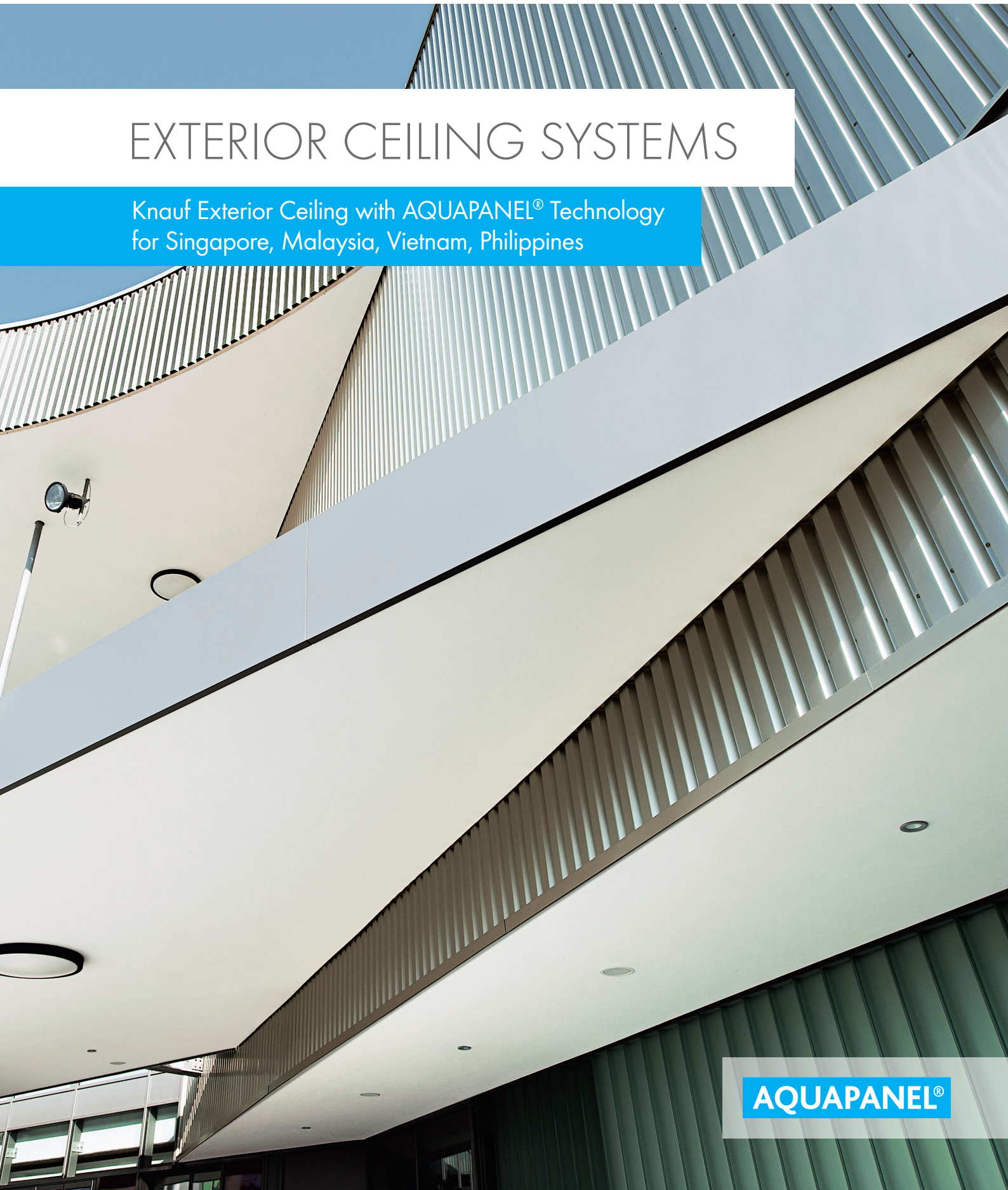
EXTERIOR CEILING SYSTEMS

Knauf Exterior Ceiling with AQUAPANEL® Technology
for Singapore, Malaysia, Vietnam, Philippines



AQUAPANEL®

Knauf AQUAPANEL® Exterior Ceiling System is engineered to withstand the most challenging of wet conditions.

System introduction

Knauf AQUAPANEL® Exterior Ceiling System is a high-performance, economical and sustainable solution for dry lining style construction of exteriors.

From external soffits, underpasses or open and underground car parks to exterior ceilings, our solution is engineered to withstand the most challenging wet conditions.

Outstanding protection against high humidity and moisture

Knauf AQUAPANEL® Exterior Ceiling System is the perfect solution for ceilings exposed to moisture, wind loading and coastal environments. The components are designed and tested to achieve the highest performance of construction.

AQUAPANEL® Cement Board Outdoor is water-resistant and made of inorganic materials, which prevents mildew from forming and spreading.

The steel framing system, designed to support AQUAPANEL® Cement Board Outdoor is supplied by Rondo, with components coated with Zinc Z275 / Zinc-Aluminum AZ150, making it suitable for a variety sheltered exterior ceiling applications (refer Rondo for details).

Options for external finishes

Different external renders can be specified as a finish coat, offering options for texture and colours.

Simple installation

The combination of lightweight materials and the simplicity of installation make the overhead work easier and faster.

Complete Knauf engineered solution backed by industry experts.

Our team of Engineers and Specification Managers will provide you with support throughout the project; from conceptual design, reviewing architectural drawings and site support to ensure optimum performance in design and construction.

EXTERNAL SOFFITS AND CEILINGS

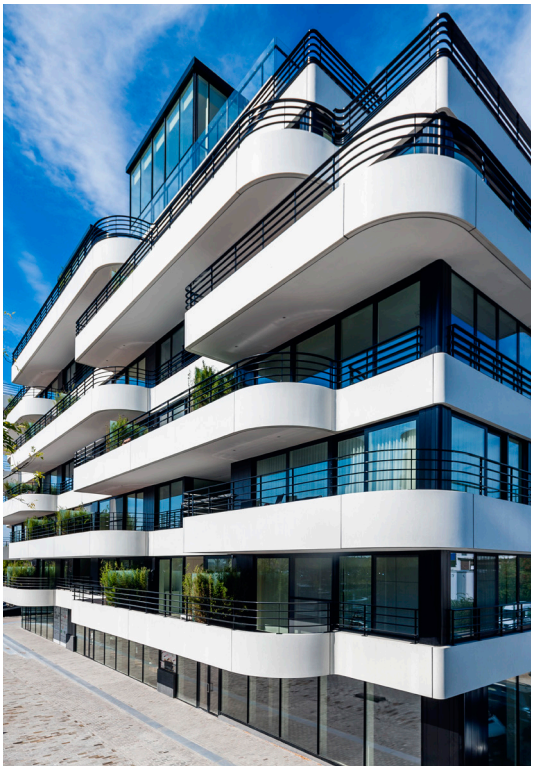
Benefits

- Simple installation
- Easy to cut, score and snap
- No pre-drilling for fasteners
- Resistant to moisture and driving rain
- Mould and mildew-resistant
- Dimensionally stable, robust and durable
- Non-combustible (A1) - complies with European standards
- Creative design opportunities
  - Options for the creation of curved ceilings
  - Spectacular ceilings thanks to expansion joints that are only needed every 15 m and enable a 225 m^2 closed area without a visible joint*
- Large choice of colours, textures and finishes with different external render systems

Ideal dry lining solution for exterior ceilings such as soffits, undersides of balconies, underpasses and underground car parks with proven resistance to moisture or mildew forming and spreading.

With Knauf AQUAPANEL® Exterior Ceiling Systems, exterior ceilings are optimally protected against various types of weather effects, regardless of their location.

*A control/movement joint must be installed if there is a control/movement joint in the structure underneath.



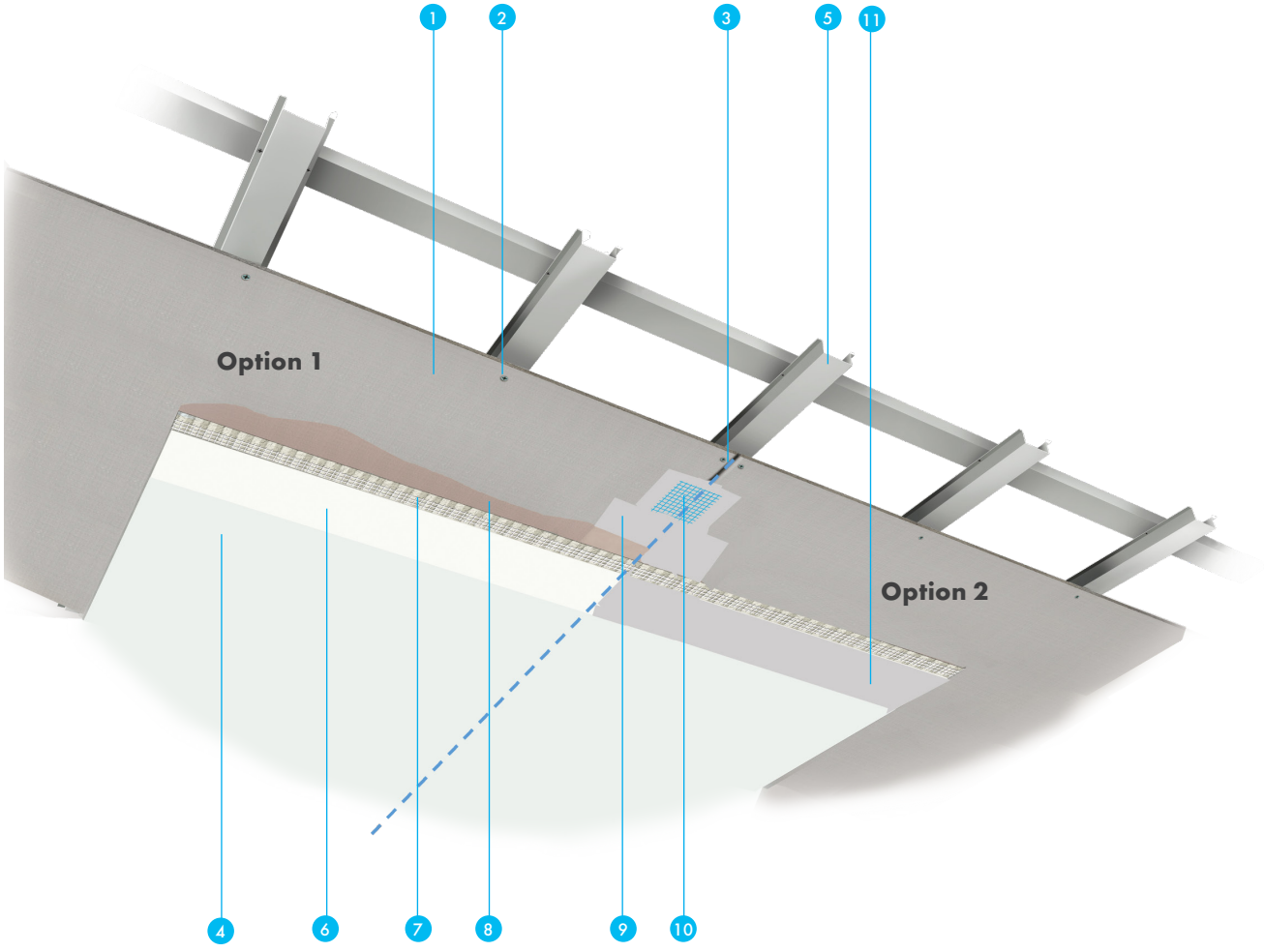
Zuidzicht | Hassel, Belgium

Physical properties	
Length (mm)	2,400
Width (mm)	1,200
Depth (mm)	12.5
Min. bending radius for 1,200 mm wide board (m)	3
Min. bending radius for 300 mm wide strip (m)	1
Weight (kg/m^2)	approx. 16
Dry bulk density (kg/m^3) according to EN 12467	approx. 1,150
Bending strength (MPa) according to EN 12467	≥ 7
Tensile strength perpendicular to the plane of the board (N/mm^2) according to EN 319	0.65
Shearing strength (N) according to EN 520	607
pH-value	12
Thermal conductivity (W/mK) according to EN ISO 10456	0.35
Thermal expansion (10^{-6} K^{-1})	7
Water vapour diffusion coefficient μ (-) according to EN ISO 12572	66
Length variation 65% - 85% humidity (mm/m) according to EN 318	0.23
Thickness variation 65% - 85% humidity (%) according to EN 318	0.2
Building material class according to EN 13501	A1 non-combustible
Certificate of conformity (COC) according to BS 476-4:1970 (Singapore)	non-combustible
Fungus Resistance according to ASTM D3273-16	Rating 10 (0 defacement by mold growth)
Fungus Resistance according to ASTM G21-15	Rating 0 (No fungal growth)

EXTERIOR CEILING SYSTEMS WITH AQUAPANEL® CEMENT BOARD OUTDOOR

EXTERIOR CEILING SYSTEM D 282.1 Ext. SEA

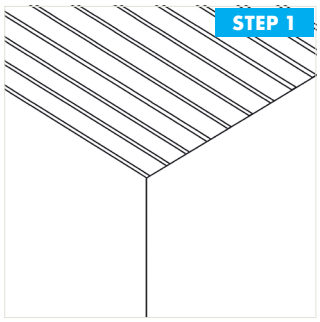
1. AQUAPANEL® Cement Board Outdoor
2. AQUAPANEL® Maxi Screws
3. 3-5 mm gap in adjacent boards at the long and short edges. Ensure short edges located along the metal profile
4. Paint or render system by others
5. Rondo exterior ceiling system
6. AQUAPANEL® Joint Filler & Skim Coating - white
7. AQUAPANEL® Reinforcing Mesh
8. AQUAPANEL® Board Primer
9. AQUAPANEL® Joint Filler – grey
10. AQUAPANEL® Tape (10 cm)
11. AQUAPANEL® Exterior Basecoat



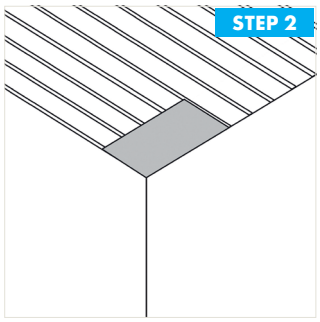
EXTERIOR CEILING SYSTEMS WITH AQUAPANEL® CEMENT BOARD OUTDOOR

INSTALLATION

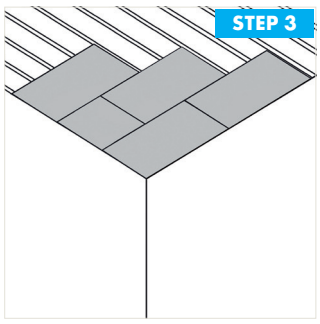
Install Rondo Exterior Ceiling, at a maximum spacing of 300mm, please refer to Rondo's design and details. Ensure framing set out accommodates for control joints in AQUAPANEL® Cement Board Outdoor and the building structure.



Align the first AQUAPANEL® Cement Board Outdoor panel carefully, perpendicular to the Rondo profiles. Screw the panel to the framework with AQUAPANEL® Maxi Screw. The distance between the supporting profiles is a maximum of 300 mm.



With subsequent board installation, leave a gap of 3-5 mm between adjacent boards on all sides. Make sure all short edges are supported by the profiles and staggered minimum 600 mm. Cross joints are not permitted. We recommend that control joints are installed in the AQUAPANEL® Cement Board Outdoor at 15 m maximum intervals and to coincide with building control joints. The result is a maximum jointless area of 15 m x 15 m. Special ceiling geometries, e.g. highly angled ceiling surfaces, may, in individual cases, require a narrower arrangement of control joints (please contact AQUAPANEL® Regional Specification Manager for more details).



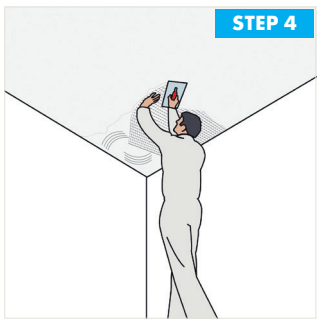
Option 1:

Prime the boards with AQUAPANEL® Board Primer.

Apply on the ceiling surface AQUAPANEL® Joint Filler and Skim Coating - white (4 mm thickness) and embed AQUAPANEL® Reinforcing Mesh.

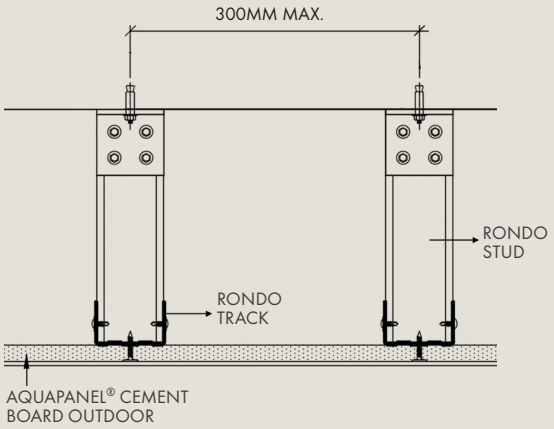
Option 2:

Apply AQUAPANEL® Exterior Basecoat (5-7 mm thickness) and embed AQUAPANEL® Reinforcing Mesh.

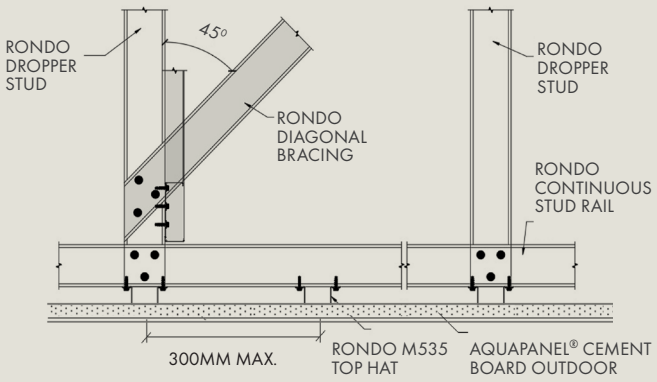


EXTERIOR CEILING SYSTEMS

Ceiling span ≤3m and ≤1.2 kN/m² wind load*



>1.2 kN/m² wind load



Preliminary design acc. to BS 5950-1:2000 for Stud Wide Flange Hangar 92x0.75, Frame 76x 0.75, Furring 50x0.75

Conventional Ceiling

Design wind load (kN/m2)	1.2	1.5	2	2.5	3.3
Hangar Drop (mm)	1200*	1200	1200	1200	1200
Hangar Spacing (mm)	750*	750	750	750	750
Primary Member (mm)	1100	1000	900	900	800
Secondary Member (mm)	300*	300	300	300	300
Hex Head Screw (nos)	6	6	6	6	6

Notes:

1. Selfweight of 12.5 mm AQUAPANEL® Cement Board Outdoor - 16 kg/m².
2. AQUAPANEL® Cement Board Outdoor span at 300 mm maximum.
3. AQUAPANEL® Cement Board Outdoor span over minimum 3 supports. Contact Knauf for information if otherwise.
4. Ultimate limit state checked for the following cases.
   a. 1.4 Dead Load + 1.4 Wind Load
   b. 1.2 Dead Load + 1.2 Impose + 1.2 Wind Load
5. An allowance of 19 kg/m2 for Dead Loads has been considered: thermal insulation, finishing system and accessories.
6. Refer to Rondo for design and details of support framing system.
7. Seismic loads and cyclonic loads have not been considered. Contact Knauf/Rondo for more information.
   Refer to Knauf (www.Knaufapac.com) or Rondo (www.rondo.asia) for information.
8. This must be subsequently verified by an object-related structural calculation, according to the local standards and design guidelines. The choice of anchors and further fixing materials (e.g. angle fixing) to transfer the loads into the primary structure should only be made on the basis of this project-specific structural design.

EXTERIOR CEILING PROJECTS

iADC Design Museum | Shenzhen, China

Suzhou No.2 Library | Suzhou, China

Design Hotel in Rovinj | Croatia

Mercedes Showroom | Ypres, Belgium

Aviatorilor 8 | Bucharest, Romania

Public Swimming Pool | Pula, Croatia

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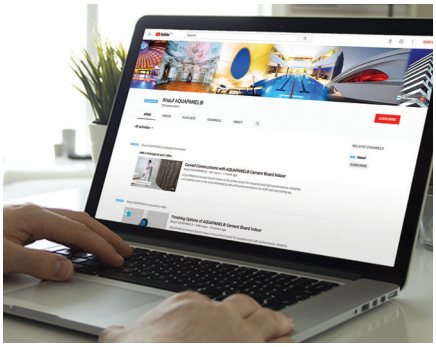
› aquapanel.info@knauf.com



YOUTUBE CHANNEL

See AQUAPANEL® in action. Our YouTube channel features product introductions and how-to videos on everything from installation to finishing options and curved wall constructions. It's all available any time – and we'll be regularly updating the channel with our latest videos, making it the first place to go for new AQUAPANEL® content.

› www.youtube.com
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