Metawell
metal sandwich technology

Metawell® sports hall ceiling

Leidsche Rijn, Utrecht, Netherlands © Jan Bitter

Shot resistant sports hall ceilings

METAWELL® RADIANT AND ACOUSTIC CEILINGS FOR SPORTS HALL

Ceiling constructions must not only meet the sound insulation requirements, but also be tested for ball impact resistance according to DIN 18032-3 and for shock resistance according to EN 13964-D. Thanks to the panels' extremely rigid structure, deformations by ball shots are almost impossible. The Metawell® ceiling may, as an option, also provide the heating of the hall. The copper pipe tubes mounted on the back side of the ceiling convert the acoustic ceiling into an acoustic and radiant ceiling.

The sports hall ceilings are delivered with full perforation and rear-fixed acoustic fleece, optionally also with copper pipe meanders. The panels are mounted to standard CD rails with a narrow shadow gap. Because of the use of countersunk head screws with a 6 mm diameter the screw heads become invisible within the 6 mm perforation. Screwing on the visible side and setting a CD grid are particularly efficient.

SUSTAINABLE AND ENERGY EFFICIENT

Sports hall ceiling elements consist out of an aluminium carrier panel with copper pipe meanders. Both materials are excellent heat conductors. Therefore the Metawell® sports hall ceilings respond extremely fast and achieve high performance values. When the ceilings are not used anymore they can be recycled without additional preparation.

Furthermore EPDs (Environmental Product Declarations) according to DIN EN ISO 14025 Type III and EN 15804 are offered.

Sports hall Köln-Porz, Germany © Stefan Schilling

ADVANTAGES

In comparison to conventional solutions the heating of sports halls with radiant ceilings has many advantages, such as:

- Low supply temperature of the heating water
- Minimum air supply requirement, which results in smaller air ducts and less air movement
- Closed hall ceilings are hygienic
- Balls cannot get stuck behind the ceiling
- Dirt cannot settle down
- The entire ceiling serves as an acoustic absorption surface
- The ceiling system can also be used for heating, optionally for cooling

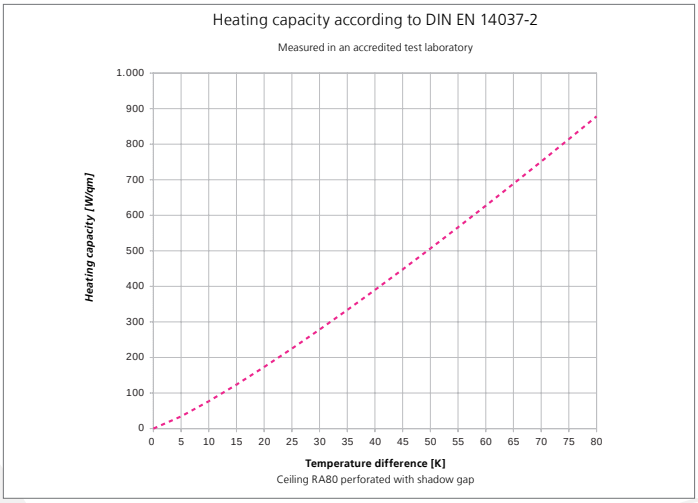


Diagram heating power

LAYOUT

On basis of the building physics data of the sports hall, the heating load of the hall is calculated by the planner, whereby the room height has a great influence on the temperature distribution. In order to ensure the desired temperature in the area where the athletes are, a correction factor should be included in the calculation.
Example: For a sports hall with a height of 7 m, a heat load of 25,000 watts is determined. The correction factor according to the table is 0.7. The heat load to be provided by the ceiling is therefore 35,700 watts.

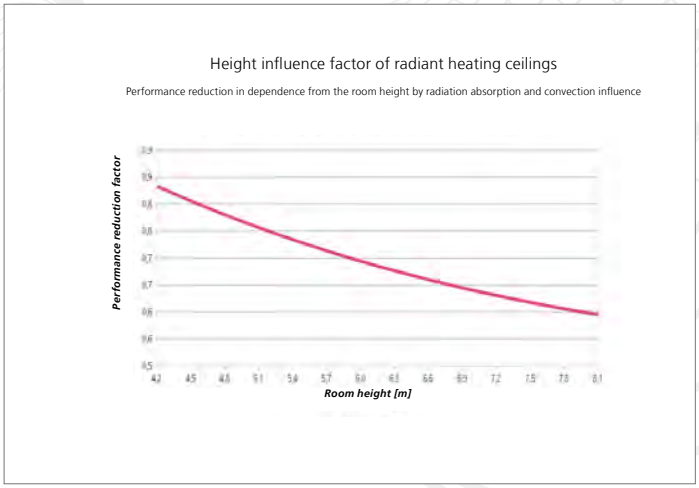


Diagram correction factor room height

Detail basket ball hoop

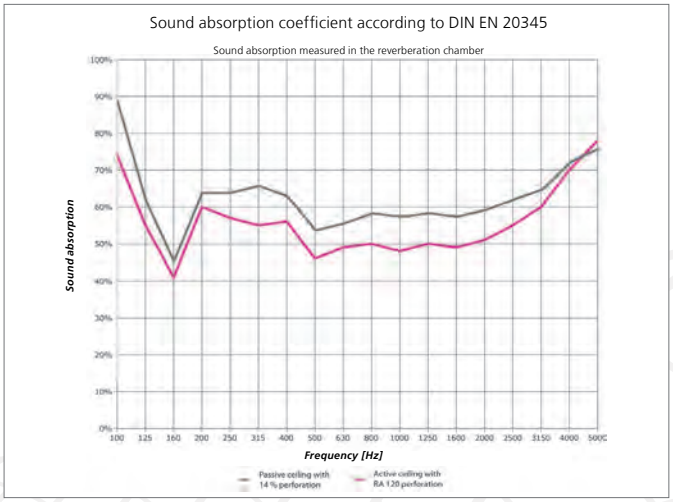
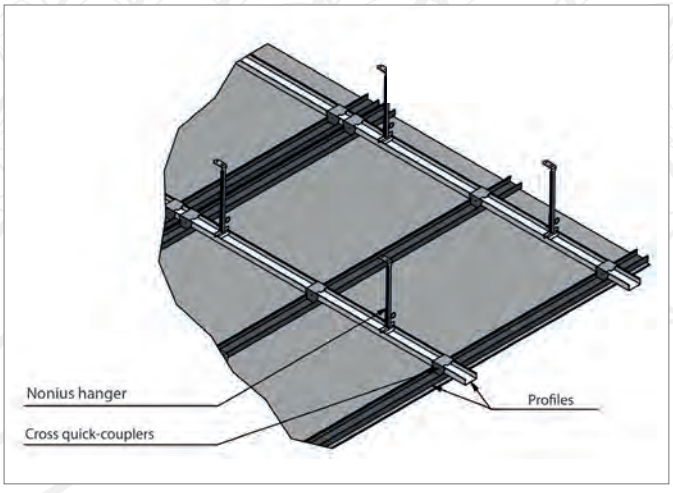


Diagram comparison of sound absorption of active and passive panels



Substructre in 3D

ACOUSTICS

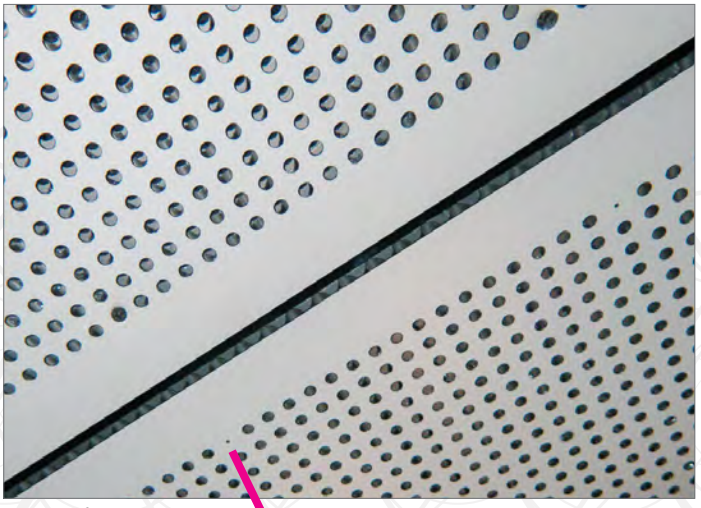
In order to ensure the speech intelligibility during training lessons and to keep the noise disturbance for athletes, trainers and audience low, room acoustic measures are taken. Subject to the kind of room use and the room volume the reverberation time in sports halls should be 1.4 to 2.5 sec., in multi-purpose halls even 1.1 to 4.4 sec.. DIN EN 18032 explicitly requests:

- Speech intelligibility in single and in particular multiple sporting activities
- Voice communication among the athletes
- Speech intelligibility when using a sound system in sports halls with audience
- Noise-free and therefore stress-free sporting activities

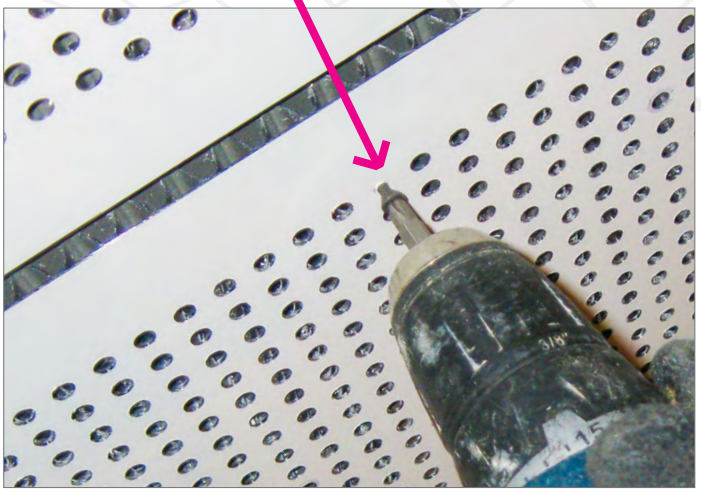
Campus Hoogvliet during installation

INSTALLATION

The installation of the ceiling is quite simple and is carried out using standard CD rails and drywall screws - special and expensive substructures are not required.
A coarse and fine grid construction is mounted to the ceiling. The coarse grid has a spacing of 900 mm, the spacing of the fine grid depends on the width of the ceiling panels. If the width is 1480 mm, three fine grids must be provided per panel; in each case on the panel longitudinal edges and in the centre of the panel. The spacing is 700 mm.
The perforated ceiling panels have a pre-drilled 2 mm hole instead of a 6 mm perforation hole at the points where the drywall screws have to be set - which clearly determines the positioning of the screws.
The screw head diameter of 5.9 mm is very similar to a perforation hole, so the attachment is hardly noticeable from the floor. In our example the gap between the panels is 10 mm.
All edge panels are supplied with over dimension. The excess material has to be cut off by the customer during assembly. This allows to level out tolerances of the building and to create a uniform shadow gap towards the walls.



Detail perforation and shadow gap



Detail fixation

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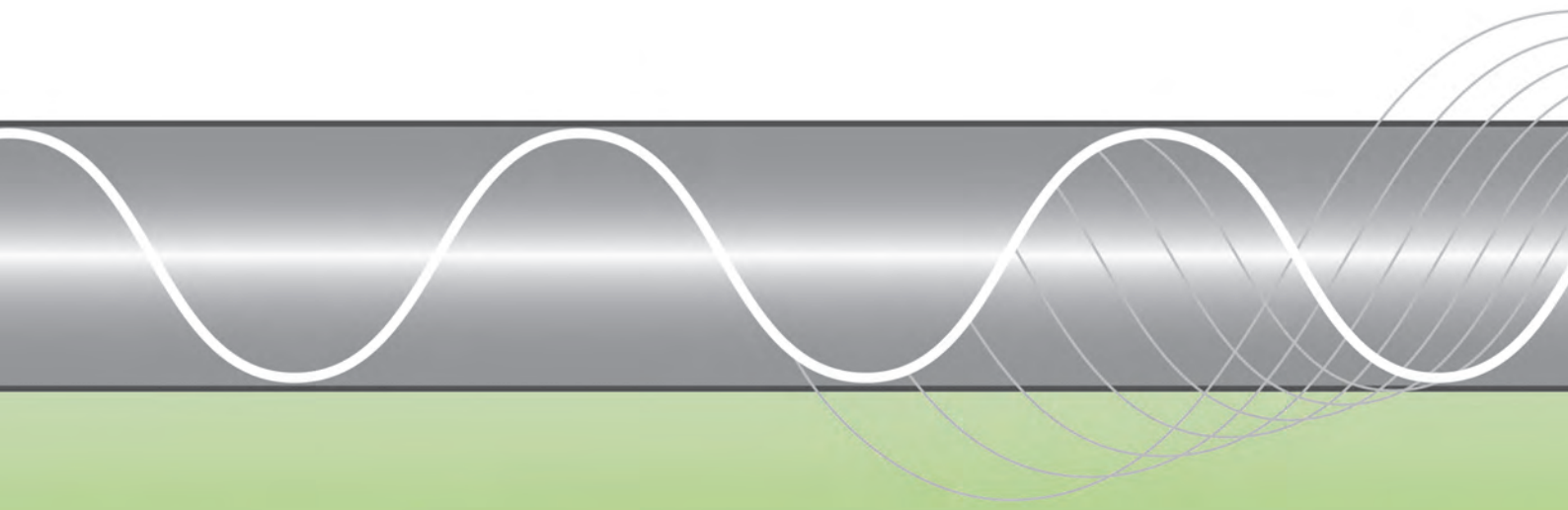

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