



## ACOUSTIC CHILLED CEILING

ACOUSTIC ABSORPTION WITH ROOM TEMPERATURE CONTROL



# CHALLENGE AND INSPIRATION

## ROOM ACOUSTICS COMBINED WITH THERMAL COMFORT AND MODERN ARCHITECTURE

Today sophisticated architecture and functionality are defining the design of office landscapes more than ever:

- Open room designs to promote team work and communication
- Lounge areas and meeting points to **promote informal** communication
- Flexible workplace design for conducting project work and also concentrated individual work
- Bundling technical equipment such as printers or scanners at **centrally-accessible points**

Future architectural practices combined with modern room designs therefore have to meet completely new challenges:

- Telephones, printers, copiers and internal foot traffic increase background noise
- The sound-reflecting surfaces such as smooth walls and hard floor coverings additionally increase the noise level
- A variety of internal and external heat sources such as room lighting, technical devices, but also people themselves create high room temperatures
- The increased sunlight across large window surfaces increases room temperatures additionally

NOT ONLY AN ATTRACTIVE ROOM LAYOUT, BUT ALSO THE ACOUSTICS AND CLIMATE PLAY AN IMPORTANT PART IN GENERATING A POSITIVE FEEL OF A ROOM. ALL THREE CONDITIONS MUST BE CONSIDERED TOGETHER TO PREVENT NEGATIVE IMPACTS ON OCCUPANTS WHICH COULD LEAD TO REDUCED PERFORMANCE AND PRODUCTIVITY.



**A constantly high noise level in the workplace hinders the ability to concentrate, triggers stress and can lead to health issues.**

If employees are distracted from their work for just a short time, they will require additional time to return to the same concentration levels. This adds up over the course of a working day and reduces efficiency and effectiveness. Not only productivity is reduced by noise disturbance. Noise as a stress-triggering factor is a significant reason for a reduction in work output.



**Figures, Data, Facts:**

- Reduction of the learning aptitude, retentiveness and the performance of the short-term memory by 25 to 30%
- Proven error rates of 25 to 30%
- Around 8% of the staff absent due to sickness within a company can be attributed to noise disturbance

*(Source: Study by the Hearing Centre of the University of Oldenburg).*

Savings in the room acoustics in the construction phase can lead to significant consequential costs.

**If on top of this the thermal comfort of the workplace is disrupted, this could impact further on the negative influences on motivation and productivity.**

**Figures, Data, Facts:**

- With increasing room temperatures the physical and mental performance declines sharply. At 28°C physically by 50% already, mentally by 20% (Source: study D. P. WYON).
- According to the Bielefeld theory, at external temperatures of up to 32°C, the room temperature must not exceed 26°C.

Acoustics and thermal comfort must therefore be of equal focus, when designing the working environment to help maintain comfort and productivity levels.



It is the task of the building operator or the employer to ensure bearable room temperatures for occupants.

# PERFECT COMBINATION

## DESIGN AND FUNCTIONALITY FOR EVERY BUILDING AREA

SUSTAINABLE ARCHITECTURE SHOULD ALREADY BE INTEGRATED IN THE CONCEPTION PHASE OF A BUILDING INCORPORATING ACOUSTIC AND THERMAL SOLUTIONS FOR THE COMFORT LEVELS OF THE ROOM OCCUPANTS. REHAU OFFERS SPECIAL SYSTEM SOLUTIONS FOR BOTH ACOUSTIC AND THERMAL REQUIREMENTS WHICH MEET THE EXACTING STANDARDS REQUIRED ON DESIGN AND FUNCTIONALITY.



For optimum acoustic conditions in the room:

### Acoustic chilled ceiling

supplying the customary cooling or heating load requirements.

### High performance acoustic chilled ceiling

for areas with increased cooling or heating load requirements (e.g. south-facing rooms).



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For areas in which the acoustic basic conditions of the room play a secondary role or are achieved by other means:

**Chilled ceiling**

supplying the customary cooling or heating load requirements

**High performance chilled ceiling**

for areas with increased cooling or heating load requirements (e.g. stairways or entrance areas)



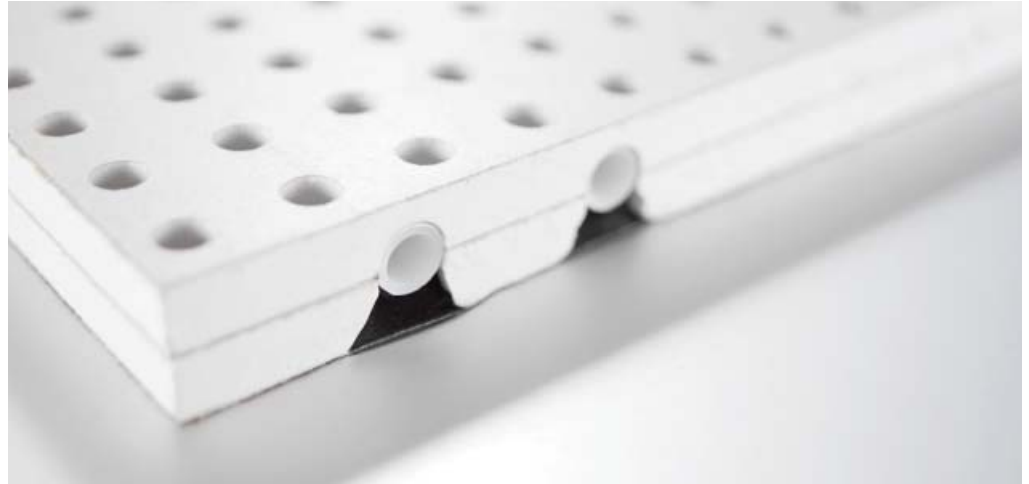
# ACOUSTIC CHILLED CEILING

## PROPERTIES AND ADVANTAGES AT A GLANCE

MÜLLER-BBM



Test reports substantiate the high sound absorption values



### Acoustics at the highest level:

- High sound absorption levels, independently verified by a renowned testing institute
- Acoustic non-woven material laminated across the whole rear surface of the boards

### Attractive design options:

- Simple integration of ventilation, lighting and acoustic systems into blank elements
- Visual high quality, seamless ceiling layout according to the architectural requirements
- Three different types of hole patterns

Hole pattern	6/18R Regular round holes	8/18R Regular round holes	8/18Q Regular square holes
Hole pattern diameter (mm)	6	8	8
Hole spacing centre - centre (mm)	18	18	18
Sound absorption (without or with 30mm additional insulation)	$\alpha_w = 0,45$ (LM) or $\alpha_w = 0,50$	$\alpha_w = 0,65$ (L) or $\alpha_w = 0,75$	$\alpha_w = 0,70$ or $\alpha_w = 0,80$
Sound absorber category	D	C	C or B
Normal cooling load (15°C / 17°C / 26°C) (standard or high performance)	66 or 75 W/m <sup>2</sup>	66 or 75 W/m <sup>2</sup>	60 or 67 W/m <sup>2</sup>
Normal heating load (36°C / 34°C / 20°C) (standard or high)	83 or 90 W/m <sup>2</sup>	83 or 89 W/m <sup>2</sup>	79 or 82 W/m <sup>2</sup>
Evaluation (cooling and heating load / sound absorption)	++/+	++/++	+ / ++

**Cooling/heating performance without compromise:**

- Optimum comfort due to high cooling/heating outputs
- The radiated heating/cooling outputs ensures an even, comfortable temperature distribution without draughts and dust turbulence
- Fast reaction times and good control response due to low thermal mass
- Good efficiency due to low flow temperatures; makes this ideal for use in combination with renewable energies



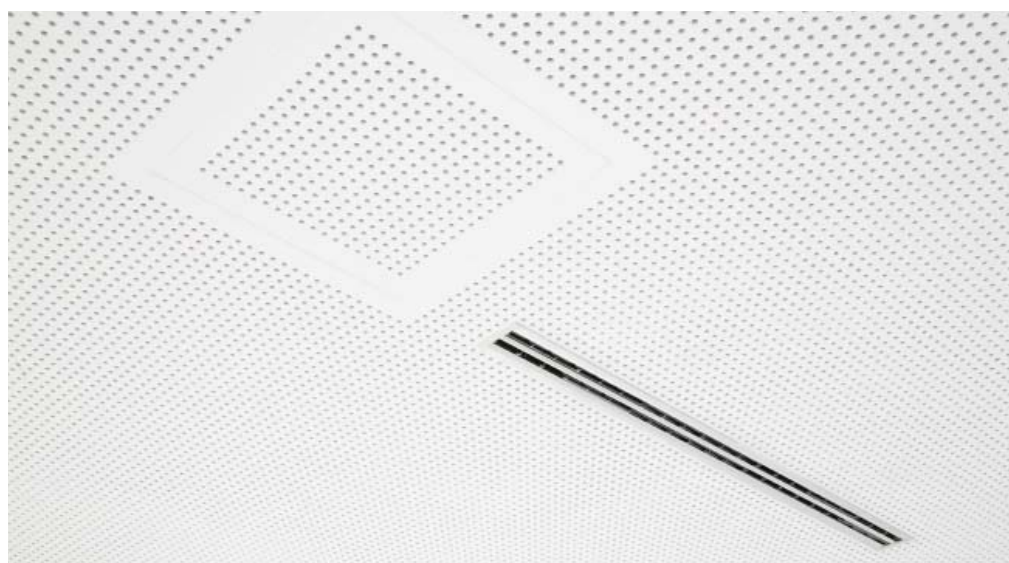
6/18R, 8/18R, 8/18Q	Length (mm)	Width (mm)	Height (mm)	Area (m <sup>2</sup> )	Pipe Length (m)
	1.998	1.188	20	2,37	60
	1.332	1.188	20	1,58	40
	666	1.188	20	0,79	20

**Optimised installation times:**

- Simple and quick assembly using pre-drilled fixing grids and standard installation techniques and, high rigidity
- RAUTHERM S pipe integrated during manufacture
- Three different board dimensions for different room layouts

**Outstanding quality:**

- Two perforated gypsum plaster boards bonded to each other
- Hole patterns are identical within each board type
- All four sides are finished as a sharp edge for precise jointing
- Tried and tested RAUTHERM S pipe (10.1 x 1.1mm) with REHAU EVERLOC™ jointing technology
- Specially-matched acoustic non-woven material bonded to the rear





# YOUR PROJECT IS UNIQUE

## OUR SERVICE FOR YOUR SUCCESS



### Expert advice from REHAU

Our qualified product specialists will be pleased to advise you about the subject of heating and cooling as well as all about room acoustics - Even on site.

### Design support

Take advantage of our offer: We will be pleased to support you with the preparation of reflected ceiling plans and assembly plans, the layout of the distribution pipes or the pressure loss calculation.

### Delivery just in time to the construction site

Scheduling and fabrication completely to your requirements. We deliver just in time to the construction site

### Want to know more?

Visit our hands-on training in the REHAU Academy, by contacting your local Sales Office.

**REHAU** – Your expert partner. Reference projects are the evidence for our expertise. Take advantage of the opportunity and tour the projects we have already completed.

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