o abaion



50 %

fewer CO₂ emissions

We have developed a key technology for climate-proof buildings. Finally, a high-performance radiant cooling system without condensation. Even at high humidity.

What's more—heating and acoustics are also taken care of!

radiant cooling + heating + acoustics + draft free + silent humidity control + comfortable + aesthetic + multi-purpose apps + 50% less co_2 + powerful + zero condensation + hygienic + patented + modular + custumisable easy installation + patented pore structures all climate zones + core / key technology +

The environmentally friendly cooling system, without cold drafts.

abaton

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Welcome to a paradigm shift.

abaton

abaton panel. 100% comfort.

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cooling	 + up to 107 W/m² (dT of 12K) + e.g. SPLY/RTN 13/15 °C at 26°C and 60% r.H.
	+ fail-safe without any condensation monitor
silent humidity control	+ radiant cooling below the dew point
	+ no power limit no condensation monitor
	 sterile and hygienic buffering of humidity, enabled by patented pore structure
heating	+ Recommended 59 W/m² (dT 9K)
	 + up to 97,5 W/m² (dT 15K) + infrared radiant heat
acoustics	+ sound absorption rate is modular & custumisable
	 alpha 0,3 - 0,95 installed as acoustically active canopy or suspended ceiling
integrated design planning	+ comprehensive planning support
	 + energy systems / heating / cooling / ventilation + control system / light / design





eling is interior

The ceiling of a room is so much more than a necessary technical component. It is a fundamental design element, part of the embodiement of a room's soul and character.

From day one, we were certain: it does not suffice for abaton panel to achieve superior heating & cooling performance. abaton panel must conform with the gighest standards in regard to interior design.

abaton panel doesn't just look good. It is a symbol for health, comfort, efficiency, and ecological sensibility.

Together with architects, interior designers and users, studio abaton develops concepts and solutions that will steal the limelight of any interior concept merely focused on furnishing and lighting.



But first, who are we? studio abaton.

We accompany our clients from the first design planning of the energy system to execution of the interior concept.

The full service agency for energy-efficiency and thermal comfort.



It all started here: TB Obkircher and TB Käferhaus.

The idea orginitaed in combined 60 years of practical experience of these two Viennese engineering firms, specialised in building engineering and technical physics.

Our background grants us great understanding of the challenges that plague construction projects of all sizes. Both from the perspective of the customer and the executing construction firms.

Max Gruber

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Benedikt Goehmann

Whether it's a quick layout of a radiant ceiling or holistic suggestions for a CO2-neutral energy system: we have the network, the experience, and the technology to provide unmatched support.

The horizon for investments in real-estate is a long one. This means even small planning errors can have long-term and expensive consequences.

Our one-stop shop approach minimizes this risk and counteracts the increasing complexity of the construction industry.

This vertically integrated approach allows us to provide highly-efficient, holistic solutions while simultaneously increasing certainty regarding planning, cost, and excecution.

Get in touch:

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Cooling sucks!

Space cooling is an unsolved dilemma!

Until now, air conditioning units were inefficient, loud, unhygienic, and unhealthy for humans and our planet.

The environmentally friendly, draft-free alternative: radiant cooling.

Radiant cooling: the comfortable alternative fit for net-zero!

There's nothing more comfortable than radiant cooling... Think of the gentle shade of a tree. Or the soft cooling effect of thick stone walls in a church during the peak of summertime. Radiant cooling is as comfortable as it gets.

Radiant cooling saves 25% of energy.

Radiant cooling removes heat from a room by cooling down a surface like walls or ceilings. This is achieved by cold water flowing through pipes embedded in the surface. The result: 25% less energy is needed, when compared to using air to cool a room. Not to mention there is no draft or noise involved.

However, until now installing radiant cooling often wasn't feasible.

The reason? The physical limit of condensation. If you cool a surface below a certain temperature, the humidity begins to condense into dew. The same way droplets form on a cold glass of water during summer time.

abaton solves the problem of condensation radiant cooling has faced so far.

Thanks to a patented pore-structure abaton enables radiant panels to buffer and control humidity. This means the limitiations of radiant cooling are a thing of the past.

abaton has developed a key technology for climate-fit buildings.

The problems caused by condensation often make it impossible to deploy radiant cooling, or involve the addition of expensive and high-maintenance supportive systems like oversized ventilation, condensation monitors, and window contacts. abaton offers a solution and makes radiant cooling possible in almost any climate.

Condensation occurs the moment a surface is colder than the dew point. The dew point is dependent on the humidity; the amount of water in the air.

The graph shows the percentage of warm days, on which conventional radiant ceilings run the risk of condensation due to the outside climate. For example, on average over the last 10 years, during 46% of cooling days in Vienna the dew-poitn was 16°C or greater. There were even years where the percentage was as high as 77%. On these days conventional radiant cooling systems would need the air to be dehumidified or the system would shut down

Paradoxically, conventional radiant cooling systems are at their weakest during periods of significant heat or humidity, hence exactly duing the time a chilled environment is needed the most.

where cooling is stastically necessary (ø >22°C).



Traditionally, the only remedy for condensation is the very energy-intensive dehumidification of a room. However, this eats away both the comfort and energy efficiency of radiant systems. It also runs the risk of poor hygiene and operational reliability if, for example, a window is opened, or there are more people in the room than expected.

Finally! An environmentally friendly, draft-free cooling system without sacrifice. Surface cooling and humidity control in one- and heating, no less!



All buildings,



The main limitation to the cooling capacity of radiant cooling is absolute humidity, which defines the dew point. The supply temperature must never fall below the dew point. This is why conventional radiant cooling systems need to increase the supply temperature with rising dew points. The result is falling cooling capacity with a rising dew point. abaton solves precisely this problem.

Room conditions for calculating performance: t.room: 26 °C metal/gypsum board: temperature supply/return = dew point +1°K / supply-temp.+2K (according to EN 1264-3) abaton panel: temperature supply/return = 13° C/15° C without limitation by the dew point

> An example: On 46% of all cooling days in Vienna the dew point of the outside air is 16°C or greater. A conventional chilled ceiling in Vienna, without additional dehumidification, will thus not be able to cosnistently provide more than 45-75 W/m2 (dewpoint 18°C, which is almost never exceeded).

Or to put it differently - an open window would result in shutting down the radiant cooling system on 46% of days. abaton panel cools at constant performance, even in systems with ventilation only via open windows.

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The problem solver: abaton HumidityBalance.

abaton relieves radiant cooling of its problem with condensation.

How are we able to cool the surface of abaton panel below the dew point?

1. Our patented material.

abaton technology is based on a special mortar in which cooling pipes are embedded. abaton mortar is purely mineral. The patented pore structure is created with a surfactant. The specific combination of air pores and capillary pores in the nanometer to micrometer range shift the layer of condensation from the surface into the inside. This means, if our material is ever cooled below the dew point, the water molecules will enter the pores unhindered. The condensation will only take place inside of the material. Due to the enormous size of the surface of the porous network the liquid water will be absorbed an buffered. The surface remains dry at all times.

2. Hygienically buffering humidity.

Our material consists of approx. 40 vol-% pores, and can absorb roughly half a liter of water per square meter. Due to the tiny pore size, only vapour molecules, which are very small (approx. 0.3 nm), can penetrate the interior of the material. This presents an insurmountable barrier for spores, fine dust, and most types of bacteria (1µm - 100 µm). This, along with the high pH-value of the cementous mortar, makes sure buffering the liquid water is sterile.

3. Cyclical operation.

abaton systems are always operated cyclically. This means, about half of the time abaton panels are operated at maximum capacity with collant (water) temperatures below the dew point (13-16°C). The other half (typically at night) the coolant is circulated at temperatures above the dew point (18-20°C). Alternatively, it can also be switched off. In this so-called regeneration cycle, the real strength of the abaton mortar comes into play: due to the surface enlargement caused by the pore structure, the buffered water is re-evaporated into the room at high-speed. This evaporation process also cools down the room by athe process of adiabatic cooling (more precisely by the enthalpy required for evaporation). All without additional energy.

4. Humidity control without microelectronics.

Our technology enables the humidity regulation of a room's air purely via the physical properties of our material. Neither the evaporation nor the condensation process requires electronic control, but rather results "automatically" from the current indoor air conditions. Reyling on physical processes minimise the complexity of the controller. Also, without any (micro)electonic part or sensors, the susceptibility to errors is massively cut down.

Cooling Capacity

Measurement based on DIN EN 14240 (active surface = $0.68m^2$ per panel)



Heating Capacity

Measurement based on DIN EN 14037 (active surface = 0.68m² per panel)



temperature difference (supply - return) dT in K

Interior design can be thought of as room comfort. This is why we see thermal comfort as an integral part of interior design.

This cross-section is what drives us: aesthetics, thermal wellbeing, and efficiency combined into an interior design experience of wellbeing.

There is nothing more comfortable than a radiant ceiling. For heating and for cooling.

In summer *abaton panel* creates an incomparable, pleasantly cool indoor climate. Think of the refreshing share of a tree. Not too cold, not too warm, no dry air. Just perfect.

Come the colder months, *abaton panel* feels like a warm ray of sunshine on a beautiful spring day. Thanks to modern building insulation, what was previously unimaginable is now possible. Buildings heated by *abaton panel* are, thanks to minimal air movements, far more comfortable and efficient than the ones with underfloor heating!

Interior is comfort





All in one. Even acoustics. Naturally.

Sounds good.

abaton panel is acoustically effective. A special strength is the good absorption of lower frequency ranges. When installed as a canopy, the higher frequencies are captured by an acoustic PET felt placed on the back. When installed as a suspended ceiling, abaton panel is combined with ca. 20% acoustic panels.

For optimal acoustics there are two possibilities:

Combination

Due to their high cooling capacity and the geometry of the room, abaton panels never take up an entire ceiling surface. Ideal coverage ranges between 60% and 75%. The remaining ceiling surfaces can be used for the installation of acoustic panels. A rule of thumb for the combination of abaton with acoustic absorber panels (for offices): 10-20% coverage to achieve reverberation times required by the current standards.

Canopy

Not only in terms of acoustics, the most efficient approach is to install abaton panel as a acoustically active canopy for heating & cooling. Acoustically active felts are placed on the back of the canopy. Depending on the suspension height, the canopy can reach a absorption rates between alpha = 0,35 to 0,9.

Exact performance values, measured by a certified lab, can be found in our download section at www.abaton.studio.

Heated ceiling? A must!

All good things come from above.



Heated ceilings have had a bad reputation for too long. Wrongly! In modern, well-insulated buildings, a heated ceiling is the most comfortable and efficient solution.

Heated ceilings offer a more comfortable, more efficient, and even more healthy alternative to underfloor heating.

How? It must be ensured the surface of the ceiling is no more than 6 degrees warmer than body temperature. Then they are more efficient and even more comfortable compared to underfloor heating.

Why? Floor heating generates sigifcant air movement. According to DIN, floor heating involves 49% of convection. This means floor heating will whirl up and spread dust.

Heated ceilings are able to avoid this, by heating with mostly infrared radiation. According to DIN, heated ceiling involve only 15% convection and 85% radiation.





The pros of heated ceilings are plenty:

- + Heating and cooling with one system saves investment costs.
- + Ceiling heaters require at least 15% less energy than floor heating (according to DIN V 18599).
- + Floor heating is made inefficient by carpets, furniture, etc.
- + Heated ceilings circulate much less air compared to floor heating and radiators.

The most hygienic cooling solution on the market.

No condensation, no aerosols, no air movement, no dirty filters.

abaton panel acts as a nimble moisture buffer when the surface temperature falls below the dew point. Humidity condenses inside the panel. It is then buffered there before being released back into the room air. All this while maintaining a dry surface and perfect hygiene.

Conventional air conditioning circulates and spreads aerosols like dust, viruses, and germs. This is aggravated further by irregularly cleaned filters.

Conventional radiant cooling systems, briefly chilled below the dew point, will instantly wetten. This then creates an optimal breeding ground for harmful organisms (mold!).

In contrast, the controlled condensation inside *abaton panel* does not pose the slightest microbiological risk. This has been scientifically confirmed by the Vienna University of Technology.

Why? Because the abaton mortar is an alkaline, antibacterial environment with a high pH value, spores and bacteria do not have a sufficient chance of survival. Furthermore, the humidity evaporates as soon as the dew point is exceeded. This means moisture is never around for long, making it impossible for mold to grow.

Every stakeholder wins!

Pros at a glance.

Planners	 + Easy to plan. + Failsafe and resilient. + Compatible with window ventilation.
Users	 + Comfortable. + Realiable. + Minimal operation cost.
Investors	 + Dependable. + Cost and energy efficient. + No maintenance.
Installers	 Maximum and reliable support from abaton (design/planning/ installation training). Easy assembly on standard dry-walling compontents

+ Failsafe (no problems with open windows or defective dew point sensors).

Lowest life-cycle costs at same investment costs.

In most cases abaton system match the price of conventional acoustic ceilings.

50 % less CO, caused by the production when compared with conventional radiant cooling systems.



abaton panel

12,7 kg CO₂/m²



radiant ceiling - gypsum baord 25,8 kg CO₂/m²

Calculated according to publicly available EPDs. Accounting limit Al production.

Due to the high performance, less space is required. Electronic components like condensation monitors can be saved. The installation as a canopy offers excellent acoustic properties. The result: we can lower operating costs, without requiring more investment.



radiant ceiling - metal $27,3 \text{ kg CO}_{2}/\text{m}^{2}$

Reliable. Reusable. Easy to recycle. Naturally.







(0) Framing Metal profiles or wood. Stainless steel screws.

(03) Wall mount Installation also possible for walls or roof slopes.

(2) **Fixtures** Space and time saving assembly with panel plus x.

Painted Finish
 With lime based paint, the surface
 can be painted any color.

(05) Seamless Finish Smooth finish with lime plaster.

(07) Small fixtures E.g. wire suspensions are mounted directly on abaton panel.



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(06) Natural look Rough surface, similar to exposed concrete.



Light rails Light is always part of the design.

Modular and easy assembly for full creative freedom!





abaton panel is fixed directly onto standard + dry-wall framing. Panel dimension: 100x75x3cm. Grid layout of framing 50 cm. + The high cooling capacity allows to reduce the necessary surface area. abaton panel can be installed as a canopy or a suspended ceiling. +abaton panel plus x allows for easy installation of fixtures like recessed lights or alarms. abaton panel can be combined with other materials like gypsum board, clay panels or any acoustically active panel. +The choice for surface finish is yours: natural, seamless, or painted.

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Timber loves abaton The solution for heating and cooling in timber construction.

Humidity regulation, thermal mass, and energy efficiency.

- Efficient ventilation and comfortable + cooling thanks to humidity regulation with patented HumidityBalance.
- Dry construction system with the + highest thermal mass heat capacity, of 27 kJ/K per m².
- + The high cooling capacity of abaton panel makes limited space a non-issue.

Using abaton panel to reduce air volume in office buildings saves investment and operating costs.

In timber construction, the space for radiant surfaces is limited. Thus, low supply temperatures have to be enabled by means of heavy dehumidification. abaton panel can regulate the humidity by itself. Condensation no longer poses a danger. This allows to massively reduce the air volume of the ventilation system (in cases with window ventilation up to 100%).





Thanks to the patented HumidityBalance technology, parts of latent cooling load can be covered by the abaton panel. This allows to downsize the ventilation system.

Abaton panel enables to downsize ventilation system between 20%-100%. It the ventilation is kept, abaton panel leads to savings of up to 1/3 of energy by reducing the dehumidification of the supply air.

In residential timber construction, abaton panel allows efficient, fail-safe radiant cooling and heating, even when only 50-60% of the ceiling space is available. No additional ventilation required.

Thermal mass, humidity regulation, and energy efficiency, while only requiring 50% of ceiling surface.

The perfect heating & cooling solution for timber construction.

Developed with KIT, University of Vienna and TU Wien.

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Suspended ceiling

abaton panel can be installed as a suspended ceiling in a color of your choice.

abaton panel is availible in one. To fill the geometry of the room, the remaining surface can be covered with abaton dummy panel (without piping) or any other paneling material like clay, gypsum, etc..

Using lime, plaster a seamless, homogenous single-color surface can be created.

Caution: Only fully mineral plaster and paints can be used (lime plaster and lime paint).

Suspended ceiling - enclosed with acoustic materials.





abaton panel - suspended ceiling

- + For a homogeneous, single-colored finish
- Alternatively panels can be lined with visible joints +
- + Dimensions of abaton panel: 100x75x3 cm

abaton panel - suspended acoustic ceiling





In order to create ideal room acoustics, the remaining surface can be coverd with acoustic panels (instead of dummy panels).

Due to the acoustic properties of *abaton panel* itself, experience has shown that covering 15-20 % of the ceiling space with acoustic panels is sufficient for the necessary absobtion to fulfill the current standards.

Detailed acoustic values can be found in our planning compendium, available in the download section: www.abaton.studio.

+ abaton panel lined with visible joints

- + Compliant with room acoustics standards
- + Several surface finishes to choose from









Heating

Acoustics

Fixtures

Thanks to the high cooling capacity of abaton, the space required for fixtures can easiliy be accounted for without losing the capacity for reliable cooling & heating. Just clear enough space and fill with abaton dummy panels or other paneling materials (clay, gypsum, etc.).

Canopy for Heating & Cooling



abaton panel plus x

Fixtures directly on *abaton panel*? No problem! With *abaton panel* plus x, fire alarms, ventilation outlets, lights etc. can easily be installed. Thie process requires nothing but common tools like a hole drill, or jigsaw.



abaton panel plus X for fixtures

- Dimensions: 100x75x3 cm +
- Free space of 84x15 cm in the middle without piping +
- Easy installation using a hole drill, jigsaw etc. +

abaton panel mounted as a canopy







A particularly efficient use of the *abaton panel* is its installation as a canopy. The suspension height can be freely chosen with a minimum of at least 85 mm (55mm air + 30mm panel thickness).

Its pre-assembled nature allows for quick installation and low investment costs. Depending on the chosen suspension height, the canopy can reach absorption rates between alpha = 0.35 to 0.9.

For detailed information refer to the planning documents in the downloads section: www.abaton.studio.



+ Installation as canopy for acoustics, heating & cooling

- + Full flexibility easily change floor plans/walls
- + Excellent for retrofitting



Wall mount

Your ceiling is unable to accommodate the installation of radiant panels, or doesn't provide for enough enough space? No problem! abaton panel can also be installed on walls.

Sloped ceilings / roof slopes are also no problem.



The surface finish is your choice.





Natural

Any color is possible: natural beton brut, painted with visible joins or fully invisble and seamless.

The wall as radiant heating & cooling surface

- Wall mounting possible with standard panels +
- Also suitable for roof slopes +
- Surface Finish: seamless, painted or beton brut. +



0 Fixtures Aesthetic, mineral, and healthy.

Painted



Seamless

As for the surface finish, the choice is yours: the grey beton-brut look, lime paint, or a seamless, homogenous surface.

The color can be freely chosen, using mineral pigments. The only requirement is that purely mineral coatings open for water vapour diffusion are used. We recommend lime based materials with 0% organic content.

Impressum

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The art of climate.