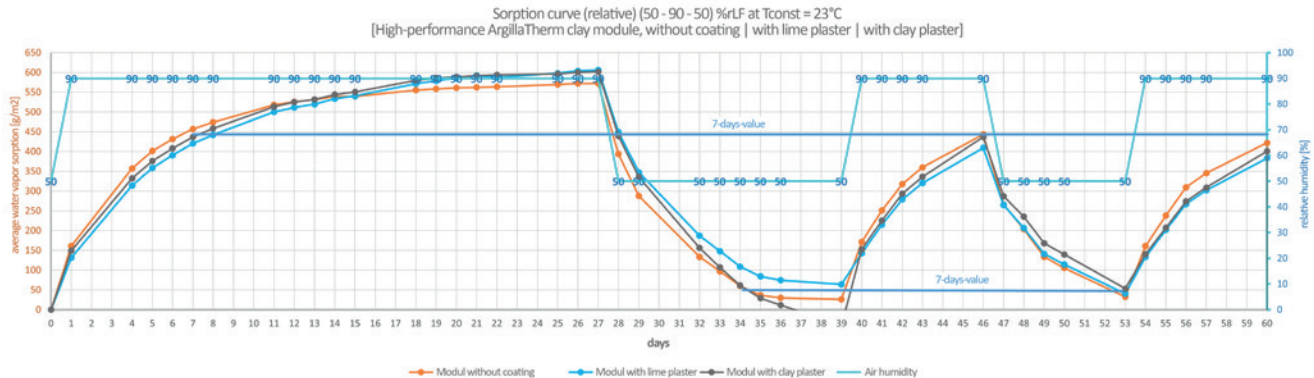
◆ Gypsum bonded adhesive plaster

Moisture absorption and release at an ambient humidity of:

Start: 50% rLF, saturation: 12h with 80% rLF, relaxation: 12h with 50% rLF



LONG-TERM SORPTION MEASUREMENTS BY MIPA WEIMAR



Results of the measurements

The high-performance clay modules can absorb more than 150 g of water vapor per m² within 24 hours and completely release it again within a very short time (desorption). After about 21 days at 90% RH, saturation is reached with a water vapor absorption of about 550 g/m². No deformation, swelling or moisture penetration of the modules was detected, even over several weeks. Even after surface coating with the ArgillaTherm clay or lime plaster system, the excellent moisture control values remain almost unchanged.



ADVANTAGE: NATURAL COMFORT



■ **Ceiling heating has an almost 100% HEAT RADIATION RATIO**

- therefore even heat distribution throughout the room
- no dust swirling as with radiator/floor heating
- therefore perfect for people with allergies and asthma



ADVANTAGE: HEALTHY INDOOR CLIMATE



- **The clay modules create a “par excellence” clay climate**
 - Moisture regulation and mould prophylaxis
 - Binding of pollutants (e.g. VOCs) and odours from the air
- **and PRESERVE the environment and nature**
 - production is almost CO² neutral
 - 100% recyclable into nature (Cradle to Cradle)



PROFESSIONAL EXPERTISE

➔ HEATING CAPACITY UP TO 140 W/m²

- Natural heating system (suitable for people with allergies & asthma) with excellent eco-balance.
- Ideal for properties with low energy demand (annual demand < 50 kWh/m²).
- In combination with a photovoltaic system and electricity storage, almost 100% can be powered by the sun.
- Use of cheap interruptible heating power tariffs according to § 14a of the technical connection conditions from the local network operators (max. interruption times of 60 minutes per block) possible.
- According to the Building Energy Act (GEG), can be used up to an energy efficiency standard KfW40+.
- Short response times despite the large energy storage due to the sandwich assembly.
- Modular, open drywall system for free installation of heating cables.
- Individual ceiling designs (full-surface or partial-surface as a ceiling sail) possible.
- Conversion of electricity into almost 100% thermal radiation.

No electrosmog! The system is free from any kind of electromagnetic and electrical radiation. If required, you can request the test report from VDE Offenbach from us.





COMPARISON OF CONSUMPTION AND MAINTENANCE COSTS

New construction with an annual energy requirement of 30 kWh/m² for heating (roughly equal to a KfW55 house).

	Gas condensing boiler	LW heat pump	Natural climate ceiling
Energy consumption per year	30 kWh x 0,06€ 1,80€/m ²	30 kWh ÷ COP 4 x 0,19€ * 1,43€/m ²	30 kWh x 0,19€ * 5,70€/m ²
Auxiliary power for pumps & actuators per year	1€/m ²	1€/m ²	0€
Maintenance costs per year	1€/m ²	1€/m ²	0€
Repairs per year	0,75€/m ²	1€/m ²	0€
New acquisition reserve per year	1€/m ²	2€/m ²	0€
Total costs per year	5,55€/m²	6,43€/m²	5,70€/m²
For rentals: heating bill/year	1€/m ²	1€/m ²	0€
Total costs per year	6,55€/m²	7,43€/m²	5,70€/m²

*Electrical heating tariff

Conclusion: The pure energy consumption costs of the natural climate ceiling with direct heating are about 4 times higher compared to central heating systems with gas condensing boiler or heat pump. However, since no further costs are incurred, the natural climate ceiling is on a par with the central heating system, or more favourable in the overall cost analysis.



COST SAVINGS THROUGH DIRECT HEATING WITH NATURAL CLIMATE CEILINGS

1. Omission of the complete equipment technology (central heat generator, pipe network, chimney, boiler room, etc.)
2. Maintenance and repair costs as well as heating bills for rentals are no longer an issue.
3. No operating costs for pumps and actuators at the heating circuit manifold.
4. Shortened heating period: The natural climate ceiling compensates the temperature differences in the transitional periods (spring & autumn).
5. About 3 times the service life compared to central heating systems.





SIMPLE INSTALLATION

Installation of the patented system is very simple. The active heating surfaces are usually laid out in whole modules (37 x 37 cm). However, the modules can also be easily cut to size, so any ceiling geometry can be covered. Open spaces are filled with clay compensation panels. A tested lightweight metal suspension system is available for use in commercial buildings.

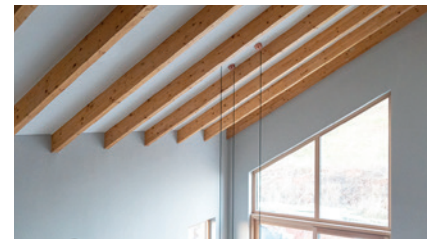
The endless matrix allows easy and free installation of the heating cables in all directions. The coating is applied using either the ArgillaTherm clay or lime plaster system, each of which is optimally matched to the high-performance clay modules. Depending on the use and aesthetic requirements, different surface designs form the perfect finish.



System components of the eSYSTEM



High performance clay modules with clay compensation panels & inserted heating cable

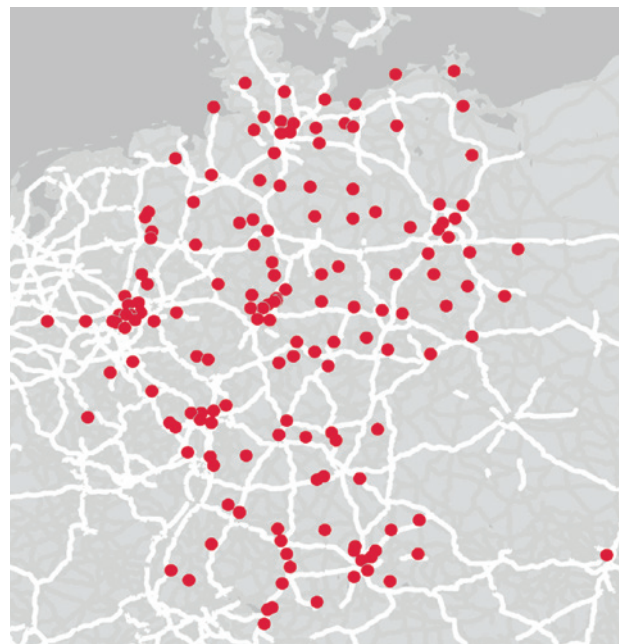


Surface coating with the ArgillaTherm natural lime or clay plaster system



REFERENCES FOR HEATING

There are now references everywhere in Germany and in several European countries. Only larger references are listed in the overview map.





THE NEXT STEP



We will be happy to advise you on the range of possibilities, send you detailed technical information or prepare a design for you.

Just write US your questions, wishes and requirements or call us right away.

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 **ArgillaTherm®**
Natural Clay Climate Systems

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LIFE IS TOO SHORT
FOR A BAD INDOOR CLIMATE!