



CoolZone,  
at the **heart** of your energy ambitions...

Inspiring Great Spaces™

**Armstrong®**  
CEILING SOLUTIONS



## Who cares about **energy efficiency**?

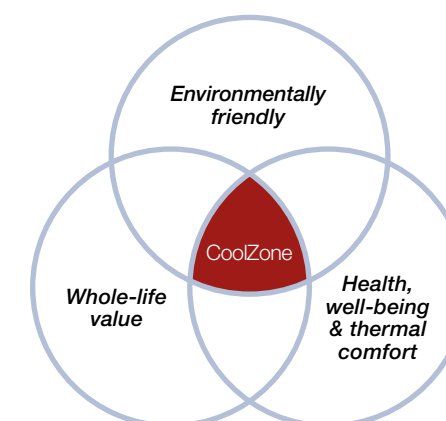
Almost everyone – customers, workers and residents, eco organisations and, more than ever, governments. As the earth warms and temperatures increase, so do costs and regulations. **A lot is at stake!**

### People want **comfort** and **cost savings**...

With homes and offices full of people, computers, photocopiers and other energy sources, achieving optimal comfort during gruelling hot summers is sometimes close to impossible. Cranking up the air conditioner can't be the answer, especially since occupants are increasingly conscious about their costs and impact on the environment. And employees are typically eager to stay away from loud compressors and hazardous coolants.

### ... and **sustainability** demands are heating up

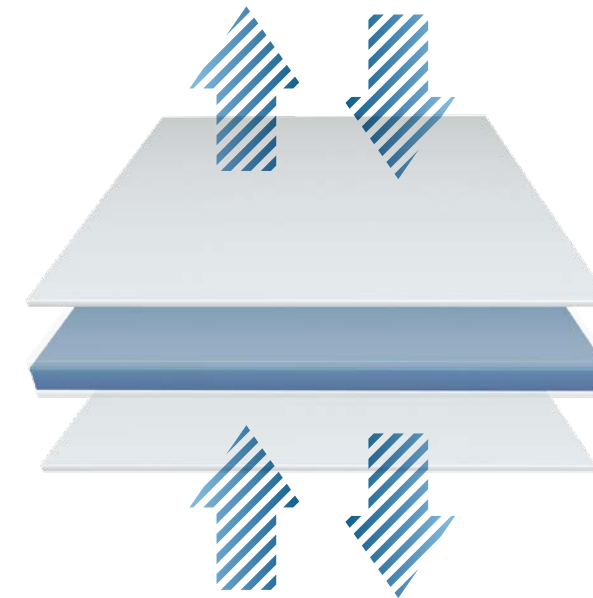
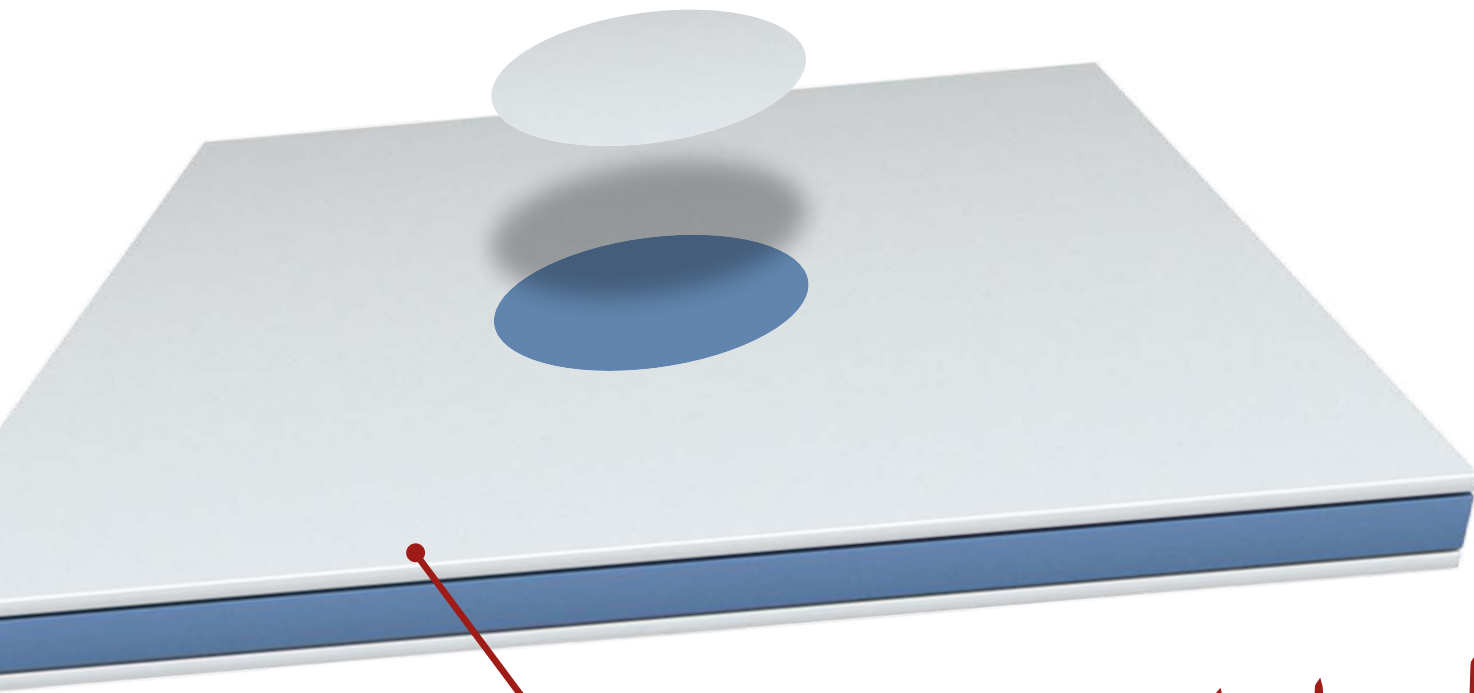
Governments are paying closer attention too. In fact, the EU is targeting **80% energy reduction by 2050**. In March 2007, the EU Heads of State and Government set a series of demanding climate and energy targets to be met by 2020, which includes a **20% drop in greenhouse gas emissions** (compared to 1990), a **20% increase in renewable energy sources**, and a **20% increase in overall energy efficiency**. Reaching these expectations will require real innovation in building design and technologies.



### Now there's a smart new solution!

Leveraging the latest, most-advanced technology, Armstrong has developed **CoolZone**, an innovative ceiling solution that absorbs energy during the day and releases it at night, keeping living and work areas at a steady temperature around the clock. During the day, the building interior stays refreshingly cool with no need for AC. Overnight, as the temperature drops outside, the ceiling desorbs heat and is ready to work the next day.

## How does CoolZone actually function?



## PCM?

PCM, or Phase-Change Material, is a substance with a high heat of fusion which, melting and solidifying at a certain temperature, is capable of storing and releasing large amounts of energy. Heat is absorbed or released when the material changes from solid to liquid and vice versa; thus, PCMs are classified as latent heat storage (LHS) units.

Source: Wikipedia

### Thermal mass is the foundation

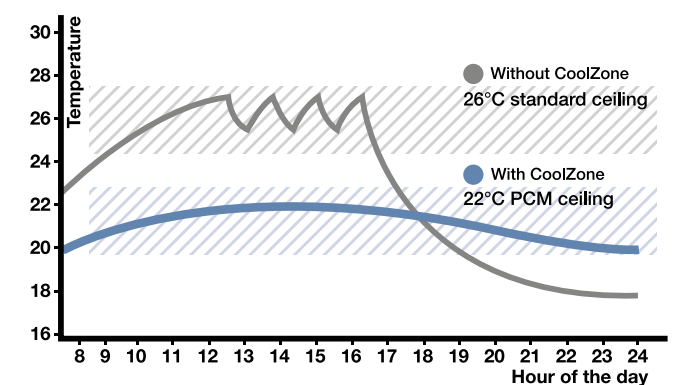
An effective way to maintain a pleasant temperature in summer is to increase the thermal capacity of a structure. By absorbing heat in walls or ceilings and releasing it at the right moment, **thermal mass acts as a buffer against temperature fluctuations**. This is especially true for lightweight structures, which are more prone to overheating in the summer.

### PCM is the game changer

Unlike traditional thermal-mass materials like brick and concrete, Phase Change Material (PCM) melts and solidifies at specific temperatures, which enables it to **store and release large amounts of energy**. The key component is the interplay between solid and liquid states. As long as these two states exist simultaneously, the **temperature won't increase**. Instead, the inflowing energy is used up in the phase transition and thus remains latent.

Think of ice cubes in a drink: as the ice absorbs the warmer temperature from the drink, the ice slowly melts. But as long as there's still ice, the drink temperature stays constant.

PCM is similar but even better. Because, unlike the ice cubes, **PCM returns back to its solid state** with just a little cool night air.







## Innovation that works overtime

**CoolZone** is ideally suited to climates that drop below 20° at night. In the hot afternoon, the **CoolZone cassettes suck up the heat and keep the room pleasantly cool**. Overnight, they **release the energy throughout the room** while using the cool night ventilation to change back to their solid state. So **they're fully charged and ready to get back to work the next day!**

## Energy modelling with CoolZone

To optimise efficiency and demonstrate regulatory compliance, energy modelling has become a requirement during the design stage of a building. Most energy-modelling software packages now include the possibility of adding PCM to the analysis, allowing you to develop more-effective cooling and ventilation strategies. Depending on the cooling load in the building, **Armstrong recommends that between 30% and 50% of ceiling coverage be reinforced by CoolZone cassettes in order to achieve optimal performance.**

## A total system approach

Optimising the benefits of the CoolZone cassettes means designing and specifying the ventilation solution to create an integrated energy strategy for the building. Thanks to a robust network of alliances and partnerships in the HVAC industry, Armstrong is able to offer valuable advice and modelling to establish the right balance of thermal comfort and energy efficiency.

For advice regarding energy strategy and modelling, contact an Armstrong representative.



## A word with **Jeremy Sumeray**

Armstrong's Sustainability Manager discusses the company's long-term vision in sustainability and explains how **CoolZone** can play a key role in energy reduction.

### What is the relationship today between sustainability and builders?

**JS:** Companies and governments recognise the importance of integrating economic growth with social justice and environmental stewardship. They see the importance of change, but they also know it has to work on paper. That's why there's an expanding focus on the cost and availability of low-carbon energy to power our world and provide us with comfortable, cost-efficient places to work, live, learn and play.

### What has Armstrong been doing to address this need?

**JS:** We have an ambitious programme to reduce the amount of energy we use to produce our ceiling systems and, more importantly, to help designers and building owners to specify materials that will reduce the amount of energy consumed while the building is in use. We have developed energy-efficient chilled-ceiling solutions, and we're now introducing a PCM ceiling system that further reduces energy consumption in buildings.

### So is it enough to just use the right products?

**JS:** Energy-efficient products are merely the beginning of our forward-thinking strategy. Our product-development processes take a complete cradle-to-grave approach to ensure that we use resources efficiently and in a way through which our products can be recycled at the end of their life. Our increasing use of Life Cycle Analysis is a powerful tool to help us become a truly sustainable company.

### How does **CoolZone** fit into your sustainability approach?

**JS:** With **CoolZone**, we now have a product that is carbon-positive, which means it eliminates more CO<sub>2</sub> than is embodied in the material during manufacturing. Successful integration of **CoolZone** into building design contributes towards achieving the highest green-building ratings. Furthermore, our technical support, training and design expertise now extends to integrating **CoolZone** with heating, cooling and ventilation strategies.

### How much of a difference can renovations make?

**JS:** A big difference. Existing buildings account for about 40% of greenhouse gas emissions. Since these buildings will be with us for many more years, we can't ignore their impact. To reduce their overall energy consumption, renovating the building stock must be a priority. This will require low-energy technologies, renewable energy systems and well-designed use of thermal mass.



# With optimal efficiency, **everyone wins!**

Companies reduce energy costs. Employees enjoy greater comfort. And the environment breathes more easily.

Armstrong's **CoolZone** solution improves thermal comfort and contributes to the intelligent energy management and commercial success of a building in a number of ways...

## People feel better

Indoor comfort can now be managed more intelligently. By absorbing heat throughout the day, **CoolZone cassettes help to maintain an even temperature**, ensuring greater comfort for building occupants.

## Energy saving

Reduce high-usage peaks. The smooth temperature fluctuations of the PCM result in reduced air-conditioning cycling frequency, which contributes to an even greater **reduction in energy consumption**.

## Cost savings

During internal testing, the onset of air conditioning was delayed by four or five hours in an average office. In addition to improved comfort, this can **save around 40% of HVAC energy costs and reduce investment costs** by choosing an air-conditioning system better adapted to a **CoolZone** environment.

## A fully **autonomous** solution

Once installed, **CoolZone** doesn't need any attention or special investment from you. The only energy it needs is from fresh ventilation overnight. And that's free!

**-40%**  
of the HVAC energy cost

**22°**  
stabilised room temperature

## Long-term reliability

**CoolZone** can outlast conventional HVAC systems. In recent tests, the PCM was put through 10,000 cycles with no loss of performance. That's equivalent to a minimum 30-year service life.

## Perfect for **renovations**

**CoolZone** integrates seamlessly into existing buildings. Additionally, Armstrong's lay-in metal tiles are an ideal retrofit solution and can be incorporated into existing suspended ceiling systems.

## Easy to move around

Flexible and loose-fit, **CoolZone** cassettes can be moved easily to wherever they're needed most. Occupants can move them within a room to deal with an area of high heat load, or from room to room, or even take them to a new building.

## Future proof

The benefit of using less energy to cool buildings is only going to increase over time. This is true from both a sustainable and a financial point of view.

## Recycle

Armstrong **CoolZone** cassettes can be recycled at the end of their life, and the PCM insert between the metal tiles can be recycled as part of the gypsum-wallboard recycling programme.





**+30**  
years service life

## At **your** service

Armstrong offers a **wide range of services** to support the specification and installation of **CoolZone** cassettes...

CPD PRESENTATIONS

INSTALLATION TRAINING

DEDICATED TEAM

CAD DRAWINGS

GRID STRENGTHENING

REVERBERATION-TIME CALCULATIONS

RECOMMENDATIONS ON VENTILATION AND NIGHT-PURGE OPTIONS

ALLIANCES AND PARTNERSHIPS IN THE HVAC INDUSTRY

## Certifications

The Quality Association PCM was founded in 2004 to develop proper quality-assurance procedures. The two organisations entrusted with this task were the Bayerisches Zentrum für Angewandte Energieforschung e.V. (ZAE Bayern) and the Fraunhofer-Institut für Solare Energiesysteme ISE.

The objective is to **guarantee the quality of the storage material as well as objects containing such storage materials**. The fundamental quality criteria are the stored heat as a function of temperature, the number of possible repetitions without any adverse effects, and the thermal conductivity of the storage materials, which is important for the charge and discharge time.

BASF has conducted **extensive tests** on Micronal to ensure its long-term performance.

The material was put through 10,000 cycles with no loss of performance. Assuming 300 cycles per year, this suggests a **durability of over 30 years**.

## Product Specification & Technical Performance

	Item Number	Nominal Size (mm)	Thickness (mm)	Weight (kg)
COOLZONE TEGULAR 8/16	BPCZ4980M	600x600	25	9.0
COOLZONE MICROLOOK 8/16	BPCZ4981M	600x600	25	9.0

Other systems and modules are also available on request.



**WEIGHT**  
**25 kg/m²**



**THERMAL CAPACITY**  
The CoolZone infill contains **25% BASF Micronal** with a melt point temperature of **23°C** providing a total heat storage capacity of **136.2 Wh/m²**.



**FINISH**  
Factory applied polyester powder coat, minimum thickness **55 microns**.



**COLOUR**

	STANDARD		SEMI-STANDARD	
	RAL 9010	Global White	RAL 9006	RAL 9007
EN ISO 2813:2000 <b>GLOSS</b>	20%	12%	30%	30%
EN ISO 7742-2 & 3 <b>LIGHT REFLECTANCE</b>	85%	75%	n/a	n/a

Other colours available upon request.



### ACOUSTIC PERFORMANCE

$\alpha_w$ : <b>0.25</b>	<b>NRC: 0.20</b>	Hz	125	250	500	1000	2000	4000
<b>Sound Absorption Class: E</b>		$\alpha_p$	0.35	0.20	0.15	0.25	0.25	0.20



**Dnfw: 40 dB**



**FIRE PERFORMANCE**  
EEA. Euroclass **B-s1, d0**



Up to **95% RH**  
(for short-term exposure)



**RECYCLED CONTENT**  
Metal ceiling tiles: up to **30%**



# WANT TO LEARN MORE



For more questions about **CoolZone**  
or any Armstrong products or services,  
contact us today!

[www.armstrongceilings.co.uk](http://www.armstrongceilings.co.uk)  
[www.armstrongceilings.ie](http://www.armstrongceilings.ie)

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