BUILT ON EXPERIENCE

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

AQUAPANEL®

THE DESIGN AND CONSTRUCTION LANDSCAPE IS CHANGING

There's an increasing demand to build faster, more efficiently and cost-effectively. There's a global call for more imaginative and sustainable designs. And there's a revolution in materials and construction techniques, opening up a new world of possibilities.

Architects are at the forefront of these changes. Driven by their vision and experience, the built environment is changing for the better, with more ambitious ideas, inspirational designs and beautiful spaces where people want to live and work.

For over 80 years, Knauf has been partnering architects in shaping this new landscape.

Continually pioneering new products, services and solutions in drywall construction, we push the boundaries of what's possible, opening the door to bolder design and better buildings. This is our expertise. Combined with the experience and talent of architects, we're changing the way the world builds – more creatively, more efficiently, more sustainably.

CONTENTS

BUILT ON EXPERIENCE

In a fast-changing world, Knauf Exterior Wall with AQUAPANEL® Technology delivers creativity, certainty and complete peace of mind whatever the building type – from offices and high-rise residential accommodation through to hospitals and stadiums.

Suzhou Olympic Sports Centre | Jiangsu, China

Markor Art Center | Beijing, China

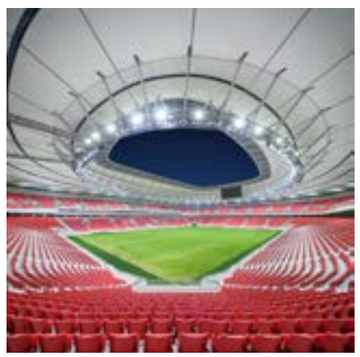
Hunan Broadcasting System Program Production Center | Changsha, Hunan, China

Tai Kwun Centre | Hong Kong, China

Suzhou No.2 Library | Jiangsu Province, China

Xiqu Centre | Hong Kong, China

Shaw Auditorium | Hong Kong, China *© Copyright Kris Provoost, courtesy of Henning Larsen Architects*



SAIC Motor Pudong Arena | Shanghai, China

DEDICATED SYSTEM SOLUTIONS

Knauf Exterior Wall comes in two basic types: drywall, or as a rear-ventilated rainscreen facade. It therefore offers an extremely flexible and adaptable solution which can accommodate an impressive range of designs, opening up new architectural possibilities and helping to turn vision into reality, whether it's being used to create commercial or high-rise residential buildings, or sports arenas or healthcare establishments. Truly, we are changing the way the world builds.

Knauf Exterior Wall – rear-ventilated rainscreen facade

With rainscreen facades for use above solid substructures such as brick or concrete, thermal insulation is separated from the weather protection materials ensuring a constant flow of air in the ventilated space to remove moisture from the building and to optimise indoor climate. Even if the facade is damaged, the insulation remains intact.

Knauf Exterior Wall – drywall solution

Drywall systems are available as single stud or double stud solutions with a variety of creative design options. And although it is most commonly used in skeleton constructions comprising reinforced concrete, drywall is also suitable for timber or lightweight steel-frame constructions.

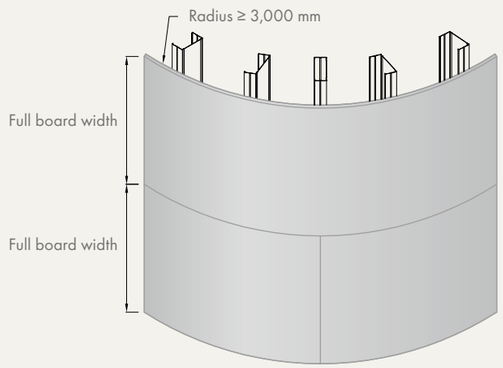
CREATIVE FREEDOM WITHOUT LIMITS

Architects and specifiers worldwide are discovering the liberating potential of Knauf Exterior Wall with AQUAPANEL® Technology. Strong, light and easy to shape into inspirational designs, the system is also able to accommodate a huge range of finishes to beautiful effect. And thanks to its easy adaptability and simple integration of building technology, Knauf Exterior Wall always remains flexible against any usage – or weather-related influences.

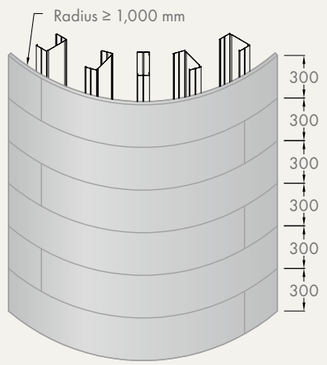
New design possibilities for curved walls

With a bending radius of 3 metres (full board) and 1 m (300 mm strips), AQUAPANEL® Cement Board Outdoor allows designers to introduce a variety of curved shapes and creative designs, including domes and arches. Moreover, by using double studs, it's possible to create different interiors and exteriors: for example, a wall that's concave on the outside, and convex on the inside.

Arrangement of AQUAPANEL® Cement Board Outdoor with different radius



Assembly with full board size panels for radius ≥ 3,000 mm



Assembly with 300 mm width panels for radius ≥ 1,000 mm

Stunning surfaces and finishing options

Compatible with an extensive range of surface finishes, from paint and renders, through to adhered materials like clinker bricks, tiles or glass elements, Knauf Exterior Wall solutions offer unlimited scope for creative expression. Even a variety of cladding systems can be realised, resulting in very thin ventilated constructions, because the required insulation is already integrated inside the drywall.

Renders


Broom finish


Combing technique


Concrete look


Fine sponged render


Floated render


Groove render


Modelling render


Paint finish


Pebble dash


Variegated stone wall render

Adhered materials


Ceramic facing bricks


Clinker bricks

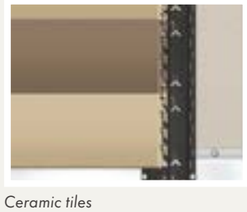

Glass elements


Mosaic tiles


Sandstein design

Ventilated facades on drywall constructions


Aluminium panels


Ceramic tiles


Glass panels


Granite plates


High-pressure compact laminate

Future-proofed and adaptable designs

The pressure on space, the protection of green land, the cost of materials and the demand for sustainability are all reasons why building redevelopment will increasingly gain importance in the future. And already now, architects are embracing the creative challenges of re-imagining and repurposing existing buildings to breathe new life into old stock. With its lightweight properties Knauf Exterior Wall is at the forefront of this movement.

Simple to remove and reconfigure, and giving easy access to electrics, pipework and trunking, Knauf Exterior Wall allows modifications and reutilisations to be carried out quickly and efficiently, helping change the look of buildings, as well as their function. This also includes measures during running operation of the building: for example, changing the layout of hospitals to accommodate changing need. Whether it's repair, modification, more energy-efficient renovation or creative remodelling, Knauf Exterior Wall provides a future-proofed and adaptable solution.

Multifunctional and integrative compositions

Depending on the construction task and location, increasing demands are placed on building technology. It is responsible, for example, for measuring weather-related, daily and seasonal conditions on the outside and for harmonising ventilation, lighting and heating technology in a way that guarantees a comfortable environment on the inside. Such climatic and energy optimisation is often accompanied by technical solutions that normally take up space in the interior of the building.

With the help of Knauf Exterior Wall, such solutions can be integrated into the building envelope faster, more flexibly and more easily compared to solid construction methods. Wall openings or core hole drillings through the outer wall can be omitted and electrical connections are easy to install even in the event of a retrofitted installation. In this way – for example, due to the installation of decentralised heating and ventilation equipment inside Knauf Exterior Wall – the usable space in the interior is increased and construction costs are saved by reducing the floor heights. This is because suspended ceilings to accommodate an air distribution system are no longer required.

FASTER, EASIER, MORE EFFICIENTLY

The installation of Knauf Exterior Wall is fast and efficient. It's components are light and easy to handle and due to the just in time window installation and the fast closing of the building envelope, the construction is largely weather-independent and interior works can begin significantly earlier than with conventional building methods.

Simplified installation

Knauf Exterior Walls with AQUAPANEL® Technology are easy to use. All drywall and facade works – exterior, interior and finishing – can be carried out by a single trade, meaning fewer hands and less risk as well as a streamlined construction process. Only the cabling and pipework inside the interior stud frame as well as window and windowsill installation require the involvement of additional parties.

Easier handling

The core component of Knauf Exterior Wall – AQUAPANEL® Cement Board Outdoor – is a lightweight board, making it much easier to handle. No pre-drilling is required, while a simple 'score and snap' technique means it can be cut quickly and efficiently. It also has a bending radius of up to 1 m in a dry state, further simplifying construction.

Similarly, Knauf's glass mineral wool with ECOSE® Technology delivers significant advantages in handling. As well as being odourless and generating significantly less dust, over 90% of professional installers state that glass mineral wool with ECOSE® Technology is softer and less itchy than conventional mineral wool. A majority of installers also say it's easier to cut.

Digression: creating much needed living space

In times of increasing urbanisation worldwide, and at the same time scarce living space in the cities, calls for fast residential construction are becoming louder and louder. However, traditional solid construction methods do not seem to offer any solutions for the creation of timely and affordable housing for broad sections of the population. Many answers are therefore aimed at modular construction, which can be carried out quickly and weather-independently due to prefabrication in the factory. Mass production makes these offers affordable, but - depending on the supplier - may also entail compromises in terms of individuality.

In addition, some municipalities and housing associations see a challenge in the compatibility at the modules' intersections (e.g. cable and pipe installation or joint treatment) and against the backdrop of resource efficiency, modular construction is not necessarily the first choice. Because, to withstand the high loads during transport, steel needs to be installed – more than necessary if assembled on site.

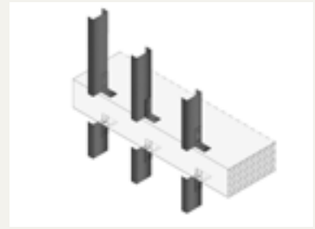
Here Knauf Exterior Wall forms a middle ground between usual solid construction methods on site and the modular design in the factory. Knauf Exterior Wall, like solid construction, can be designed individually, but is less fraught with risk due to fewer interfaces between individual trades. At the same time, like modular construction, it is efficient and largely weather-independent, and additionally offers compatibility due to the lack of intersection issues. Knauf Exterior Wall thus combines the advantages of both construction methods – modular and solid.

Accelerated construction

The building envelope can be closed immediately after the joint treatment of the boards, significantly earlier than with conventional methods such as brick and block. (Once jointed, the boards can also be left for up to 6 months, providing added peace of mind). As a result, interior works (including screeding and the installation of stud frames, vapour barriers, lining and insulation) can progress simultaneously with exterior finishing, resulting in a more efficient construction.

Working to precise plans and dimensions, manufacturers can build windows in advance and transport them to the site, ready for immediate installation. This adds reassurance to project delivery deadlines and significantly contributes to accelerated construction and weather independence compared to traditional ways of construction. In masonry variants, such as aerated concrete or sand lime brick, if the windows are not installed in the insulation layer, the openings must first be measured after erection of the exterior wall. Unlike Knauf Exterior Wall, this is a disadvantage which brings considerable time delays.

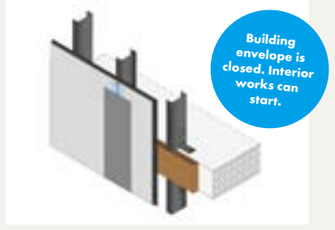
1. Install the scaffold



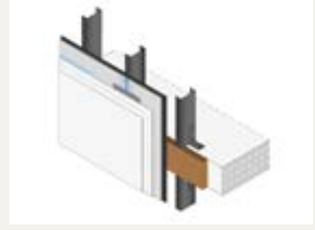
2. Install exterior stud frame

3. Insulate floor front and temporarily bond water barrier to the studs

4. Install ACB outdoor



5. Joint treatment



6. Apply base coat and finishing

Solid construction/traditional construction – example: office building 3,000 m² area

Weeks	−5	−4	−3	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Build the solid wall						■	■	■	■										
Determination of the wall opening dimensions										■									
Window manufacturing in factory										■	■	■	■	■	■				
Window installation																■	■		
Apply the finishing and insulation (if required)																		■	■

Knauf Exterior Wall – example: office building 3,000 m² area

Weeks	−5	−4	−3	−2	−1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Accurate generation of the wall opening dimensions						■													
Window manufacturing in factory						■	■	■	■	■	■								
Window installation								■	■										
Building of Knauf Exterior Wall incl. finishing									■	■	■								

← 8 WEEKS FASTER →

FASTER PAYBACK AND A HIGHER RETURN ON INVESTMENT

The lightweight nature of Knauf Exterior Wall doesn't just help deliver efficient and economical builds, it delivers significant financial benefits too, both in terms of construction costs and rental or resale value.

Lower construction costs

Because Knauf Exterior Wall with AQUAPANEL® Technology is a lightweight solution, there is significantly less bearing load in both primary construction and foundation works. How significant the weight difference between traditional construction methods and Knauf Exterior Wall can be, is shown in the graphs at the bottom of this page. As a result, the building design and its construction can be executed much more cost-effectively.

Weight for weight, Knauf Exterior Wall solutions also cost less to transport than traditional building materials such as brick, while the speed of installation reduces the extended need for scaffolding, helping cut rental costs. Equally, the use of drywall solutions eliminates water waste, while a faster drying time minimises the amount of energy needed to dry out the construction. These advantages drive cost benefit into the project right from the start.

Increased sale and rental value

With Knauf Exterior Wall, it is possible to achieve the same thermal performance as brick and block with a thinner wall thickness, meaning that more internal floor space is available for sale or for rent. The graphs at the bottom of this page show how much of the area occupied by the exterior wall in traditional ways of construction can be converted into usable, productive space by using Knauf Exterior Wall. Equally, speedy construction means that a sale – or rental return – can be achieved more quickly than with traditional construction methods. Both factors combine to ensure a faster and higher return on investment.

OPTIMUM DESIGN, MINIMUM IMPACT

In today's construction environment, there is a drive to reduce the impact of the building on human health and the natural environment. This must be considered at every stage of the process, from planning and design through to construction, use, renovation and demolition. There are various ways this can be achieved, and Knauf Exterior Wall solutions offer strong capabilities in each case.

Energy efficiency and CO_2 reduction

Energy is used both in the production, transportation and installation of building materials (the 'embodied' energy), as well as during habitation and use (the 'operating' energy).

Embodied energy

This represents up to 30% of the overall life-cycle energy consumption of a building and is therefore a significant factor. The exact percentage varies based on factors including the age of building, the local climate and the exact nature of materials used. Historically, this percentage has been lower. However, the intensifying focus on minimising operational emissions – e.g. by driving efficiency improvements in heating and cooling – has meant both a relative increase in embodied energy, and in its importance as a measure.

Many of the products within Knauf Exterior Wall with AQUAPANEL® Technology possess an Environmental Product Declaration (EPD) as per ISO 14025 and EN 15804. In addition to referencing environmental impact and waste categories, these EPDs at least provide a product life cycle assessment from cradle-to-gate, including the energy resources needed to supply and transport raw materials and to manufacture the end product.

As a complete system, Knauf Exterior Wall has a 50% less primary energy requirement during manufacture than conventional brickwork construction. Equally, CO_2 output in material production for a Knauf Exterior Wall is 30% lower than brick and block construction. As a specific example, mineral wool with ECOSE® Technology from Knauf Insulation uses a formaldehyde free binding agent, reducing energy demand during manufacturing.

Additionally, because of its lightweight properties, Knauf Exterior Wall uses less energy and generates less CO_2 during transportation, while – because it is a drywall construction – the drying time of the building and therefore the energy required are significantly reduced during the construction phase.

Operating energy

Buildings with a high-performance envelope in a cold climate require just 20% to 30% of the energy required to heat the current average building (source: the Organisation of Economic Co-operation and Development – OECD). The insulation within the walls is a critical factor, and Knauf Exterior Wall has many advantages in this respect – not least superior thermal insulation compared with traditional constructions of an equal thickness. This can be further enhanced by minimising thermal bridges. These advantages are at their biggest with the initial layer of insulation – especially in developing countries where insulation is often not being installed – but can also be significant in developed countries. This is especially the case in renovations of poorly insulated stone, masonry or concrete constructions, where Knauf's rear-ventilated rainscreen facade with insulation offers a smart and effective solution. The ability to install varying thicknesses of mineral wool in that system, means that the desired energy standard can be reached, even in the most demanding situations.

Materials efficiency and waste reduction

Efficient building materials include products that are reusable, renewable, and/or recyclable. The reuse and recycling of these materials require that buildings at the end of their useful life are not demolished and hauled to landfills. 'Deconstruction' is a method of harvesting and reclaiming useful building materials. Selective demounting and separation of Knauf Exterior Wall with AQUAPANEL® Technology can be carried out easily, reducing the volume of waste while increasing the potential for recycling.

Simply re-imagining a building and extending its useful life also reduces waste. The adaptability of Knauf Exterior Wall (see page 9) facilitates modifications and reutilisations, even while the building is in use. Renovations with rear-ventilated facade systems guarantee continued use without being forced to make compromises in design or energy-efficiency. And once installed, a service life of approximately 50 years can be achieved (according to Environmental System Declaration).

Waste arising during production of AQUAPANEL® Cement Board Outdoor is fed back into the production process. The amount of recyclable materials in the composition of AQUAPANEL® Cement Board Outdoor is approximately 5-10% by mass.

Protecting occupant health

In LEED standards, the Indoor Environmental Quality (IEQ) sets out to measure and improve the well-being and comfort of building occupants using five key categories – one of which is indoor air quality (IAQ). Here, the focus is on minimising the effects of air impurities – including volatile organic compounds (VOC) and other microbial contaminants – which are present in the majority of building materials and maintenance products, and which have the potential to negatively impact on occupant health and productivity. Choosing zero or low VOC emission materials and finishing products – such as those built in Knauf Exterior Wall – improves both the building's IAQ and the comfort of its occupants.

Most of the products of Knauf Exterior Wall are classified A+ according to French VOC regulation. As an example, the ECOSE® Technology from Knauf Insulation enables the production of natural mineral wool insulation materials bonded with a bio-based technology free from formaldehyde, phenols, acrylics and with no artificial colours, bleach or added dyes. These products passed a VOC emission chamber test, where the sum of VOC measured was below the limit values of 1,000 µg/m³ after 3 days and 100 µg/m³ after 28 days. The products were awarded with the Eurofins Indoor Air Comfort Gold Certificate.

The accumulation of moisture and the knock-on effects of damp – including mould, viruses and bacteria – are also contributing factors to poor IAQ. Using water and mould resistant products helps to minimise or eliminate these issues.

To achieve reliable moisture protection, Knauf Exterior Wall has a layered structure with a carefully designed sequence of vapour barring and breathable materials. In an unfavourable climate, this helps to diffuse condensate safely to the ambient air. To protect the insulation, the water and windproof AQUAPANEL® Water Barrier is installed behind the AQUAPANEL® Cement Board Outdoor, while to avoid condensate formation inside the wall, a vapour barrier is installed behind the interior lining.

Quality certifications

Company:
- ISO 9001

Systems:
- Environmental System Declaration

Products:
- Declaration of Performance
- ETA-07/0173
- LEED Confirmation
- Certificate of Building Biology
- Environmental Product Declarations
- Safety Against Ball Throwing
- Blue Angel (Insulation)
- Eurofins Indoor Air Comfort Gold Certificate (Insulation)
- Certificate of Conformity (COC) in accordance with SCDF Fire Code 2018 requirements (Singapore)
- Singapore Green Building Product Certificate

Scan to get access to certificates

BUILDING ENGINEERING PHYSICS – A CERTAIN SOLUTION

The defining quality of Knauf Exterior Wall solutions is the ability to prevent water from entering the construction. Combined with moisture protection, thermal and acoustic performance and effective resistance to both fire and seismic activity, Knauf Exterior Wall with AQUAPANEL® Technology allows you to create the buildings you want, with the attributes you demand and the quality assurance you need.

Moisture protection

Knauf Exterior Wall solutions feature a layer design which combines a sequence of vapour barring and breathable materials to enable moisture and condensate within the construction to be safely released. The result is reliable protection in even the most unfavourable climates.

Corrosion protection

The Knauf Exterior Wall consists of a lightweight steel construction including fastener, connecting and anchoring materials. The steel components are to be protected against corrosion. The minimum corrosion protection category to be chosen is C3-high according to EN ISO 12944 (urban and industrial atmospheres with moderate air pollution) to ensure the serviceability and longevity of the Knauf Exterior Wall of 50 years. For higher requirements and the corrosion protection category to be chosen, a detailed analysis of the object-related atmosphere has to be carried out. Generally, the category of corrosion protection has to be determined by the planner on an object-related basis.

Fire protection

All components within Knauf Exterior Wall are non-combustible, with the exception of the membranes which dissipate quickly without causing damage. By exchanging or adding components, Knauf Exterior Wall can meet a variety of fire safety requirements. For example, fire resistance class EI30 of an undisturbed wall construction can be achieved by lining the interior stud frame with two gypsum boards.

Sound protection

Because of its construction and sequence of layers, Knauf Exterior Wall creates a spring-mass system which helps maximise sound reduction. Window installations and other penetrations of the wall can influence the sound protection of the exterior wall and have to be considered object-wise.

Thermal insulation

Knauf Exterior Wall provides superior thermal insulation compared with traditional constructions of an equal thickness. And the thermal performance of each Knauf Exterior Wall can be further enhanced with various measures, each helping to minimise the impact of thermal bridging.

Examples include using:

- A second insulation layer, such as ETICS
- A double stud system instead of a single stud
- Intermediate insulation between the stud frames in a double stud system
- Offset/staggered profiles
- Ventilated construction or a construction in front of floors to minimise thermal bridges between Knauf Exterior Wall and the concrete slabs

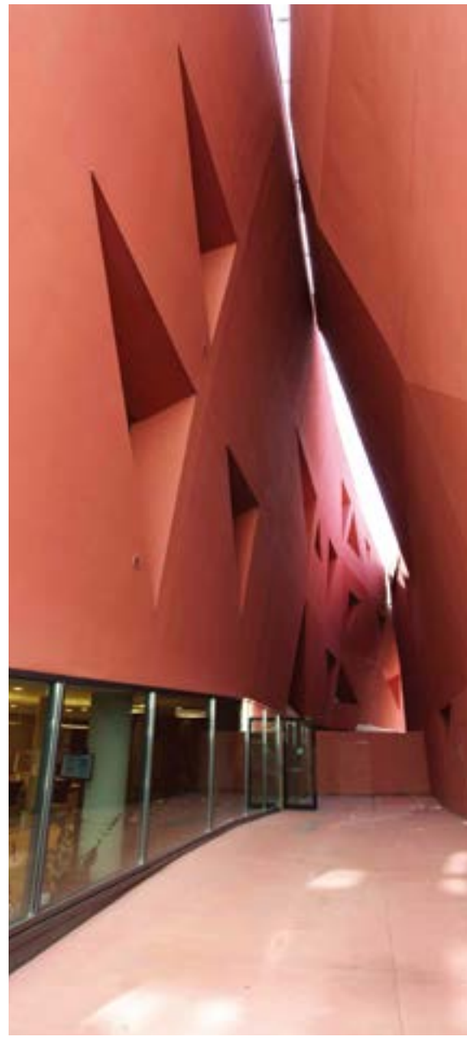
With respect to thermal insulation, the construction related advantages of the rear-ventilated rainscreen facade are the heat insulation and the good room climate conditions in the summer. The discharge of hot air over the ventilation gap prevents a potential heat accumulation or a heat up between facade and insulation. Furthermore the exterior wall warms up to a lesser extent and more slowly than with direct contact with solar radiation. That way the temperature inside the building remains comfortable in the summer, the room climate is less vulnerable to variations in outdoor temperature, and the energy demand for cooling is reduced.

Earthquake safety

During seismic activity, Knauf Exterior Wall experiences a lower risk of failure than traditional construction materials, thanks to its ductility and positive deformation behaviour. Moreover, in the event of actual failure, its lightweight properties are less potentially damaging to the surrounding area. Compared with most other building types, Knauf Exterior Wall is also easier to repair and rebuild, making it ideal for use in earthquake zones.

Expansion joints

Expansion joints have to be provided at a distance of ≤ 15 m, in order to allow weather-related expansion and shrinkage. Building separation joints and expansion joints in the primary construction have to be incorporated into the facade. Some facade geometries such as complex surfaces and facades that are subject to increased stress may require additional expansion joints.



BRINGING EXCELLENCE AND EXPERTISE TO YOUR PROJECT

Knauf Exterior Wall encapsulates versatile components and features – but, more importantly, it embodies the expertise of our pioneering past. Because of this, we're able to help shape a better present and future. Our whole focus is on supporting our partners and customers, giving them the inspiration and solutions they need to create better buildings.

Established in 1932, Knauf is a global group employing over 27,000 people across 86 countries. Supported with an extensive distributor network, we deliver an exceptional local service across all territories – and all from one single source. A key part of this group – and of Knauf's Exterior Wall with AQUAPANEL® Technology – Knauf AQUAPANEL is based in Germany. Since 2002, Knauf AQUAPANEL has pioneered drywalling solutions and technology and applied its expertise to help create certainty in a changing world.

AQUAPANEL® is the home of the Knauf Dry Exterior Wall Competence Centre

Knauf AQUAPANEL is also the home of the Knauf Dry Exterior Wall Competence Centre. Sitting at the heart of our innovation and technical expertise, this centre acts as a pivotal resource, gathering insight and best practice and offering advice and technical support at every stage of the process – from design, specification and planning through to installation and beyond, ensuring that the full benefits of Knauf Exterior Wall solutions are available to our customers.

Our support includes:

- Local expertise delivered via country-based Specification Managers (with the back-up of an International Technical Support team)
- Project-related system recommendations including static pre-dimensioning, physical analyses, U-Value calculations and hygrothermal simulation
- Site visits and support, via an experienced team of Application Engineers
- Assistance with the certification of products and systems, including approval tests and building law examinations
- The supply of samples, mock-ups or demonstrations to aid decision-making
- Wide range of technical documentation including consumption tables, installation guides, leaflets and CAD Files
- Wide range of technical and practical training, available locally or at our International Training Centre in Dortmund
- ISO 9001 certified, ensuring Quality Control and high standards of service

AQUAPANEL® CEMENT BOARD OUTDOOR

Exceptional weatherproofing, outstanding benefits.

Knauf Exterior Wall with AQUAPANEL® Technology comprises comprehensive system solutions, made possible by a core product at the heart of each system – AQUAPANEL® Cement Board Outdoor. This key component is a premium product offering unrivalled performance in wet and humid conditions, helping to protect buildings quickly, effectively and permanently. Manufactured from aggregated Portland cement, AQUAPANEL® Cement Board Outdoor features coated glass fibre mesh in the back and front surfaces for added strength. The ends are square cut, and the edges reinforced with a smooth finish (EasyEdge™).

Performance

- 100% water-resistant – dimensional stability
- Mould and mildew resistant
- Freeze-thaw cycle proven
- Non-combustible (A1) – complies with European standards
- Non-combustible - complies with Certificate of Conformity (COC) according to BS 476-4:1970 (Singapore)
- Robust and reliable, safe and hygienic material

Installation

- Lightweight cement board – less effort in handling
- Easy to cut using a simple score and snap technique
- No pre-drilling required
- Bending radius of 3 m at full board size, and 1 m with 300 mm wide strips

Finishing

The AQUAPANEL® portfolio includes mineral finish, dispersion plaster, and silicon synthetic resin plaster. Moreover it is compatible with...

- Paint
- Brick slips
- Tiles
- Claddings (e.g. aluminium, granite stone, glass and many more)

Physical properties	
Length (mm)	2,400
Width (mm)	1,200
Depth (mm)	12.5
Min. bending radius for 900/1,200/1,250 mm wide board	3
Min. bending radius for 300 mm wide strip	1
Weight (kg/m²)	approx. 16
Dry bulk density (kg/m³) according to EN 12467	approx. 1,150
Bending strength (N/mm²) according to EN 12467	> 7
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 (–) according to EN ISO 12572	66
Building material class according to EN 13501	A1 non-conbustible
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)

KNAUF EXTERIOR WALL – THE SOLUTIONS

Available in a multitude of modular, dedicated systems, Knauf Exterior Wall with AQUAPANEL® Technology can be quickly and easily configured to meet a range of design challenges in the planning phase – from complex physical requirements to commercial or economic considerations. The examples on the following pages represent just a small sample of possible permutations.

Knauf Exterior Wall with AQUAPANEL® Technology comes in two basic types: as drywall in skeleton constructions (e.g. reinforced concrete) or as a rear-ventilated rainscreen facade for use above solid substructures such as brick or concrete. In both cases, the primary construction is carrying the structural load, while the lightweight Knauf Exterior Wall solutions carry their own dead weight and the wind loads.

Rear-ventilated rainscreen facade

With classic rear-ventilated rainscreen facades in front of massive constructions such as brick or concrete, thermal insulation is separated from the weather protection materials ensuring a constant flow of air in the ventilated space to remove moisture from the building. On projects where insulation is not required – typically during some purely cosmetic renovations – Knauf Exterior Wall can be used to create very thin facade constructions.

WL132C.1

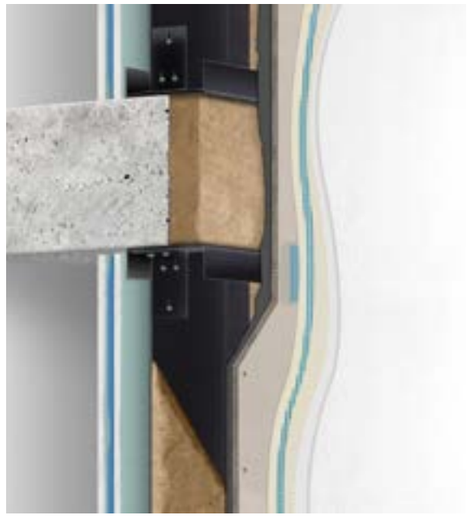
- Rear-ventilated rainscreen facade
- With thermal insulation

› See pages 26-27

Single stud exterior wall

Where there are low or no special requirements for thermal and sound insulation, Knauf's single stud system is an ideal solution. Lightweight and with a thin profile, it is quick and easy to install. Extra insulation can be added by attaching an external thermal insulation composite system (ETICS) to the front of AQUAPANEL® Cement Board Outdoor.

WM111C.1



- Single stud

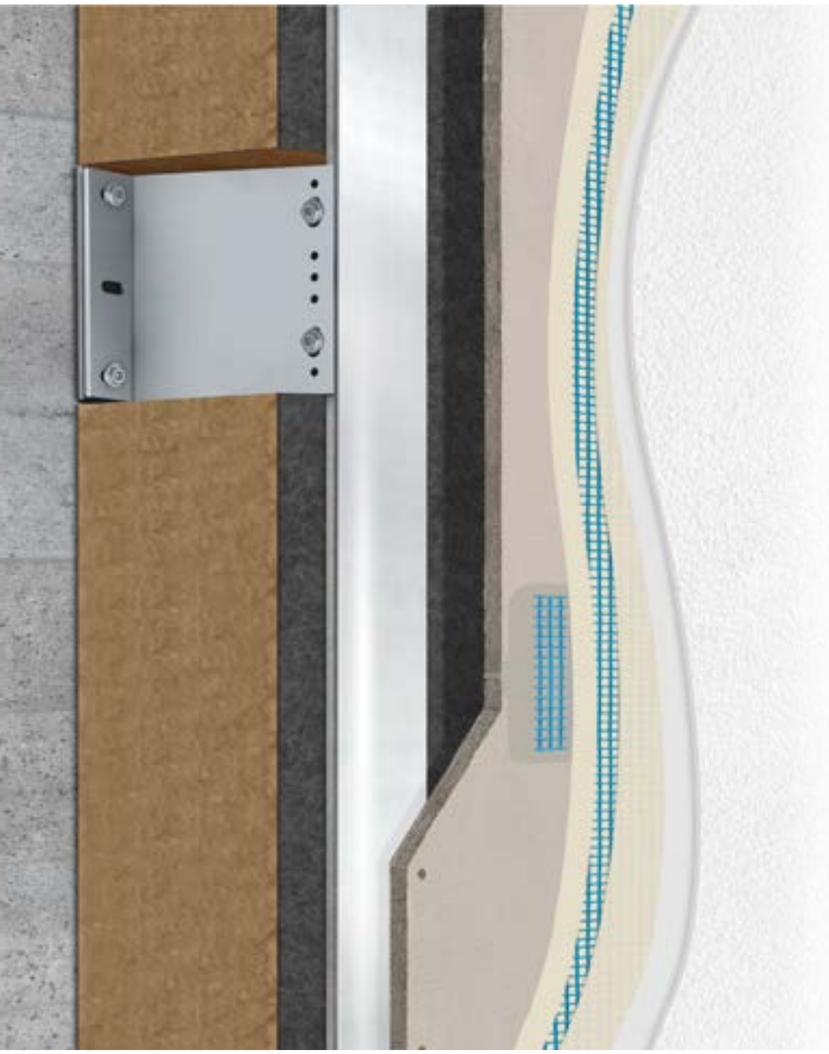
› See pages 28-31

WL132C.1

Rear-ventilated rainscreen facade

With classic rear-ventilated rainscreen facades in front of massive constructions such as brick or concrete, thermal insulation is separated from the weather protection materials ensuring a constant flow of air in the ventilated space to remove moisture from the building. The rear-ventilated rainscreen facade WL132C.1 with AQUAPANEL® Cement Board Outdoor is an ideal solution for new buildings or for renovations and upgrades. Capable of accommodating virtually any thickness of mineral wool insulation, it is able to meet even the most demanding energy standard. Moreover, because of the non-combustibility of the material, it is suitable for any height of building.

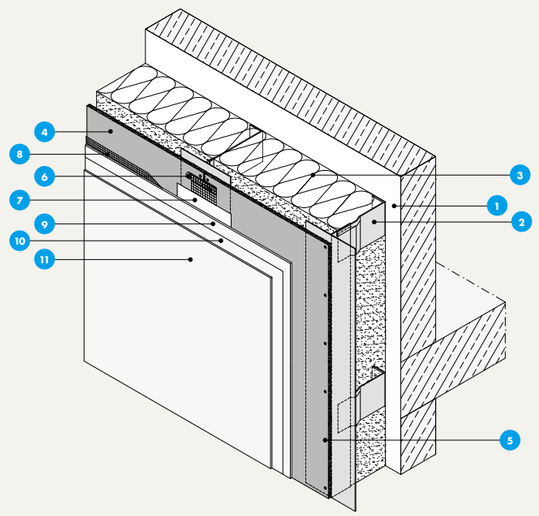
Scan to get more information about this system



Eagle in Flight | Tirana, Albania

Gerber Quartier | Stuttgart, Germany

Piller Blowers and Compressors | Moringen, Germany



1 Thermal separation element
2 RONDO Cladding System
3 Insulation board according to local needs
4 AQUAPANEL® Cement Board Outdoor
5 AQUAPANEL® Maxi Screw
6 AQUAPANEL® Joint Tape (10 cm)
7 AQUAPANEL® Joint Filler – grey
8 AQUAPANEL® Reinforcing Mesh
9 AQUAPANEL® Exterior Basecoat
10 AQUAPANEL® Basecoat Primer
11 Render finish (e.g. AQUAPANEL® Exterior Mineral Finish – white)

Preliminary design acc. to BS 5950-1:2000 for RONDO Stud 681WF (92x50x1.15mm)

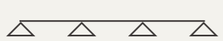
	3 Spans (m), 92x1.15mm		
Design wind load (kN/m²)	1.5m interval	3.0m interval	4.5m interval
0.4			
0.5			
0.6			
0.7			
0.8			
0.9			
1			
1.1			
1.2			
1.3			
1.4			
1.5			
1.6			
1.7			
1.8			
1.9			
2			
2.1			
2.2			
2.3			
2.4			

The span table is used to show how the substructure needs to be dimensioned as a function of wind loads [kN/m²] according to the relevant national standards and the span widths of the profiles, which are determined (usually synonymous with floor height). The substructure shown in the table comprises only the RONDO Stud 681WF (92x50x01.15mm).

The fixing to the load-bearing structure is not considered. It is assumed that the profile is planked with AQUAPANEL® Cement Board Outdoor. An angle fixing of the profile to connect to the load-bearing structure is recommended in any case. 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.

Further profile solutions can be demonstrated by a simple proof of the fitness for use shown by a deformation limit of max. f = l/360.

600 mm stud spacing
400 mm stud spacing
300 mm stud spacing
Please refer to Appendix, you can contact specification manager for further assistance



- Interval: Spacing between the brackets that fix the studs to the wall of the building or structure of the facade
- 3 Spans: The stud is fixed to 4 brackets

WM111C.1

Single stud exterior wall

With a profile of only 142.5 mm and an installation time of 82 min/m², the WM111C.1 system is a straightforward solution for buildings with no remarkably challenging requirements for sound and thermal insulation and for regions with low seasonal differences in temperature and humidity. It consists of a single metal stud frame planked with AQUAPANEL® Cement Board Outdoor on the outside and with a double layer of gypsum boards on the inside. For rooms with special priorities such as water resistance, acoustic control or fire resistance, those interior boards can easily be replaced by high-performance boards from Knauf's versatile range of wall linings.

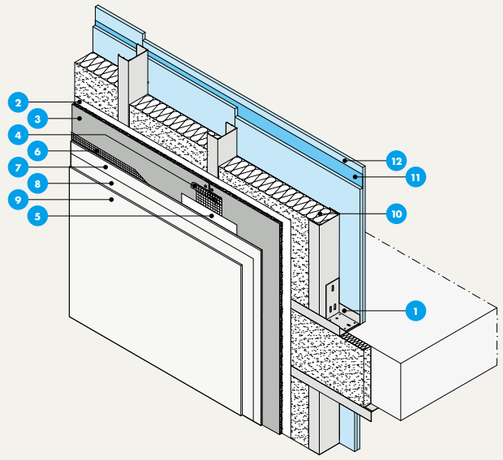
Scan to get more information about this system

Suzhou Olympic Sports Centre | Suzhou, China

German Pavillon EXPO 2010 | Shanghai, China

Car Park Utility Rooms | Stuttgart, Germany

Hunan Broadcasting System Program Production Center | Changsha, Hunan, China



1 RONDO Exterior Wall System
2 Vapour Barrier SD ≥50m according to the EN 13984*
3 AQUAPANEL® Cement Board Outdoor
4 AQUAPANEL® Joint Tape (10 cm)
5 AQUAPANEL® Joint Filler – grey
6 AQUAPANEL® Reinforcing Mesh
7 AQUAPANEL® Exterior Basecoat
8 AQUAPANEL® Basecoat Primer
9 Render finish (e.g. AQUAPANEL® Exterior Mineral Finish – white)
10 Insulation board (thickness: 100 mm) according to local needs
11 Optional Vapour Barrier: Knauf Insulation LDS 10 silk or similar (SD 5-10m according to EN 13984)*
12 Knauf Gypsum board

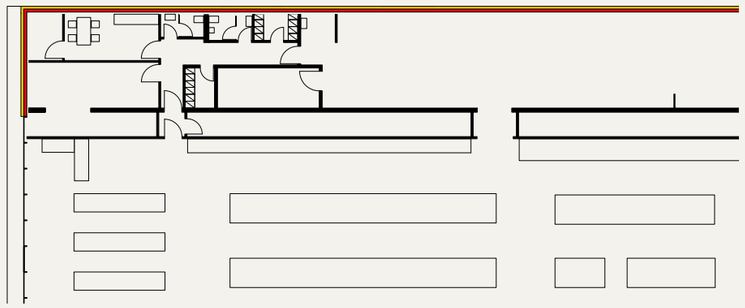
› *Note: Please be advised that under the local climate condition the vapour barrier specifications at the exterior and interior side of the wall to prevent accumulation of moisture within the wall construction could vary. Location and type of vapour barrier to be determined by the architect and a building physics expert.

Economic advantages (example: retail shop)

Building perimeter:	135 m
Floor height:	5.5 m
Exterior wall surface per floor:	742.5 m²
Number of floors:	1
Wall opening share:	50%
Opening surface:	371.25 m²
Net exterior wall surface:	371.25 m²

Thickness: areated concrete
Thickness: WM111C.1
Space gain

Only a part of the building is shown



Cost-influencing factors*

Based on a specific intended use and location of a building, the dead weight is the most important factor of the total loads, which can be influenced by planning. Basically, lower loads enable a leaner structure and thus significant cost savings.

The calculation of explicit cost saving amounts for load-bearing walls and ceilings as well as foundations achieved by the weight reduction when using Knauf Exterior Wall is generically not possible, since this is always to be calculated project specifically on the basis of floor plan geometries, spans and the load-bearing capacity of the building ground.

26 tons WM111C.1 | 70 tons Aerated concrete | 44 tons Weight savings

With a longer production time, considerable costs for personnel employment are involved. Additionally, a longer building process means a longer supply of building site facilities, where costs should be minimised. The efficient construction of Knauf Exterior Wall as well as the shorter drying times and the significantly lower weather dependency compared to massive constructions offer a considerable cost reduction potential and entails much less risk in the planning of the construction process.

28 days WM111C.1 | 71 days Aerated concrete | 43 days Erection time savings

Revenue-influencing factors*

22.44 m² — Space gain when using WM111C.1 compared to aerated concrete

€2,692.80 — Additional income through rental (in €/year)**

By using Knauf Exterior Wall more space can be realised inside the building with a comparable thermal insulation value. Consequently, rentable space and resulting rental income are larger. For landlords and investors, the best possible use of the land area plays an important role. By using Knauf Exterior Wall, this area efficiency and land utilisation are significantly improved.

*Figures are based on a study by Prof. Dr. Bert Bielefeld of the University of Siegen, Germany. All measurements use comparable U-values.
**Rental income based (in €/m² per month): €10.00 ***The time saved due to the immediate window installation is taken into account (see page 11).

Preliminary design acc. to BS 5950-1:2000 for RONDO Stud 681WF (92x50x1.15mm)

	Wall height, 92x1.15mm			
Design wind load (kN/m²)	2.4m	3.0m	3.6m	4.0m
0.4				
0.5				
0.6				●
0.7			●	●
0.8			●	●
0.9			●	●
1			●	●
1.1			●	
1.2			●	
1.3		●	●	
1.4		●		
1.5		●		
1.6		●		
1.7		●		
1.8		●		
1.9		●		
2		●		
2.1		●		
2.2		●		
2.3		●		
2.4	●	●		

The span table is used to show how the substructure needs to be dimensioned as a function of wind loads [kN/m²] according to the relevant national standards and the span widths of the profiles, which are determined (usually synonymous with floor height). The substructure shown in the table comprises only the RONDO Stud 681WF (92x50x01.15mm).

The fixing to the load-bearing structure is not considered. It is assumed that the profile is planked with a suitable board both sides (AQUAPANEL® Cement Board Outdoor on the exteriors and a gypsum based board on the interiors). An angle fixing of the profile to connect to the load-bearing structure is recommended in any case. 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.

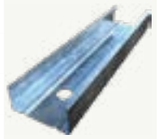
Further profile solutions can be demonstrated by a simple proof of the fitness for use shown by a deformation limit of max. f = l/360.

600 mm stud spacing
400 mm stud spacing
Please refer to Appendix, you can contact specification manager for further assistance
● Back to back

PRODUCT RANGE

Stud framework

Easy to work with and install, the components used to create our stud frames include profiles, bracket, screws and sealing strips, all available in a wide range of specifications and geometries to meet any design requirement. All profiles have Galvanized corrosion protection AZ150 g/m² according to AS1397 and ASTM A653 to ensure long-term protection.

Profiles			Part number	Web height (mm)	Flange width (mm)	Nominal thickness BMT(mm)	Weight (approx. kg/m)
RONDO Stud		› Point of use: Exterior Stud Frame › Designed to absorb and transmit wind and dead loads › Enables a preliminary static design according to BS5950-1 › Galvanized AZ150 g/m² according to AS1397 and ASTM A653 › High corrosion resistance and long-term durability	493WF	76	50	0.75	1.064
			671WF	76	50	1.15	1.608
			495WF	92	50	0.75	1.158
			681WF	92	50	1.15	1.752
			511WF	150	50	0.75	1.499
			691WF	150	50	1.15	2.274
			C15216	152	64	1.60	3.850
RONDO Track		› Point of use: Exterior Stud Frame › Designed to absorb and transmit wind and dead loads › Enables a preliminary static design according to BS5950-1 › Galvanized AZ150 g/m² according to AS1397 and ASTM A653 › High corrosion resistance and long-term durability	494	76	32	0.75	0.869
			670	76	32	1.15	1.258
			496	92	32	0.75	0.956
			680	92	32	1.15	1.513
			512	150	32	0.75	1.738
			692	150	32	1.15	2.516
RONDO Nogging Track		› Point of use: Exterior Stud Frame › Designed to absorb and transmit wind and dead loads › Enables a preliminary static design according to BS5950-1 › Galvanized AZ150 g/m² according to AS1397 and ASTM A653 › High corrosion resistance and long-term durability › Pre-punched at 400 or 600mm centers	505WF-406	76	32	0.75	0.887
			505WF-610	76	32	0.75	0.887
			506WF-406	92	32	0.75	0.976
			506WF-610	92	32	0.75	0.976
			507WF-406	150	32	0.75	1.344
			507WF-610	150	32	0.75	1.344
RONDO Slotted Deflection Head Track		› Point of use: Exterior Stud Frame › Designed to absorb and transmit wind and dead loads › Enables a preliminary static design according to BS5950-1 › Galvanized AZ150 g/m² according to AS1397 and ASTM A653 › High corrosion resistance and long-term durability	5673	76	50	1.15	1.372
			5683	92	50	1.15	1.516
			5690	150	50	1.15	2.039

Connecting angles			Part number	Size (mm)	Thickness (mm)	Weight
RONDO Slotted Web Cleat 80mm		› Used to transfer loads where a deflection allowance is needed › 3mm thick coated steel	SWC3	80 x 75 x 50	3.0	0.190 kg/pc
RONDO Slotted Web Cleat 125mm		› Used to transfer loads where a deflection allowance is needed › 3mm thick coated steel	SWC3a	125 x 75 x 50	3.0	0.340 kg/pc
RONDO L-Bracket		› Used to transfer loads where a deflection allowance is needed › 1.5mm thick coated steel	545	75 x 75 x 55	1.5	0.090 kg/pc

Screws and anchors			Part number	Size (mm)	Thickness (mm)	Weight
HILTI Stud Anchor		› Zinc Plated	MHSA650 MHSA1090	M6 x 50 M10 x 90	-	0.002 kg/pc
RONDO Hex Head Screw		› Zinc plated with ceramic coating	MHHDPS	12- 14 x 25mm 12-24 x 25mm	-	0.002 kg/pc
RONDO Wafer Head Self-Drilling Screw		› Zinc plated with ceramic coating	MWHS1016-16	10-16 x 16mm	-	0.002 kg/pc
RONDO Flat Head Self- Drilling Screw		› Zinc plated with ceramic coating	MFHS1016-20	10-16 x 20mm	-	0.002 kg/pc

Insulation

Available in panels and rolls for easy installation, mineral wool from Knauf Insulation is suitable for a wide range of applications, including inside stud frames, in the space between interior and exterior frames, as well as in front of floors to reduce thermal bridges between Knauf Exterior Wall with AQUAPANEL Technology® and concrete slabs. It is also used as an insulation board in rear-ventilated rainscreen facade systems. In addition, Knauf's MW Volamit 040 is widely used for ETICS applications and is available in easy to handle lamella formats and does not require the use of dowelling.

Insulation for metal constructions			Width (mm)	Length (mm)	Thickness (mm)	m²/ package
Knauf Insulation Metallbau-Dämmplatte FCB 035		› Insulation board › Thermal conductivity rating: 035 › Glass mineral wool › ECOSE® Technology › Non-combustible	625	1,250	50	9.38
					75	6.25
					150	3.13
Knauf Insulation Universalrolle Classic 035		› Insulation roll › Thermal conductivity rating: 035 › Glass mineral wool › ECOSE® Technology › Non-combustible	1,200	13,000	40	15.60
				10,500	50	12.60
				8,700	60	10.44
				6,300	80	7.56
				5,200	100	6.24
				4,400	120	5.28
				3,700	140	4.44
				3,300	160	3.96
				2,900	180	3.48
				2,600	200	3.12
				2,900	220	3.48
				2,700	240	3.24

Insulation board for ventilated facades			Width (mm)	Length (mm)	Thickness (mm)	m²/ package
Knauf Insulation Fassaden-Dämmplatte TP 435 B		› Facade insulation board › Thermal conductivity rating: 035 › Glass mineral wool › ECOSE® Technology › With glass fleece backing on one side › Non-combustible	600	1,250	40	9.00
					60	6.00
					80	4.50
					100	3.75
					120	3.00
					140	2.25
					160	
					180	
					200	2.16
Knauf Insulation Fassaden-Dämmplatte FPL-035		› Facade insulation board › Thermal conductivity rating: 035 › Stone mineral wool › Suitable for areas of fire flashover › Non-combustible	625	1,200	30	12.00
					50	7.50
					60	6.00
					80	4.50
					100	3.75
					120	3.00
					140	2.25
					160	
					180	
					200	1.50

Insulation fasteners for ventilated facades			Diameter (mm)	Length (mm)	For insulation board thickness (mm)
Knauf Insulation Dämmstoffhalter		› For fixing of facade insulation boards made of glass or stone mineral wool in concrete or brickwork in rear-ventilated rainscreen facade constructions	90	90	60
				110	80
				130	100
				150	120
				170	140
				190	160
				210	180
				230	200

Exterior lining

To ensure that Knauf Exterior Wall acquires its water resistant properties, AQUAPANEL® Cement Board Outdoor is fitted on top of AQUAPANEL® Water Barrier, a highly windproof, rainproof and permeable layer which can be easily fixed on exterior studs by using adhesive tape. Complemented with specially developed system accessories including AQUAPANEL® Joint Filler, AQUAPANEL® Tape as well as AQUAPANEL® Maxi Screws with special coatings for added corrosion protection, the result is a complete – and completely reliable – lining system of AQUAPANEL® products.

Water barrier			Width (mm)	Roll length (mm)
AQUAPANEL® Water Barrier		› Water resistant and wind tight membrane › Used as a water conducting layer directly behind AQUAPANEL® Cement Board Outdoor › Diffusion equivalent air layer thickness (sd): 0.025 m Scan for datasheet	1,500	50,000

Adhesives tapes			Width (mm)	Roll length (mm)
Knauf Insulation LDS Solitop		› One-sided reinforced adhesive tape made of polyethylene › Specially developed for outdoor use › Used for bonding overlaps and penetrations of AQUAPANEL® Water Barrier	60	40,000
			150	25,000

Cement boards			Width (mm)	Length (mm)	Thickness (mm)	Weight (approx kg/m²)
AQUAPANEL® Cement Board Outdoor		› Cement board › Easy Edge™ › Building material class: A1, non-combustible › 100% water resistant › Bending radius 1-3 m (in dry state) Scan for datasheet	1,200	2,400	12.5	16

Screws			Length (mm)
AQUAPANEL® Maxi Screw SN25		› With countersunk head and nail tip Scan for datasheet	25
AQUAPANEL® Maxi Screw SN39			39
AQUAPANEL® Maxi Screw SN55			55
AQUAPANEL® Maxi Screw SB25		› With countersunk head and drill tip Scan for datasheet	25
AQUAPANEL® Maxi Screw SB39			39
AQUAPANEL® Rustproofed Screw SN40		› With countersunk head and nail tip › Stainless steel Scan for datasheet	40
AQUAPANEL® Rustproofed Screw SB40		› To fix AQUAPANEL® Cement Board Outdoor on aluminium substructure › With countersunk head and drill tip › Stainless steel Scan for datasheet	40

Material of substructure	Steel framework					Aluminium framework
Metal thickness	0.6mm ≤ x ≤ 1.0mm			1.0mm < x ≤ 2.0mm		≤ 2.0 mm
Amount of board layers	Single layer	Double layer	Triple layer	Single layer	Double layer	Single layer
AQUAPANEL® Maxi Screw SN25	x					
AQUAPANEL® Maxi Screw SN39	x	x				
AQUAPANEL® Maxi Screw SN55			x			
AQUAPANEL® Maxi Screw SB25				x		
AQUAPANEL® Maxi Screw SB39				x	x	
AQUAPANEL® Rustproofed Screw SN40						
AQUAPANEL® Rustproofed Screw SB40						x

*only necessary in ventilated constructions

Joint filler			Coverage (ca. kg/m²)	Storage life (approx month)	Weight (kg/bag)
AQUAPANEL® Joint Filler – grey		› Cement-bound joint filling material › Full-surface skimcoating of joints › Reinforced with AQUAPANEL® Tape 10 cm Scan for datasheet	0.7	12	20

Joint tapes			Width (mm)	Roll length (mm)
AQUAPANEL® Tape 10 cm		› Glass fabric joint tape › Alkali-resistant coating › Colour: blue › Mesh size: 4x4 mm Scan for datasheet	100	50,000
			100	20,000
AQUAPANEL® Exterior Reinforcing Tape		› Glass fabric joint tape › Alkali-resistant coating › Colour: blue › Mesh size: 4x4 mm Scan for datasheet	200	50,000

Exterior finishing

Knauf Exterior Wall is able to accommodate a wide range of finishes, so whatever you want to create, it's achievable. In terms of render, AQUAPANEL® has a range of products in its portfolio, including AQUAPANEL® Exterior Basecoat, AQUAPANEL® Reinforcing Mesh, AQUAPANEL® Basecoat Primer and a range of finishing renders. In addition, Knauf offers a selection of renders to increase choice and design possibilities. Knauf Exterior Wall is also compatible with a wide range of third-party finishes, including cladding, brick slips, tiles and paint, so there is no limit on design potential.

Basecoats			Coverage (ca. kg/m²)	Storage life (approx month)	Weight (kg/bag)
AQUAPANEL® Exterior Basecoat		› Cement-based, synthetic resin-enhanced basecoat › Colour: grey › Used for basecoating AQUAPANEL® Cement Board Outdoor when finishing with a thin layer of finishing plaster, decorative render or paint Scan for datasheet	7.8 (with 5 mm layer thickness)	12	25
AQUAPANEL® Exterior Basecoat – white		› Cement-based, synthetic resin-enhanced basecoat › Colour: white › Used for basecoating AQUAPANEL® Cement Board Outdoor when finishing with a thin layer of finishing plaster, decorative render or paint Scan for datasheet	6.3 (with 5 mm layer thickness)	12	25
SM700 Pro		› Mineral basecoat › Fibre-reinforced › Used as a basecoat in External Thermal Insulation Composite Systems (ETICS) – e.g. Knauf WARM WALL Plus › Colour: white (special colours available on request)	7.0-13.0 (5-10 mm layer thickness)	12	25

Reinforcing mesh			Width (mm)	Roll length (mm)
AQUAPANEL® Reinforcing Mesh		› Alkali-resistant coating › Colour: blue › Used to reinforce AQUAPANEL® Exterior Basecoat and AQUAPANEL® Exterior Basecoat – white › Mesh size: 4x4 mm › Initial tear strength: approx. 2,200 N/5 cm › Approx. 160 g/m² Scan for datasheet	1,000	50,000
Armiergewebe 4x4 mm		› Alkali-resistant coating › Colour: white with blue markings › Used as a reinforcing mesh in External Thermal Insulation Composite Systems (ETICS) – e.g. Knauf WARM WALL Plus › Mesh size: 4x4 mm › Initial tear strength: approx. 2,000 N/5 cm › Approx. 165 g/m²	1,000	50,000

Basecoat primer			Coverage (approx kg/m²)	Storage life (approx month)	Weight (kg/ bucket)
AQUAPANEL® Basecoat Primer		› Synthetic dispersion › Alkali-resistant › Colour: white › Used as a primer on AQUAPANEL® Exterior Basecoat and AQUAPANEL® Exterior Basecoat – white where AQUAPANEL® render finishes are used › Reduces suction variations Scan for datasheet	7.8 (with 5 mm layer thickness)	12	15

Finishing renders			Coverage (approx kg/m²)	Storage life (approx month)	Weight (kg/unit)
AQUAPANEL® Exterior Mineral Finish – white		› Mineral finishing render › For use on top of AQUAPANEL® Exterior Basecoat and AQUAPANEL® Exterior Basecoat – white › Grain size: 2 mm › Can be used as a smooth floating finishing render or freely structured using different tools and designs Scan for datasheet	3.0 (with 2 mm layer thickness)	12	30
AQUAPANEL® Exterior Dispersion Plaster – white		› Ready-to-use › Pasty consistency › Water-repellent › Allows diffusion › Prevents fungal attack › For application on AQUAPANEL® Exterior Basecoat and AQUAPANEL® Exterior Basecoat – white › Grain size: 2 mm Scan for datasheet	3.1	24	25
AQUAPANEL® Exterior Silicon Synthetic Resin Plaster – white		› Ready-to-use › Pasty consistency › Water-repellent › Allows diffusion › Prevents fungal attack › For application on AQUAPANEL® Exterior Basecoat and AQUAPANEL® Exterior Basecoat – white › Grain size: 2 mm Scan for datasheet	3.1	24	25

Interior lining

Knauf Exterior Wall systems include an unrivalled choice of fully compatible lining boards to meet any specification need, including moisture rating, impact resistance, fire rating and sound reduction. For specialist applications in wet and humid areas, AQUAPANEL® Cement Board Indoor has been specifically developed to provide a robust and reliable solution, including in swimming pools and steam saunas. All boards come with comprehensive accessories including vapour control layers, sealant tapes, joint fillers, adhesives and screws.

Vapour barriers			Width (mm)	Roll length (mm)
Knauf Insulation LDS 10 Silk		› Vapour control membrane made of high strength polypropylene spun-bonded fabric › Diffusion equivalent air layer thickness (sd): 10 m › Approx 140 g/m²	3,000	50,000

Adhesive tapes			Width (mm)	Roll length (mm)
Trenn-Fix		› Special coated paper strip › Adhesive along one edge › Used as separation strip between dry-built surfaces and other constructional elements › Used between dry-built surfaces to generate a sliding separation	65	50,000
Knauf Insulation LDS Soliplan		› One-sided adhesive tape made of kraft paper › Used for durable air-tight bonding of vapour barrier overlaps and fitting edges	60	40,000
Knauf Insulation LDS Solitwin		› One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › With centre-slit backing paper › Used for durable and elastic air-tight bonding of the vapour barrier in corner areas and window connections	60	25,000
Knauf Insulation LDS Solifit		› One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › Used for durable and elastic air-tight bonding of vapour barrier overlaps and penetrations, when flexible connections are necessary (e.g. pipes, beams, etc.)	60	25,000
Knauf Insulation LDS Solifit S		› One-sided reinforced adhesive tape made of low-density polyethylene (LDPE) › Used for durable and elastic air-tight bonding of vapour barrier overlaps and penetrations, when flexible connections are necessary (e.g. pipes, beams, etc.) › No peeling, collection and disposal of the release paper required › Easy handling by finger lift › Tape tears by hand	60	25,000
Knauf Insulation LDS Kleberaupe		› Elastic, double-sided adhesive tape › Used for safe, durable and elastic bonding of the vapour barrier to flanking building parts	25	8,000

Liquid adhesive			Capacity (ml)	Storage life (approx month)
Knauf Insulation LDS Solimur		› Elastic, durably strong special adhesive › Used for safe, durable and elastic bonding of the vapour barrier to flanking building parts	600	24
			310	24

Adhesive primer			Coverage (approx m)	Storage life (approx month)
Knauf Insulation LDS Primer		› Dispersion-based adhesive primer › To enhance adhesion of LDS adhesive tapes and LDS Solimur to porous substrates to guarantee a durable adhesive bond	25-30 (100 mm application width)	18

Air-tight sleeves			Diameter (mm)	Width (mm)	Length (mm)
Knauf Insulation LDS Universalman-schette		› Multi-purpose sleeve › Two-layer polypropylene spun-bonded fabric › For fast and professional, in particular retrospective, sealing of pipe openings in the vapour barrier	75-125	400	400
Knauf Insulation LDS Leitungsman-schette		› Cable sleeve › Self-adhesive kraft paper › For professional sealing of cable feed-throughs	8-12	150	150
Knauf Insulation LDS Leitungsman-schette 6-fach		› Cable sleeve › Non-woven polyethylene › For professional sealing of up to 6 cable feed-throughs	4-11	230	230

Gypsum boards			Width (mm)	Length (mm)	Thickness (mm)	Weight (kg/m²)
Knauf Sheetrock® StandardCORE™ (Singapore/Malaysia)		› Lightest gypsum plasterboard by thickness available. › Easy to lift, carry and install. › Improves installation speed and reduces wastage. › Complies with international standards such as BS EN 520 or equivalent local standard for physical properties. › Uniformed and stronger core helps in reducing board damages	1,220	2,135 2,440 2,745 3,050	9.5 12.5 16.0	5.3 7.2 11.7
			1,200	2,400		
Knauf Sheetrock® Firestop™ (Singapore/Malaysia)		› Features a fire-resistant gypsum core that provides additional safety in case of fire and regular moisture resistant plasterboards. › Complies with international standards such as BS EN 520 or equivalent local standard for physical properties classification for gypsum boards, as well as BS 476 for non-combustibility. › Extensive acoustic assemblies for commercial projects (STC).	1,220	1,830 2,440 2,745	16.0	13.6
			1,200	2,400		

Gypsum boards			Width (mm)	Length (mm)	Thickness (mm)	Weight (kg/m²)
Knauf Sheetrock® Impactstop™ (Singapore/Malaysia)		› Features a higher density gypsum core that provides additional protection recommended for severe duty applications as per BS 5234 when assembled with Rondo metal framing system. › Complies with international standards such as BS EN 520 or equivalent local standard for physical properties classification for gypsum boards, as well as BS 476 for non-combustibility. › Excellent acoustic properties when assembled in systems for commercial projects. › Knauf Sheetrock® Impactstop™ (with AirTough™ technology) is also moisture- and fire-resistant. It can be used in the approved systems to provide additional fire protection.	1,220	1,830 2,440 2,745	16.0	13.6
			1,200	2,400		
			1,220	1,830 2,440 2,745	19.0	16.75
			1,200	2,400		
FireShield (Philippines)		› Fire resistant performance › Heavier with higher density › Stronger, tougher flexural performance › Prevent the spread of fire for 30 minutes and up to 4 hours, depending on system applied › Specially formulated to resist the dehydration by heat in the event of a fire › Tested to various standards such as British, American or European standards for the products and systems that provide minimum periods of fire resistance	1,220	2,440	13.0 16.0	12.0 14.8
DenseShield (Philippines)		› Highest level of Impact resistant (severe duty) in accordance with BS 5234 PART2 › Designed and manufactured for internal in high traffic areas where superior robustness is required, high traffice areas and meceus of escape in buildings such as hotels, condominiums, and public buildings, such as hospitals, shopping malls, educational institutes and, high-end residences	1,220	2,440	13.0 16.0	12.1 14.9
MultiShield (Philippines)		› Fire achieves 30 to 240 minutes in accordance with AS/NZS 1530.4 Standard test methods for fire tests of building construction and materials › Moisture meets the requirements of ASTM C1396 for moisture resistant plasterboard › Sound good acoustic performance.	1,220	2,440	13.0 16.0	12.0 14.6
Knauf Fireshield (Vietnam)		› Used for ceilings & drywall › Non-combustible › Fire, smoke and heat resistant	1,220	2,440	12.7 15.9	11.3 14.1

Drywall screws			Width (mm)	Length (mm)
Schnellbauschraube TN Feingewinde		› To fix impregnated gypsum boards (GKBI/H2) to metal substructures › Bugle head › Nail tip › Double, fine-pitched thread › Metal thickness ≤ 0.7 mm › Incl. one bit/package	3.5	25 35
Schnellbauschraube TB		› To fix impregnated gypsum boards (GKBI/H2) to metal substructures › Bugle head › Drill tip › Metal thickness: 0.7 mm < x ≤ 2.25 mm › Incl. one bit/package	3.5	25 45
Diamantschraube XTN		› To fix Diamant boards (GKFI/DFH2IR) to metal and timber substructures › Self-tapping thread › Nail tip › Metal thickness ≤ 0.7 mm and timber constructions (except for XTN 3.9x23 mm) › Incl. one bit/package	3.9	23 33 38 55
Diamantschraube XTB		› To fix Diamant boards (GKFI/DFH2IR) to metal substructures › Self-tapping thread › Drill tip › Metal thickness: 0.7 mm < x ≤ 2.25 mm › Incl. one bit/package	3.9	35 55

Gypsum filler			Coverage (approx. kg/m²)	Storage life (approx month)	Weight (kg/bag)
Knauf Sheetrock® All Purpose Joint Compound		› Excellent bond › Premium grade lightweight, all-purpose and finishing compound › May be used for all three coats or as a finishing coat › Excellent workability, easy application by hand or with mechanical tools › Minimal mixing and cleaning of tool › Sandable by hand or with mechanical sanding tools › Smooth finish › Excellent surface for painting	0.61~0.73	9	5 28

Interior finishing

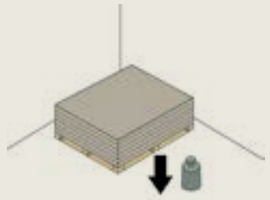
From primers, renders, skim coatings and paint, Knauf offers a full range of surface finishes for every need – from standard to high-end Q4 specifications with minimal marks, traces or shading caused by shallow light angles. The end result will depend on the decorative finish required as well as the skills of the contractor.

Finishing plaster			Coverage (approx. kg/m²)	Storage life (approx month)	Weight (kg/bag)
Knauf Stopping Compound		› Smooth Finishing › Quick Set › Easy to Trowel › Low Shrinkage › Excellent Bonding	0.3	6	20

PRODUCT HANDLING

Boards

› Always carry the boards upright, or use board rollers. Handle with fork lift or crane as palletted goods. Take care not to damage corners and edges when setting the boards down. Place boards down on their long edge before laying them flat.



› Ensure that the base is strong enough to support the boards.

› Protect boards from moisture and weathering before they are installed. Boards which have become damp must be dried on both sides on a flat surface prior to fitting. Before installing, condition the boards to the ambient temperature and humidity.

Profiles

› Protect profiles from moisture and weathering before they are installed. Products should not be left permanently exposed to the elements.

Powder materials

› Store bags in a dry place and in original packaging.

› Do not apply joint fillers, basecoat or finishing materials in temperatures less than +5°C.

Health and safety

› Avoid unnecessary dust on job site when using electrical saw.
Keep sanding and other dust generation to a minimum.
Maintain adequate ventilation and/or wear suitable protection.
› Exercise care when using power tools and take all necessary precautions.
› Follow instructions on packaging when applying system accessories.
› When using powdered products, mix with water in well-ventilated conditions.
Avoid contact with eyes and skin. In the event of contact with the eyes, irrigate with plenty of clean water immediately.
› When handling insulation or cutting boards which contain glassfibre, wear suitable protection including face mask and gloves.
Wear protective glasses when working overhead.
› Follow national health and safety regulations at all times.

Product data sheets and material safety data sheets are available on our website **www.AQUAPANEL.com/downloads.**

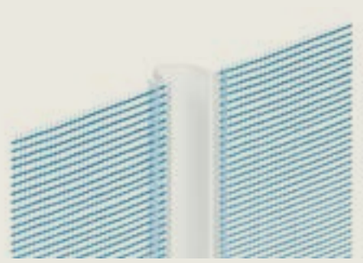
Insulation

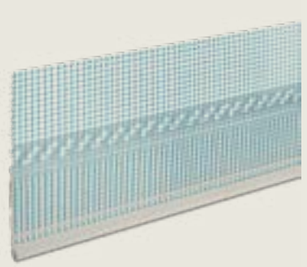
› Insulation materials are supplied enclosed in packaging which is designed for short term protection only. For longer term protection on site, the product should be stored either indoors, or under cover and off the ground. Products should not be left permanently exposed to the elements.

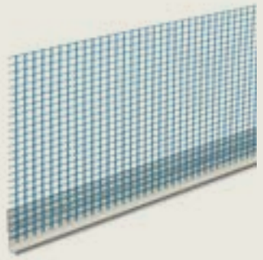
FURTHER INFORMATION

Plaster profile overview

The profile overview represents a selection of applicable plaster profiles for Knauf Exterior Wall with AQUAPANEL® Technology. It shows areas of application, product names and material numbers of Knauf profiles and other selected manufacturers.



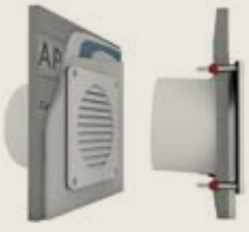




Scan to get more information

Fasteners and penetrations

Knauf Exterior Wall with AQUAPANEL® Technology can be penetrated by fastenings, pipe penetrations or electrical cable installations on the interior as well as on the exterior stud frame of the wall construction. For further information, please refer to the corresponding instructions.



Scan to get more information

References

A selection of worldwide references of Knauf Exterior Wall with AQUAPANEL® Technology as well as details on individual projects can be found on our website. Here you will find the latest inspirations for your next construction project.

Scan to get more information

WL132C.1 Rear-ventilated rainscreen facade

Preliminary design acc. to BS 5950-1:2000 for RONDO profiles

The span table is used to show how the substructure needs to be dimensioned as a function of wind loads [kN/m²] according to the relevant national standards and the span widths of the profiles, which are determined (usually synonymous with floor height).

The fixing to the load-bearing structure is not considered. It is assumed that the profile is planked with AQUAPANEL® Cement Board Outdoor. An angle fixing of the profile to connect to the load-bearing structure is recommended in any case. 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.

Further profile solutions can be demonstrated by a simple proof of the fitness for use shown by a deformation limit of max. f = l/360.

- 600 mm stud spacing
- 400 mm stud spacing
- 300 mm stud spacing
- You can contact specification manager for further assistance
- RONDO 152x64x1.6mm

3 Spans (m), 76x0.75mm

Design wind load (kN/m²)	1.5m interval
0.4	600
0.5	600
0.6	600
0.7	600
0.8	600
0.9	600
1	600
1.1	600
1.2	600
1.3	400
1.4	400
1.5	400
1.6	400
1.7	400
1.8	400
1.9	400
2	400
2.1	400
2.2	400
2.3	400
2.4	400
2.5	–
2.6	–
2.7	–
2.8	–
2.9	–
3	–
3.1	–
3.2	–
3.3	–
3.4	–
3.5	–
3.6	–
3.7	–

3 Spans (m), 76x1.15mm

Design wind load (kN/m²)	1.5m interval	3.0m interval	4.5m interval
0.4	600	600	300
0.5	600	600	–
0.6	600	600	–
0.7	600	600	–
0.8	600	600	–
0.9	600	400	–
1	600	400	–
1.1	600	400	–
1.2	600	400	–
1.3	400	300	–
1.4	400	300	–
1.5	400	300	–
1.6	400	–	–
1.7	400	–	–
1.8	400	–	–
1.9	400	–	–
2	400	–	–
2.1	400	–	–
2.2	400	–	–
2.3	400	–	–
2.4	400	–	–
2.5	400	–	–
2.6	300	–	–
2.7	300	–	–
2.8	300	–	–
2.9	300	–	–
3	300	–	–
3.1	300	–	–
3.2	300	–	–
3.3	300	–	–
3.4	300	–	–
3.5	300	–	–
3.6	300	–	–
3.7	300	–	–

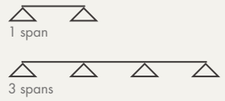
3 Spans (m), 92x1.15mm

Design wind load (kN/m²)	1.5m interval	3.0m interval	4.5m interval
0.4	600	600	600
0.5	600	600	600
0.6	600	600	600
0.7	600	600	600
0.8	600	600	600
0.9	600	600	600
1	600	600	–
1.1	600	600	–
1.2	600	600	–
1.3	600	600	–
1.4	600	600	–
1.5	600	600	–
1.6	600	600	–
1.7	600	600	–
1.8	600	600	–
1.9	600	600	–
2	600	600	–
2.1	600	600	–
2.2	600	600	–
2.3	600	600	–
2.4	600	600	–
2.5	600	400	–
2.6	600	–	–
2.7	600	–	–
2.8	600	–	–
2.9	600	–	–
3	600	–	–
3.1	600	–	–
3.2	600	–	–
3.3	600	–	–
3.4	600	–	–
3.5	600	–	–
3.6	600	–	–
3.7	600	–	–

3 Spans (m), 150x1.2mm

Design wind load (kN/m²)	1.5m interval	3.0m interval	4.5m interval	6.0m interval
0.4	600	600	600	600
0.5	600	600	600	600
0.6	600	600	600	600
0.7	600	600	600	600
0.8	600	600	600	600
0.9	600	600	600	600
1	600	600	600	400
1.1	600	600	600	400
1.2	600	600	600	400
1.3	600	600	600	–
1.4	600	600	600	–
1.5	600	600	600	–
1.6	600	600	600	–
1.7	600	600	600	–
1.8	600	600	600	–
1.9	600	600	600	–
2	600	600	600	–
2.1	600	600	400	–
2.2	600	600	400	–
2.3	600	600	400	–
2.4	600	600	400	–
2.5	600	600	400	–
2.6	600	–	–	–
2.7	600	–	–	–
2.8	600	–	–	–
2.9	600	–	–	–
3	600	–	–	–
3.1	600	–	–	–
3.2	600	–	–	–
3.3	600	–	–	–
3.4	600	–	–	–
3.5	600	–	–	–
3.6	600	–	–	–
3.7	600	–	–	–

WL132C.1 Rear-ventilated rainscreen facade



- Interval: Spacing between the brackets that fix the studs to the wall of the building or structure of the facade
- 1 span: The stud is fixed to 2 brackets
- 3 Spans: The stud is fixed to 4 brackets

1 Span (m), Wall height, 76x0.75mm

Design wind load (kN/m²)	2.4m	3.0m	3.6m
0.4	600	600	600
0.5	600	600	–
0.6	600	600	–
0.7	600	600	–
0.8	600	–	–
0.9	600	–	–
1	600	–	–
1.1	600	–	–
1.2	600	–	–
1.3	600	–	–
1.4	600	–	–
1.5	–	–	–
1.6	–	–	–
1.7	–	–	–
1.8	–	–	–
1.9	–	–	–
2	–	–	–
2.1	–	–	–
2.2	–	–	–
2.3	–	–	–
2.4	–	–	–
2.5	–	–	–
2.6	–	–	–
2.7	–	–	–
2.8	–	–	–
2.9	–	–	–
3	–	–	–
3.1	–	–	–
3.2	–	–	–
3.3	–	–	–
3.4	–	–	–
3.5	–	–	–
3.6	–	–	–
3.7	–	–	–

1 Span (m), Wall height, 76x1.15mm

Design wind load (kN/m²)	2.4m	3.0m	3.6m	4.0m
0.4	600	600	600	600
0.5	600	600	600	–
0.6	600	600	600	–
0.7	600	600	–	–
0.8	600	600	–	–
0.9	600	600	–	–
1	600	600	–	–
1.1	600	–	–	–
1.2	600	–	–	–
1.3	600	–	–	–
1.4	600	–	–	–
1.5	600	–	–	–
1.6	–	–	–	–
1.7	–	–	–	–
1.8	–	–	–	–
1.9	–	–	–	–
2	–	–	–	–
2.1	–	–	–	–
2.2	–	–	–	–
2.3	–	–	–	–
2.4	–	–	–	–
2.5	–	–	–	–
2.6	–	–	–	–
2.7	–	–	–	–
2.8	–	–	–	–
2.9	–	–	–	–
3	–	–	–	–
3.1	–	–	–	–
3.2	–	–	–	–
3.3	–	–	–	–
3.4	–	–	–	–
3.5	–	–	–	–
3.6	–	–	–	–
3.7	–	–	–	–

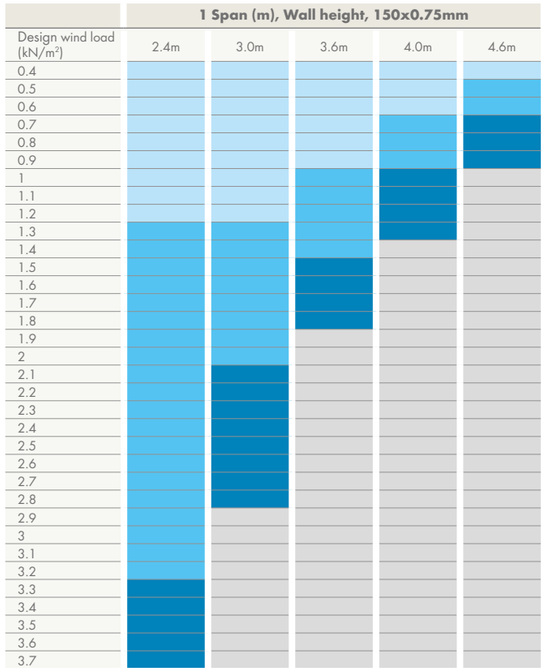
1 Span (m), Wall height, 92x0.75mm

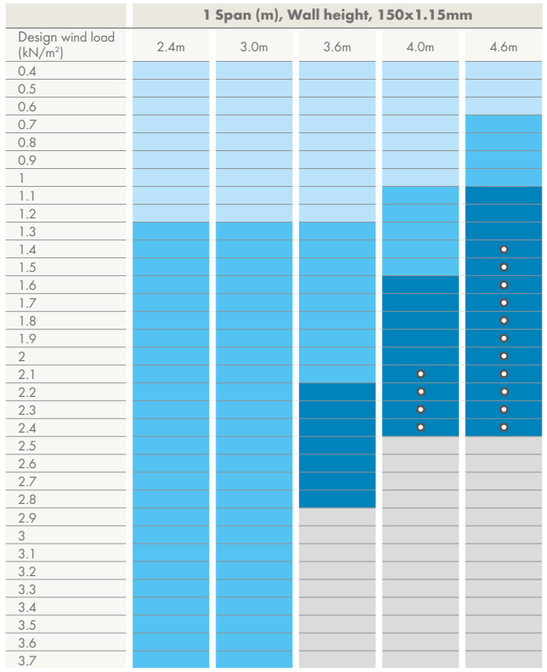
Design wind load (kN/m²)	2.4m	3.0m	3.6m	4.0m
0.4	600	600	600	300
0.5	600	600	600	–
0.6	600	600	600	–
0.7	600	600	–	–
0.8	600	600	–	–
0.9	600	400	–	–
1	600	400	–	–
1.1	600	–	–	–
1.2	600	–	–	–
1.3	600	–	–	–
1.4	600	–	–	–
1.5	600	–	–	–
1.6	300	–	–	–
1.7	300	–	–	–
1.8	300	–	–	–
1.9	300	–	–	–
2	300	–	–	–
2.1	–	–	–	–
2.2	–	–	–	–
2.3	–	–	–	–
2.4	–	–	–	–
2.5	–	–	–	–
2.6	–	–	–	–
2.7	–	–	–	–
2.8	–	–	–	–
2.9	–	–	–	–
3	–	–	–	–
3.1	–	–	–	–
3.2	–	–	–	–
3.3	–	–	–	–
3.4	–	–	–	–
3.5	–	–	–	–
3.6	–	–	–	–
3.7	–	–	–	–

1 Span (m), Wall height, 92x1.15mm

Design wind load (kN/m²)	2.4m	3.0m	3.6m	4.0m
0.4	600	600	600	600
0.5	600	600	600	600
0.6	600	600	600	600
0.7	600	600	600	–
0.8	600	600	600	–
0.9	600	600	600	–
1	600	600	600	–
1.1	600	600	–	–
1.2	600	600	–	–
1.3	600	400	–	–
1.4	600	400	–	–
1.5	600	400	–	–
1.6	600	–	–	–
1.7	600	–	–	–
1.8	600	–	–	–
1.9	600	–	–	–
2	600	–	–	–
2.1	600	–	–	–
2.2	600	–	–	–
2.3	600	–	–	–
2.4	300	–	–	–
2.5	–	–	–	–
2.6	–	–	–	–
2.7	–	–	–	–
2.8	–	–	–	–
2.9	–	–	–	–
3	–	–	–	–
3.1	–	–	–	–
3.2	–	–	–	–
3.3	–	–	–	–
3.4	–	–	–	–
3.5	–	–	–	–
3.6	–	–	–	–
3.7	–	–	–	–

WL132C.1 Rear-ventilated rainscreen facade





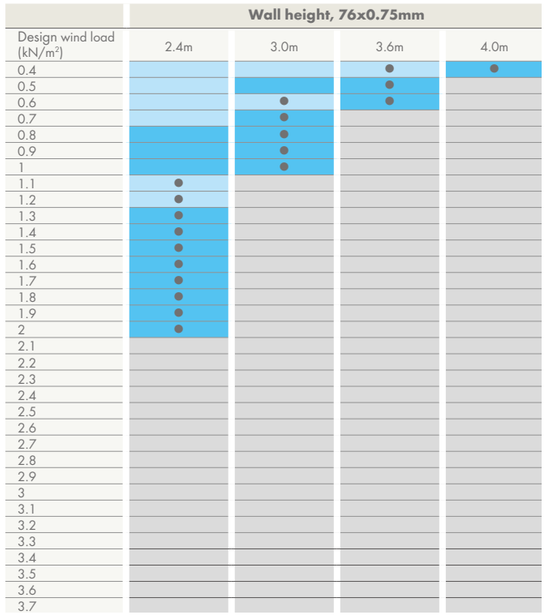
WM111C.1 Single stud exterior wall

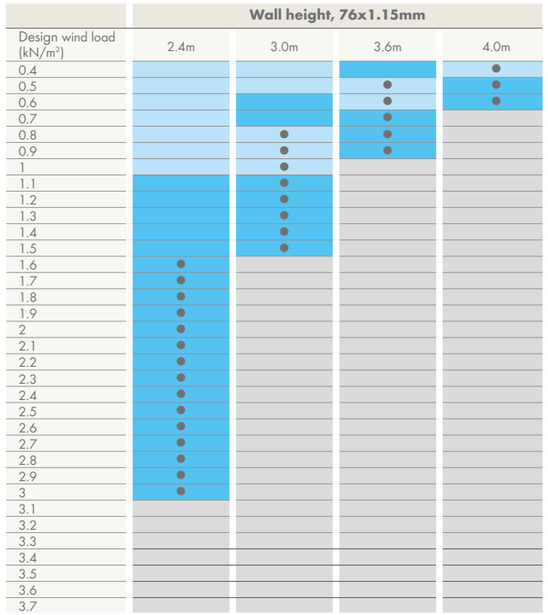
Preliminary design acc. to BS 5950-1:2000 for RONDO profiles

The span table is used to show how the substructure needs to be dimensioned as a function of wind loads [kN/m²] according to the relevant national standards and the span widths of the profiles, which are determined (usually synonymous with floor height).

The fixing to the load-bearing structure is not considered. It is assumed that the profile is planked with a suitable board both sides (AQUAPANEL® Cement Board Outdoor on the exteriors and a gypsum based board on the interiors). An angle fixing of the profile to connect to the load-bearing structure is recommended in any case. 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.

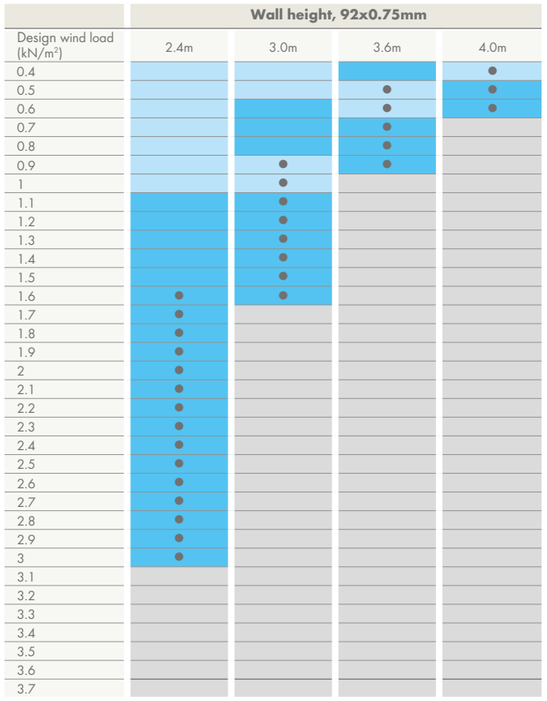
Further profile solutions can be demonstrated by a simple proof of the fitness for use shown by a deformation limit of max. f = l/360.

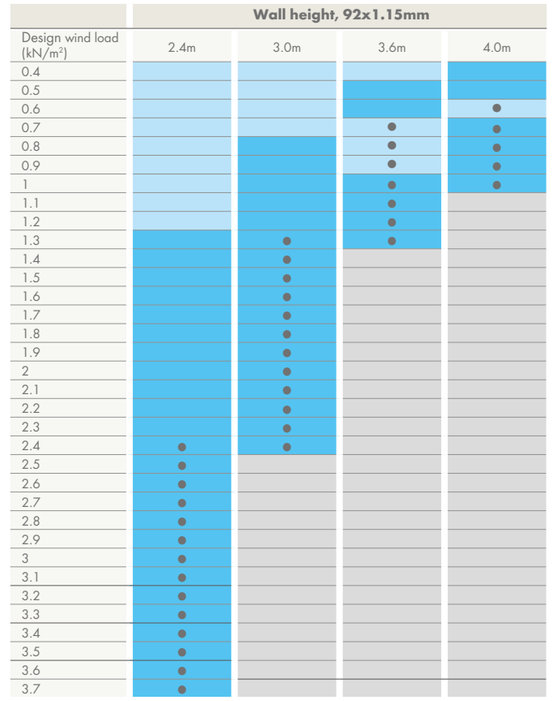


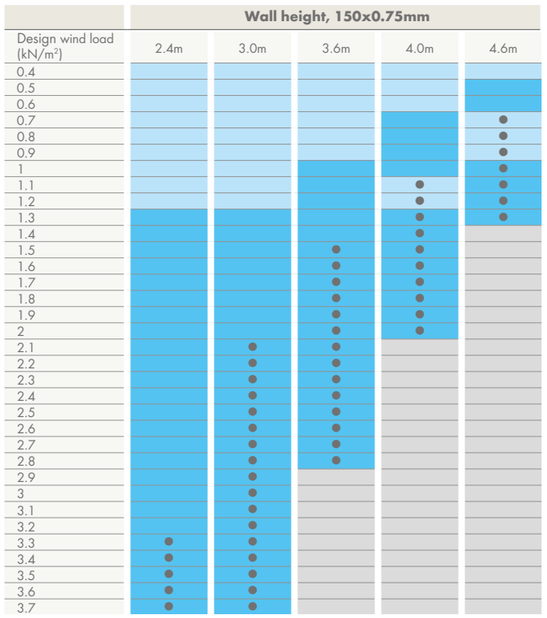


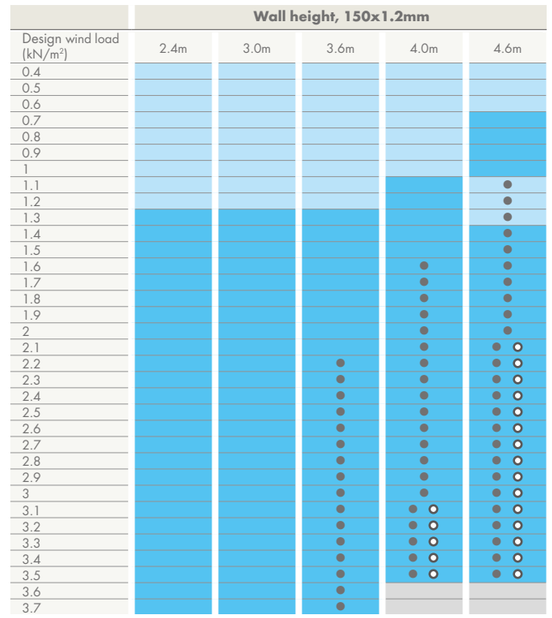
WM111C.1 Single stud exterior wall

600 mm stud spacing
400 mm stud spacing
300 mm stud spacing
You can contact specification manager for further assistance
Back to back
RONDO 152x64x1.6mm









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Knauf Aquapanel GmbH & Co. KG
Zur Helle 11
58638 Iserlohn
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