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# Building Design

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Creative design freedom, architectural expression, building form and function are supported by innovative envelope solutions and systems that are cost-effective, provide safer, faster, high quality construction and achieve superior lifetime performance and durability.

Kingspan's insulated roof and wall systems meet these objectives for both functional buildings and projects where creative form, shape and image are key design factors.

Kingspan's insulated roof and wall systems are fully compliant to applicable Building Regulations and Standards, as well as property insurers fire certification requirements (**FIREsafe**)

Kingspan's range of insulated roof and wall systems are proven for the following:

- Safer construction
- Structural integrity
- Thermal and air tightness
- Fire safety
- Acoustics
- Robustness and durability
- Buildability quality
- Faster build speed
- Environmental sustainability
- Reduced lifetime costs

Furthermore, property investors and occupiers require solutions that provide the most economic business case in terms of Whole Lifecycle Costs (WLC) at new build and through out the building's operating lifetime.

Kingspan's factory pre-engineered, single component systems optimise build speed and installed cost. Lower lifetime costs are achieved by reduced maintenance and lower energy usage which, in turn, minimises Carbon Dioxide (CO<sub>2</sub>) emissions throughout the building's lifetime.

Product quality is assured through the use of accredited and tested raw materials, high technology manufacturing techniques and rigorous testing to appropriate National and European standards.

All Kingspan products are manufactured to EN ISO 9001:2000 quality assurance.

The worldwide use and installation of over 250 million square metres (m<sup>2</sup>) of Kingspan's insulated roof and wall systems, is testament to the recognition of our solutions by international property investors, designers, constructors and occupiers.

#### Applications and Building Purpose Groups

Kingspan's insulated roof and wall systems are widely used across all building sectors including:

- Industrial & Manufacturing
- Distribution, Logistics & Transport
- Commercial & Office
- Retail
- Leisure, Sport & Hotels
- Education
- Healthcare

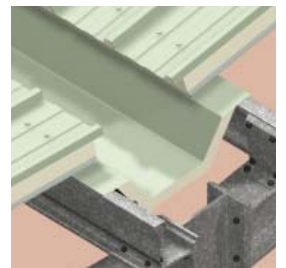
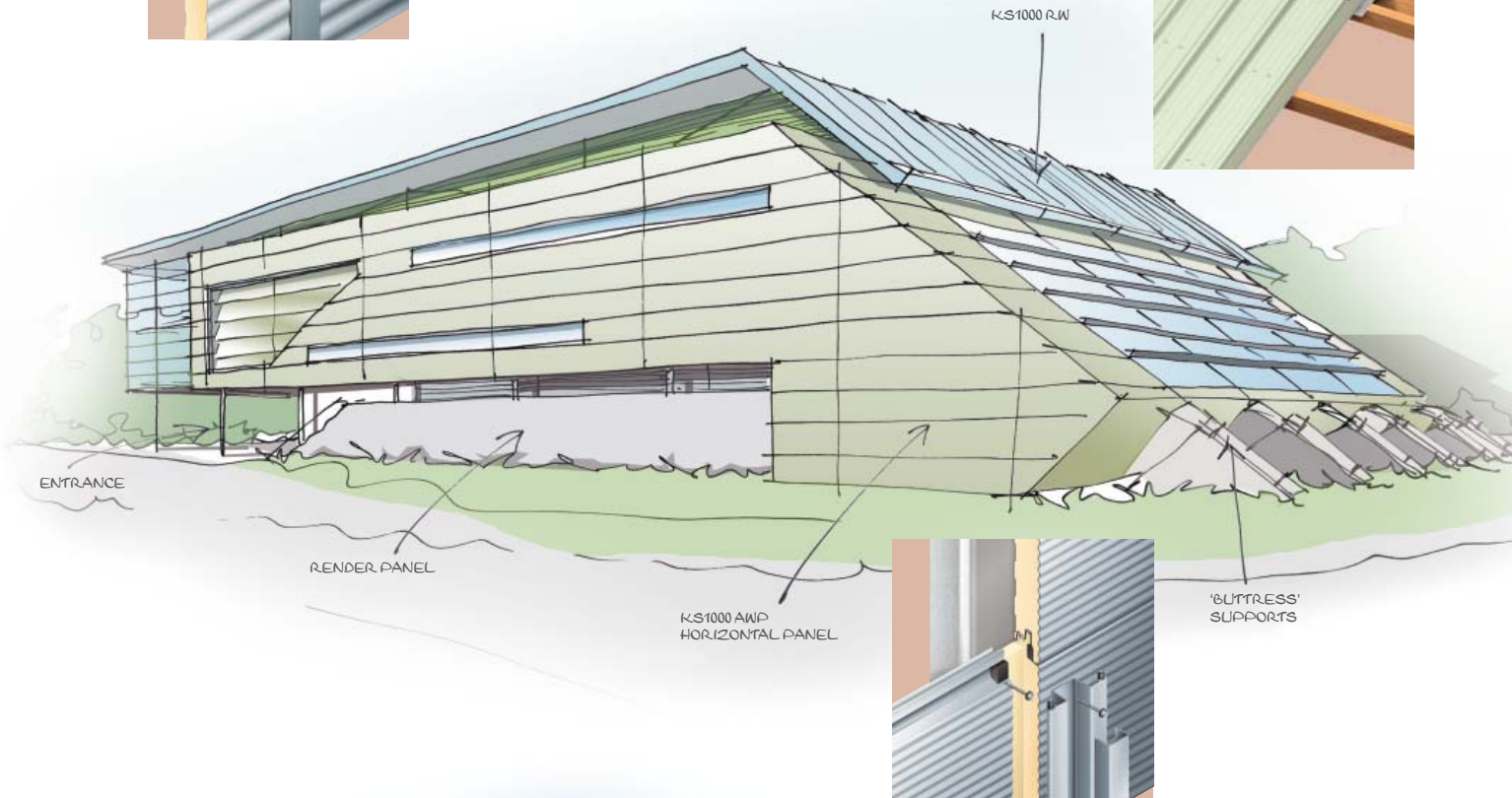
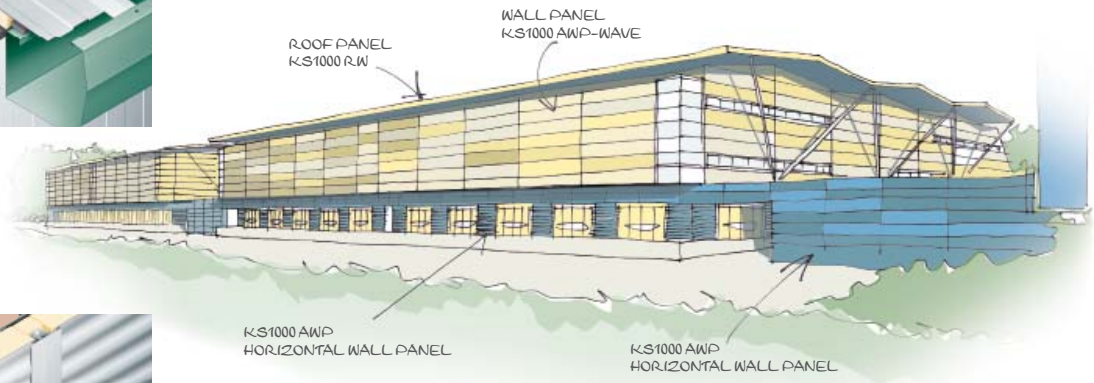
- Defence
- Student Accommodation
- Residential & Social Housing
- Utilities
- Public & Local Authority

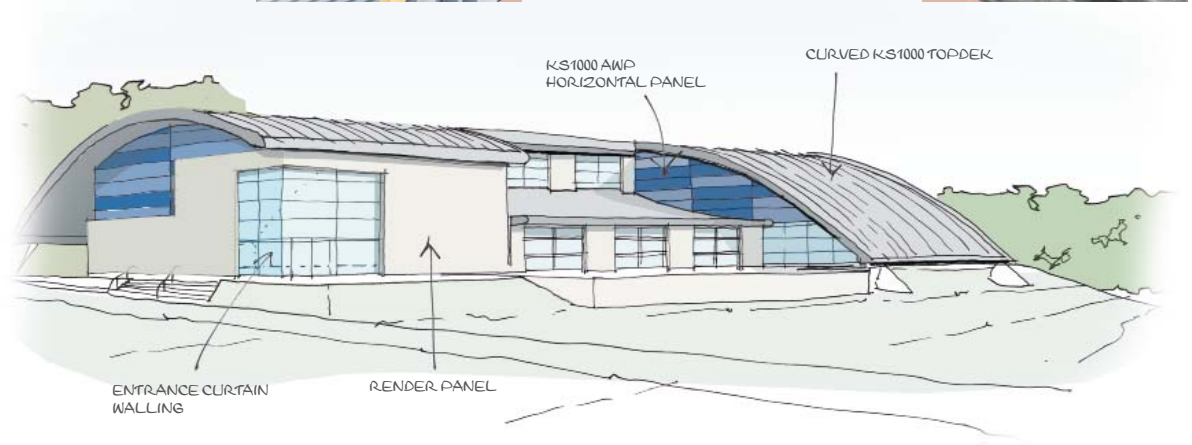
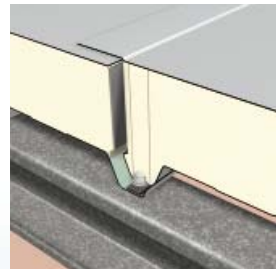
#### Design, Construction and Regulatory Performance Requirements and Compliance

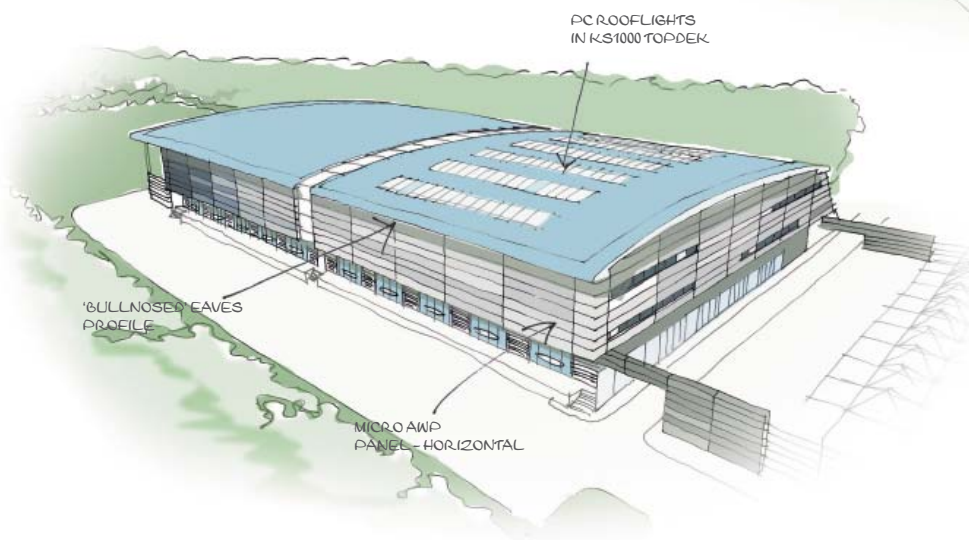
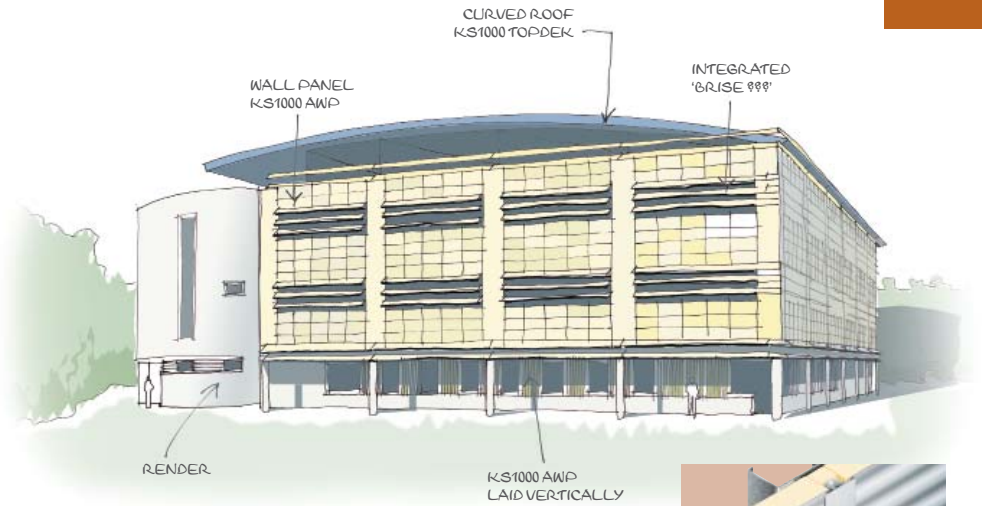
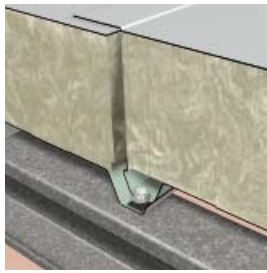
Compliance	Regulations, Standards & Accreditations according to:	Kingspan Solutions
Health & Safety	National Building Regulations & Norms	✓
Structural	National Building Regulations & Norms	✓
Thermal	National Building Regulations & Norms	✓
Airtightness	National Building Regulations & Norms	✓
Energy Efficiency	National Building Regulations & Norms	✓
Fire Safety	National Building Regulations & Norms	✓
Acoustics	National Building Regulations & Norms	✓
Health & Hygiene	Non-deleterious fibre-and mould growth-free	✓
Environmental & Sustainability	Complies with Montreal and Kyoto Protocol	✓
Durability & Robustness	National Building Regulations & Norms	✓
Accreditation	EN ISO 9001:2000	✓
Whole Lifecycle Costs (Capital & Operating)	Project specific upon request	✓
Lightning Protection	National Building Regulations & Norms	✓



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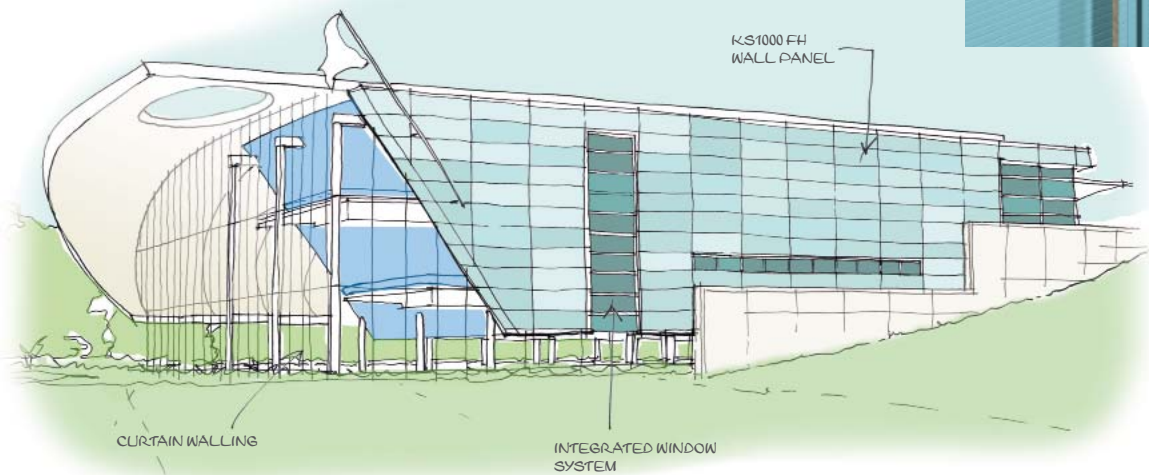




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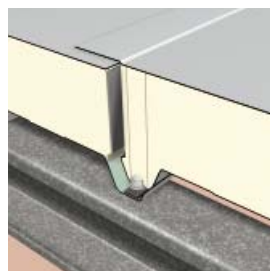
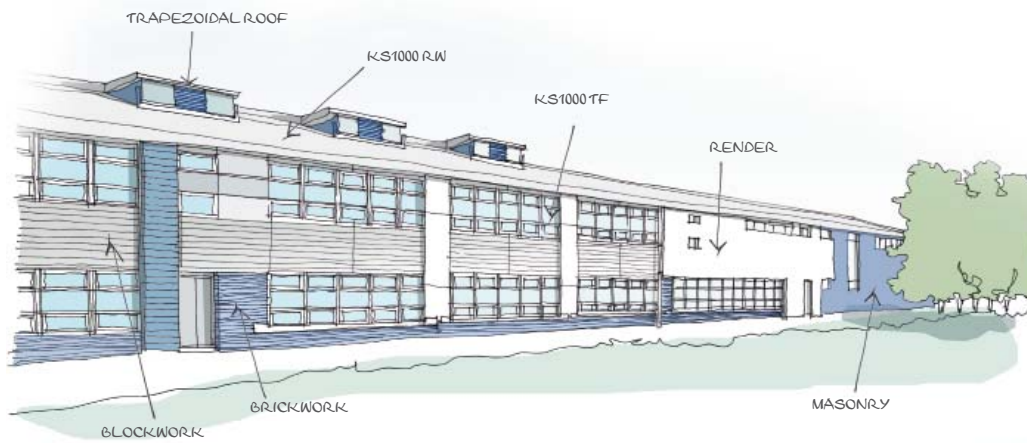
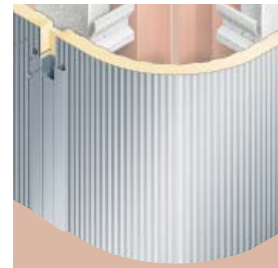
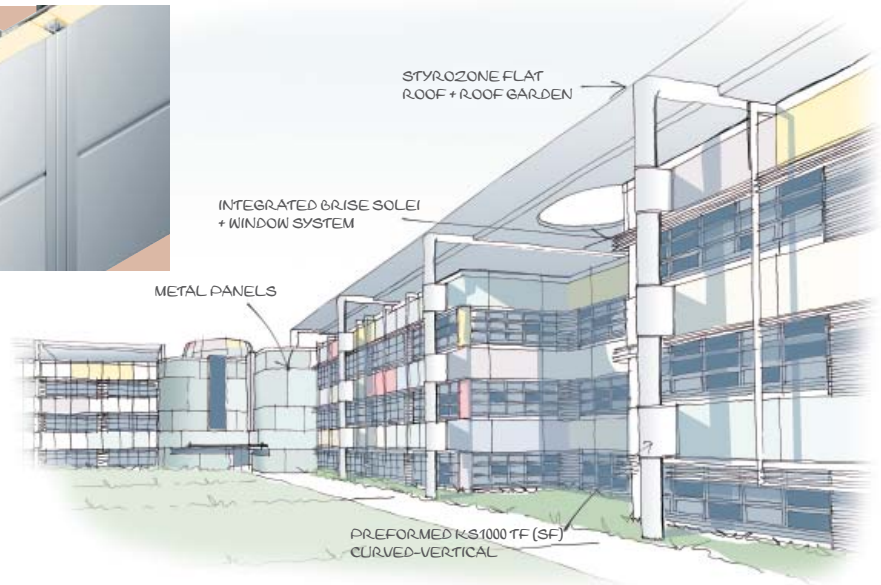


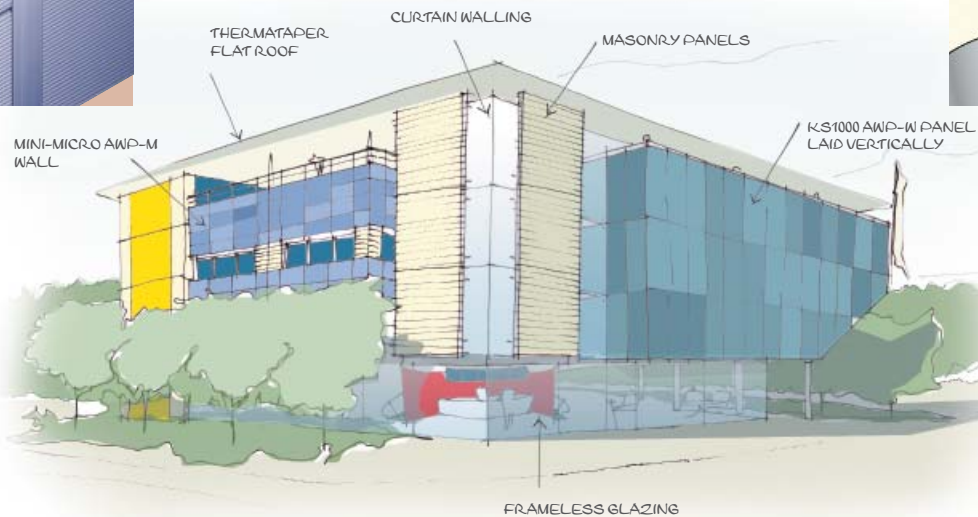
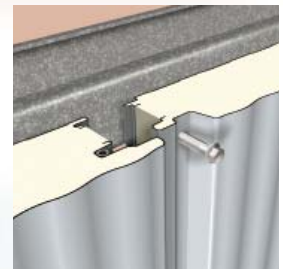
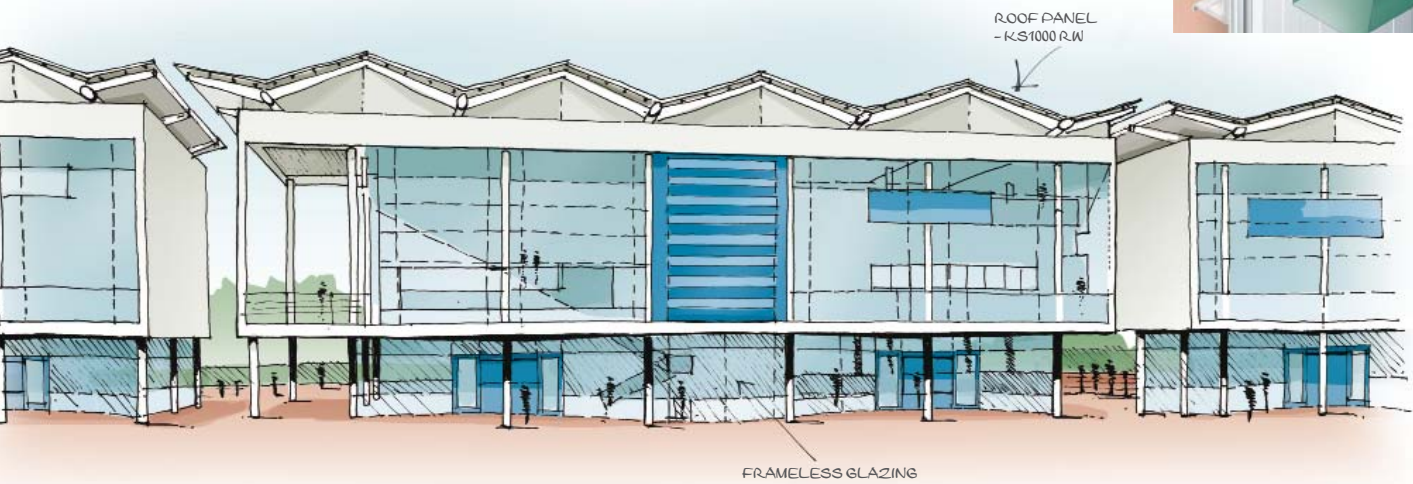
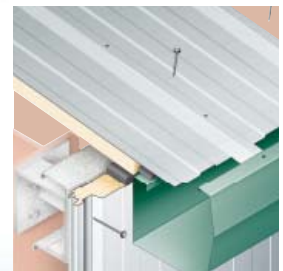
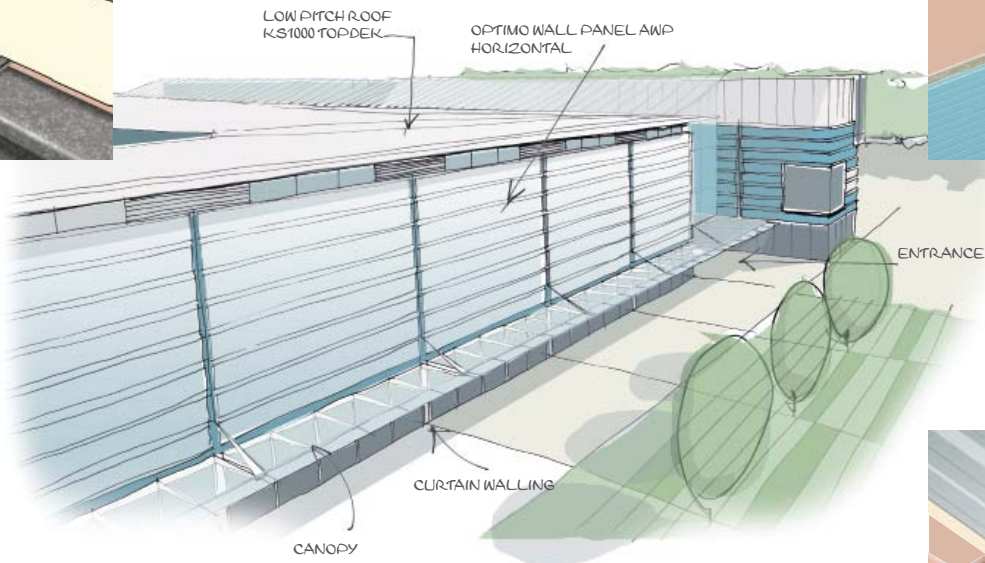
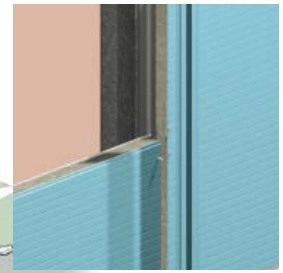
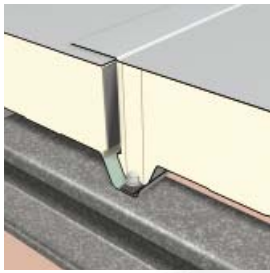
KS1000 FH  
WALL PANEL

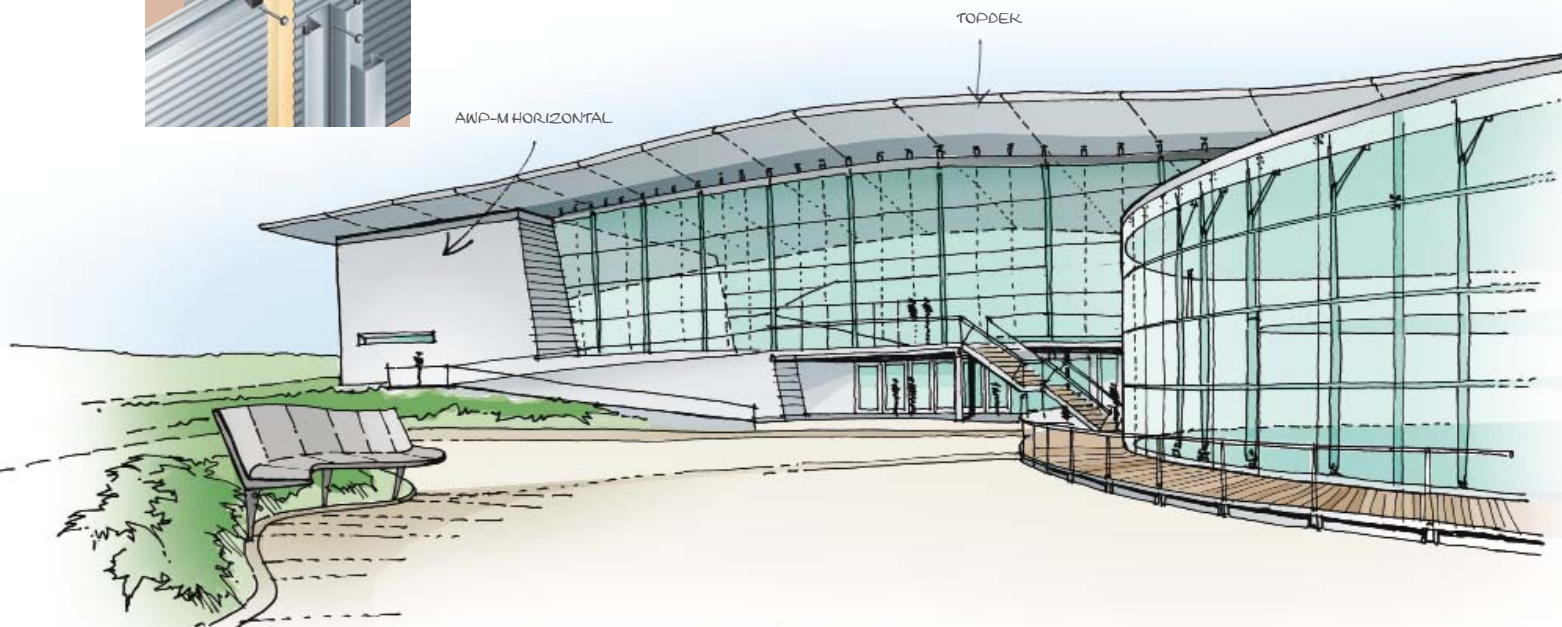
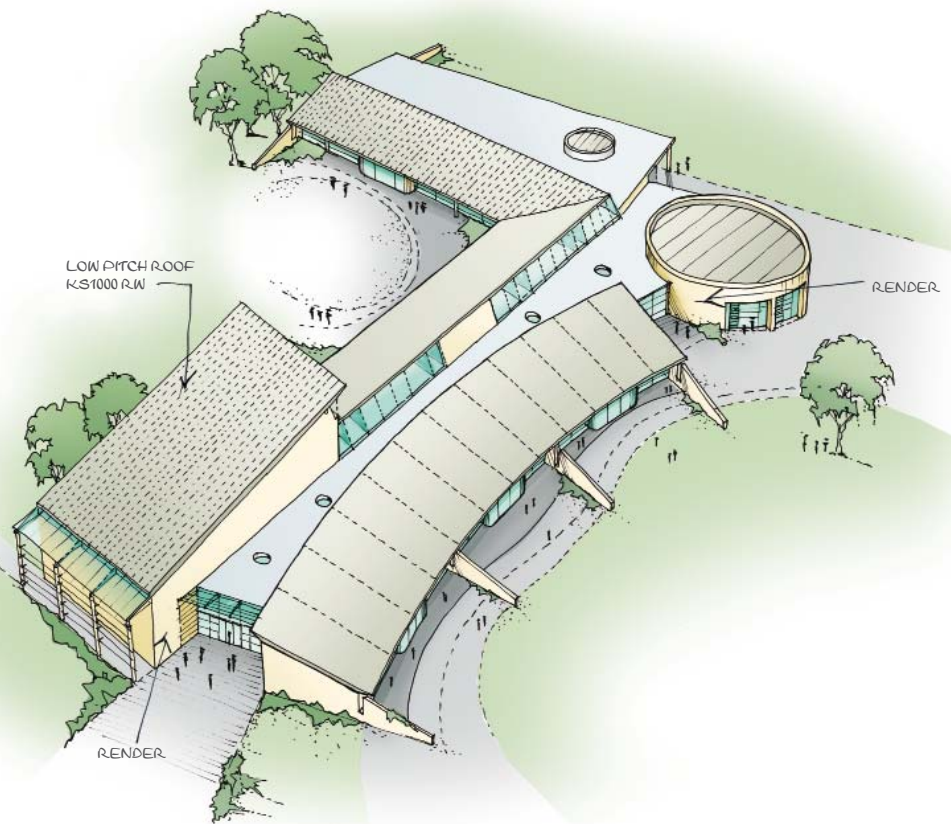
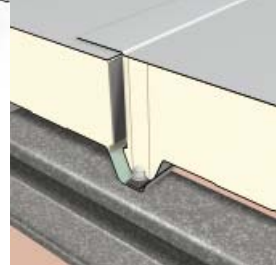
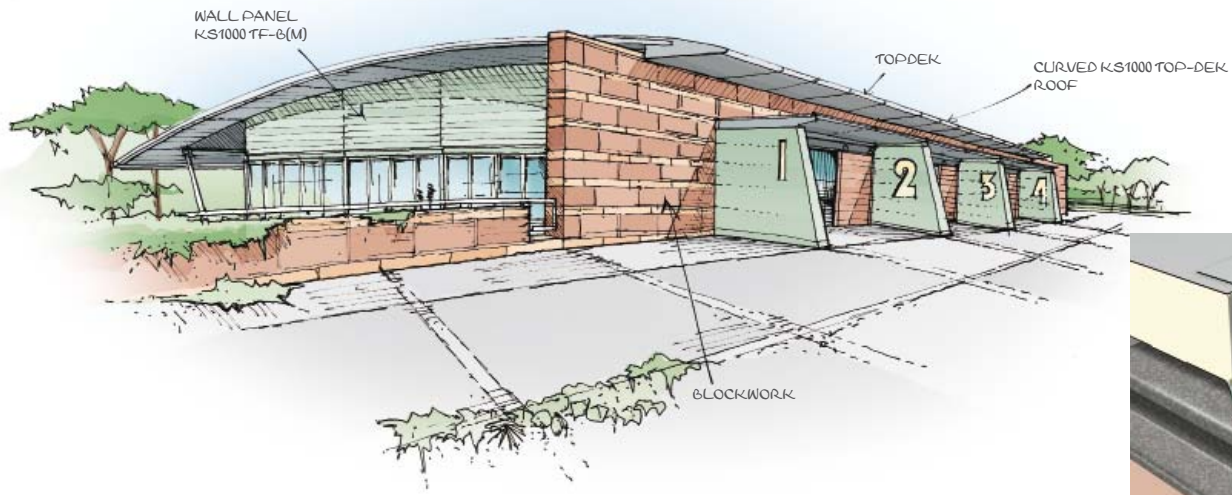


CURTAIN WALLING

INTEGRATED WINDOW  
SYSTEM







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Safety should be an inherent part of any workplace, especially when one of the greatest risks relates to working at height. Investigations have shown that falls from height accounted for 47% of fatalities and 30% of major injuries in the 2001/02 period in construction. It is still the most common cause of accidents in the industry.

When it comes to working at height a safe environment must always be provided. Employers, designers, constructors, employees and all those in control of work are responsible for providing the necessary safety equipment and protection.

**Site Safety – Remember ignorance of the law excuses nobody!**



## Legislation

There are a number of regulations relating to providing safe working environments. However, as far as working at height is concerned, the following are the most pertinent:

- Before any form of work at height is undertaken, a risk assessment must be completed in line with country specific Health & Safety Regulations for every procedure that is carried out during a given operation.
- Workplace (Health, Safety and Welfare) Regulations are probably the most relevant in terms of ensuring the health and safety of workers.
- Construction Design & Management (CDM) Regulations are about management of health and safety and apply to construction projects and all those associated with them, including clients, designers, contractors and operatives. Under CDM Requirements, designers must:
  - Consider during the development of designs the hazards and risks which may arise from those constructing and maintaining the structure.
  - Design to avoid risks to health and safety as far as is reasonably practicable.
- Country specific Health & Safety Regulations require that:
  - There shall, so far as is reasonably practicable, be suitable and sufficient safe access to and egress from every place of work and to any other place provided for the use of any person while at work.
  - Suitable and sufficient steps shall be taken to prevent, so far as reasonably practicable, any person falling.

This should include the provision of safe access and egress for:

- a) Any guardrail, toe-board, barrier or other similar means of protection; or
- b) Any work platform

In addition, a suitable personal suspension equipment or means of arresting the fall can/must be provided (safety nets). The regulations also includes requirements on ladders that they should not be used as a means of access or egress or as places of work unless it is reasonable to do so having regard to the nature or duration of work being carried out.

## The Role of the Client

Those who own, occupy or have responsibility for a building have an important role to play when arranging for construction work to be done. This includes considering the design and specification of a new building, appointing a contractor for refurbishment or instructing an employee to carry out an emergency repair.

Unrealistic building or refurbishment programmes can lead to undue pressure on those carrying out the work. This can make it harder for contractors to plan for safe working, to prepare quality safety method statements and to review and amend systems of work. Clients have an important role here. They should avoid placing unreasonable programming demands on the project.

The usual practice of a client is to:

- Appoint a competent planning supervisor and principal contractor and check that any other designers or contractors they appoint are competent. Clients should satisfy themselves, as far as they reasonably can, that those they appoint to carry out work on the project are competent to do so and have the necessary resources. This could, for example, include enquiries on:
    - membership of the relevant trade bodies or professional organisations.
    - previous experience of similar work.
    - arrangements for managing health and safety standards.
    - references from previous clients.
    - time needed to carry out the work safely.
  - Provide relevant information needed to allow the work to be done safely. This could include information on:
    - what existing roofs and walls are made of, especially if they contain fragile materials.
    - the age of an existing structure.
    - previous modifications made.
    - existing arrangements for access.
    - restrictions on availability of space for crainage or handling equipment.
    - relevant permit to work arrangements operated by the client.
    - fire prevention precautions.
    - areas where contractor access will be prohibited.
  - All designs, specifications and materials should comply with the relevant building regulations.
- Clients can benefit considerably from a structured approach to health and safety. Better planning and better systems of co-ordination between designers, contractors and specialist subcontractors can lead to:
- reduced delays
  - a building that is easier and cheaper to maintain

Work at height is more expensive than similar work done at ground level. This additional cost can increase dramatically if it is not properly organised and controlled.

## The Role of the Designer

Using their professional skills and judgement, designers can eliminate hazards and make risks easier to manage. This helps contractors to provide a safer place to undertake the work. Designers need to consider the initial construction work as well as future maintenance and cleaning requirements.

*The designers have a duty to ensure that their designs give adequate regard to health and safety. Foreseeable risks should be avoided. If it is not reasonably practicable to avoid them, they should be combated at source. Priority should be given to design solutions providing general rather than individual protection.*

For example:

- eliminate fragile materials.
- minimise the need for work at height during construction.
- minimise inspection and maintenance requirements for the completed roof and wall envelope.
- identify and design in safe access and working for maintenance and cleaning.
- consider carefully the siting of plant which will require maintenance. Are there alternatives to placing it on the roof? If not, there are the optimum position on the roof where safe access can most easily be provided?
- consider carefully rooflight location.
- provide clear and unambiguous specifications for safety critical elements of the design.
- provide information relevant to construction and maintenance for inclusion in tender documentation and in the health and safety file.

The design of the roof and wall should be reviewed as a total design package. It should take account of the interaction between all components (in both final and partially erected state) and their effect on the systems of work necessary to erect the structure.



## Designing Roofs

Access to roofs is often simple and it can be easy to walk around on them. Accidents happen not just to roof workers but also to engineers, surveyors, children, caretakers, etc. The first priority is to design out the risk at source, for example by specifying adequate in-built edge protection. Designers should consider the alternatives available in terms of their effectiveness in preventing falls, as well as cost, aesthetics and buildability.

Roof work is dangerous. Almost one in five construction deaths are caused by falls from or through roofs. Falls through fragile materials such as roof lights and asbestos cement roofing sheets account for more of these deaths than any other single cause. There are also many serious injuries, often resulting in permanent disabilities. These accidents occur across the whole range of roof work from the simplest repairs to large-scale construction projects".

### Edge Protection

Edge protection options in order of effectiveness are:

parapet.

guardrail at the roof edge.

permanent protected walkway for access to plant on the roof.

preformed sockets to support temporary edge protection guardrails.

running line systems designed, installed and tested to the relevant standards.

Designers should be aware of the requirements of the relevant Health & Safety Regulations.

## Fragile Materials

The most important issue for designers is how to design out fragile materials or eliminate unprotected fragile materials at height.

The supplier of building materials should be able to provide:

- initial material strength.
- the effects of ultra-violet radiation on material properties.
- fixing specifications, including type, number and position.

### Rooflights

*For rooflights designers should consider carefully the potential to eliminate or reduce this hazard.*

The decision on whether to include rooflights should take account of the risks associated with temporary gaps during construction, and the risks when access to the roof is needed later during maintenance or cleaning.

Where rooflights are required, designers should consider:

- specifying rooflights that are non-fragile
- fitting rooflights designed to project above the plane of the roof and which cannot be walked on (these reduce the risk but they should still be capable of withstanding a person falling onto them).
- specifying rooflights with a design life that matches that of the roof, taking account of the likely deterioration due to ultra-violet exposure, environmental pollution and the internal and external building environment.

Kingspan rooflight systems are non-fragile and do not increase Health & Safety risk.

### Roofing Systems

*The safest option is to specify a roof system which is non-fragile during construction and over its design life.*

*Kingspan insulated roof systems are non-fragile, simple and fast to install and are load bearing independent of the fixing system.*

Handling of very long roof panels can be dangerous for roof workers and others, even in moderate winds. Under certain wind conditions, sheeting work has to be stopped.

### Roof Maintenance

Designers can help reduce the amount of work done at height throughout the life of the structure.

For example, they could:

- increase the maintenance life of roof components
- locate plant and equipment at low level wherever possible
- design gutter detailing to reduce blockages

### Co-operation with Others

Good liaison between designers can achieve better standards at all stages of the work. A practical example is the effect of gutter design on systems when the roof is laid.

Roof workers and others commonly use gutters for access at eaves level along the roof. The structural strength of the gutter, its width and depth and the quality of the fixings greatly affect its safety as a means of access. Where gutters are not strong enough or are fitted after the roof cladding is fixed, means of access will be needed which takes this into account. Problems can often be avoided if designers consult with each other.

## Principal Contractors

Principal contractors are the key players in setting practical on-site safety standards and ensuring that they are actually followed. They should:

- ensure that the overall work programme gives enough time for work to be done safely by subcontractor, taking account of likely weather conditions.
- allow time to consider method statements and deal with the implications of design changes.
- devise a work programme which reflects the need to control access to areas below roof work where there is danger of falling materials.
- specify clearly at tender stage the resources allocated to control and manage risks such as falls from height.
- ensure that relevant information is passed to the contractor.

Principal contractors need to ensure that an adequate construction phase health and safety plan is in place before construction starts. The plan needs to set out explicitly how the work is to be done in practice and the precautionary measures that need to be taken.

Safety method statements can usefully form the basis of the construction phase health and safety plan. They are usually drawn up by individual contractors rather than the principal contractor. Principal contractors need to scrutinise contractor method statements.

They need to satisfy themselves that these are appropriate and adequate for the work in hand. It is not acceptable for principal contractors merely to specify that method statements are drawn up. They need to establish an effective system for reviewing them.

Principal contractors need to monitor compliance with the construction phase health and safety plan and take positive action to remedy matters if risk is not being effectively controlled.

## Contractors

Contractors need to:

- prepare safety method statements that are relevant to the work being done.
- ensure that they and their employees are competent to carry out the work in hand safely.
- co-operate with the principal contractor in implementing the construction phase health and safety plan.



## On-Site Installation

Kingspan provide site installation methods guidance booklets for their insulated roof and wall systems which are available to designers and constructors from Kingspan's Technical Services.



### Roof Systems

- KS1000 RW
- KS1000 TOP-DEK
- KS1000 FF
- KS1000 RT
- KS1000 X-DEK

### Wall Systems

- KS1000 AWP B/M/E/W/L/S/I/F
- KS1150 TF/TL/TC B/M/E/W/L/S/I/F
- KS1000 FR
- KS1000 FH
- KS1000 RW

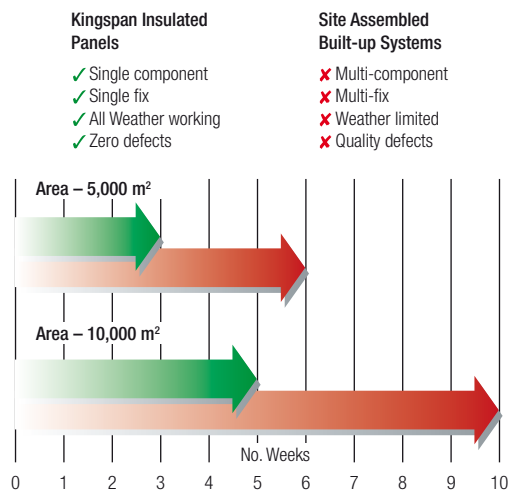
Contact Kingspan Technical Services.

## Buildability

Kingspan insulated roof and wall systems are factory pre-engineered enabling safer, simple, cost-effective, rapid and superior quality site construction. This facilitates reliable and fast site programme certainty, lower prelim and attendance costs, 'on time' project handover and earlier client/tenant trading income payback compared with multi-part site-assembled envelope systems.

## Build Speed

Kingspan single component, single fix insulated roof and wall systems can typically reduce on-site construction time by up to 50% compared with conventional built-up, multi-part roof or wall on-site assemblies. This allows the site installation of roof and wall systems to be removed from the building programmes' critical path.





“Reduce lifetime energy usage,  
operating costs and CO<sub>2</sub> emissions  
by up to 40%”

## Thermal Performance and Energy Efficiency

### Introduction

World wide concern regarding climate change and the impact which greenhouse gas emissions have on the environment have encouraged governments to act.

The EU Directive on the energy performance of Buildings (EPBD) – ensures that building standards across Europe place a high emphasis on minimising energy consumption.

These measures are a vital component of the EU's strategy to meet its Kyoto Protocol commitments.

This protocol was signed by 159 countries in Dec. 1997. The Main goal is reduction of emissions rising in consequence by greenhouse effect.

In brief the EPBD requires all EU Member States to:

- develop a calculation methodology for the energy performance of buildings
- set and enforce minimum energy performance requirements for new built buildings and buildings undergoing major renovation

- develop energy performance certificates for buildings, which must be shown to buyers/tenants when buildings/apartments are constructed, sold or rented out

- ensure the regular inspection of certain boilers and air-conditioning systems

The recent EC Action Plan for Energy Efficiency foresees a key role for the EPBD in realising the savings potential in the building sector, which is estimated at 28%, and which in turn can reduce the total EU final energy use by around 11%.

Kingspan insulated roof and wall systems provide solutions and construction details for building designers which already satisfy these higher specifications in terms of U-values, thermal bridging, condensation risk, air leakage and insulation continuity. These systems also enable the integration and downsizing of HVAC plant, thus reducing lifetime energy usage, operating costs and Carbon Dioxide (CO<sub>2</sub>) emissions by up to 40%

## EU Directive on Energy Performance, May 2010

4.1.2003	EN	Official Journal of the European Communities	L 1/65
<p align="center"><b>DIRECTIVE 2002/91/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL</b>  <b>of 16 December 2002</b>  <b>on the energy performance of buildings</b></p>			
<p>THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,</p> <p>Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,</p> <p>Having regard to the proposal from the Commission (1),</p> <p>Having regard to the opinion of the Economic and Social Committee (2),</p> <p>Having regard to the opinion of the Committee of the Regions (3),</p> <p>Acting in accordance with the procedure laid down in Article 251 of the Treaty (4),</p> <p>Whereas:</p> <p>(1) Article 6 of the Treaty requires environmental protection requirements to be integrated into the definition and implementation of Community policies and actions.</p> <p>(2) The natural resources, to the prudent and rational utilisation of which Article 174 of the Treaty refers, include oil products, natural gas and solid fuels, which are essential sources of energy but also the leading sources of carbon dioxide emissions.</p> <p>(3) Increased energy efficiency constitutes an important part of the package of policies and measures needed to comply with the Kyoto Protocol and should appear in any policy package to meet further commitments.</p> <p>(4) Demand management of energy is an important tool enabling the Community to influence the global energy market and hence the security of energy supply in the medium and long term.</p> <p>(5) In its conclusions of 30 May 2000 and of 5 December 2000, the Council endorsed the Commission's action plan on energy efficiency and requested specific measures in the building sector.</p> <p>(6) The residential and tertiary sector, the major part of which is buildings, accounts for more than 40 % of final energy consumption in the Community and is expanding, a trend which is bound to increase its energy consumption and hence also its carbon dioxide emissions.</p> <p>(7) Council Directive 93/76/EEC of 13 September 1993 to limit carbon dioxide emissions by improving energy efficiency (SAVE) (5), which requires Member States to develop, implement and report on programmes in the field of energy efficiency in the building sector, is now starting to show some important benefits. However, a complementary legal instrument is needed to lay down more concrete actions with a view to achieving the great unrealised potential for energy savings and reducing the large differences between Member States' results in this sector.</p> <p>(8) Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (6) requires construction works and their heating, cooling and ventilation installations to be designed and built in such a way that the amount of energy required in use will be low, having regard to the climatic conditions of the location and the occupants.</p> <p>(9) The measures further to improve the energy performance of buildings should take into account climatic and local conditions as well as indoor climate environment and cost-effectiveness. They should not contravene other essential requirements concerning buildings such as accessibility, prudence and the intended use of the building.</p> <p>(10) The energy performance of buildings should be calculated on the basis of a methodology, which may be differentiated at regional level, that includes, in addition to thermal insulation other factors that play an increasingly important role such as heating and air-conditioning installations, application of renewable energy sources and design of the building. A common approach to this process, carried out by qualified and/or accredited experts, whose independence is to be guaranteed on the basis of objective criteria, will contribute to a level playing field as regards efforts made in Member States to energy saving in the buildings sector and will introduce transparency for prospective owners or users with regard to the energy performance in the Community property market.</p> <p>(11) The Commission intends further to develop standards such as EN 832 and prEN 13790, also including consideration of air-conditioning systems and lighting.</p>			
<p>(1) OJ C 213 E, 11.7.2001, p. 266 and OJ C 203 E, 27.8.2002, p. 49.  (2) OJ C 36, 8.2.2002, p. 20.  (3) OJ C 107, 3.3.2002, p. 76.  (4) Opinion of the European Parliament of 6 February 2002 (not yet published in the Official Journal), Council Common Position of 7 June 2002 (OJ L 197, 20.8.2002, p. 4) and decision of the European Parliament of 10 October 2002 (not yet published in the Official Journal).</p>			
<p>(5) OJ L 237, 22.9.1993, p. 28.  (6) OJ L 40, 11.2.1989, p. 12. Directive as amended by Directive 93/68/EEC (OJ L 220, 30.8.1993, p. 1).</p>			

## Thermal Performance and Energy Efficiency

Most buildings have to be heated during the winter (some throughout the entire year) to provide a suitable environment for the occupants or the processes within the building. Conversely, some buildings have to be kept cool eg. chill stores for keeping food fresh. In simple terms, the insulation system or envelope separates the internal and external environments. To achieve this, it must have barrier systems to effectively control:

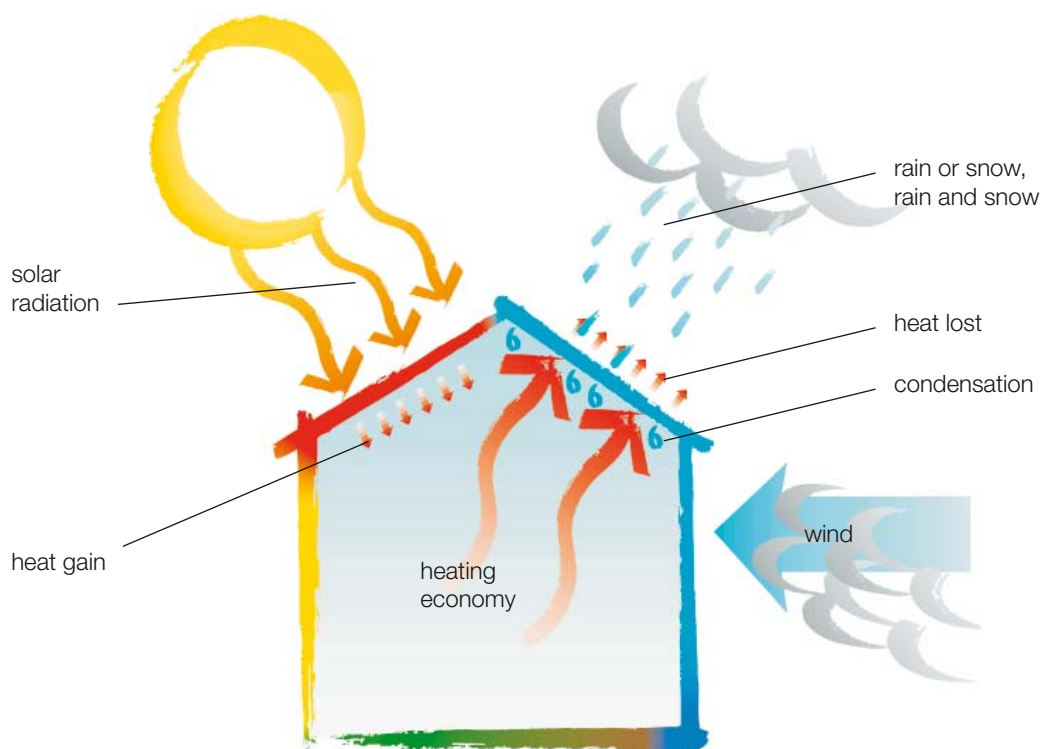
1. **The flow of heat.** This is generally the flow from inside to outside during the winter months and the flow from outside to inside in the summer.
2. **The flow of precipitation.** The envelope must prevent rain and snow from entering the building.
3. **Wind.** It must prevent wind from blowing through the building. If uncontrolled wind is allowed to blow through a building, the internal environment cannot be controlled in any way.
4. **Humidity.** The envelope must allow the control of humidity levels indoors.

An envelope must satisfy all these criteria and must be capable of providing satisfactory performance in each area for the designed service life of the building.

In most buildings, the envelope is relied upon to absorb the energy difference between inside and out. This puts a lot of stress on the barrier materials within the envelope assembly to provide a variety of ways to respond to the changing external environment. An envelope assembly is designed to a minimum tolerance and a failure in any one of the components within the assembly will significantly reduce the overall assembly performance. What is critically important is that to be successful, any envelope solution must integrate the performance of its different components to achieve the desired result. For example, an envelope which has theoretically good thermal properties but which lets rain in or loses heat when the wind blows has not achieved its required performance.

In addition to meeting all these control barrier requirements, the envelope design must also be economical and “buildable”.

### Roof, wall & façade environment



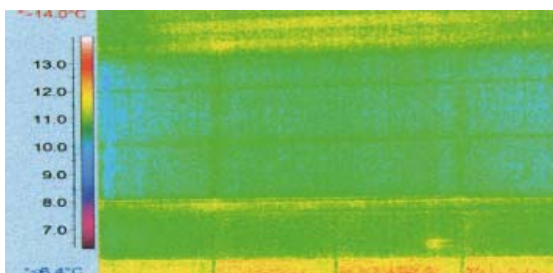
## Thermal Performance and Energy Efficiency

The efficiency of the thermal insulation of the installed building envelope depends on the correct specification of parameters, assembly and durability of the system. Error in any of these areas results in degradation of envelope heat insulating properties.

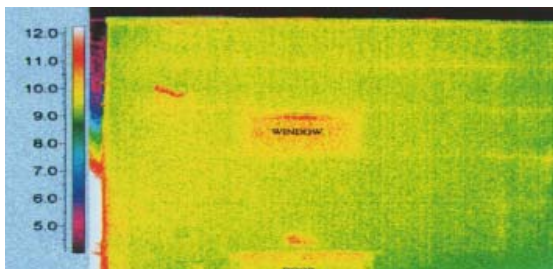
Using infrared thermography makes it possible to identify quickly and precisely any imperfections in thermal insulation performance and verify the thermal insulating properties of the roof and wall systems.

The following thermographic photographs demonstrate high performance insulation properties combined with low air permeability, which are typical properties of Kingspan insulated roof and wall systems.

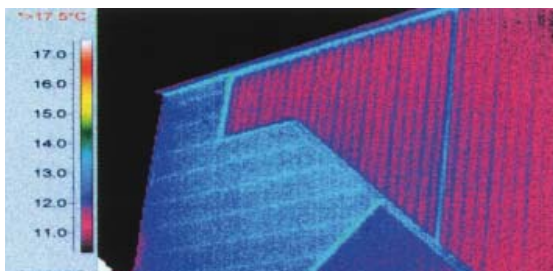
Wall – outside views



This photograph shows the lower glazed part and the sandwich insulating panels above it. All the panels show favourable quality of the insulation which is completely coherent and its joints are tight. At the eaves moulding in the area where the roof assembled on the building is in contact with insulating sandwich panels, small leakage with air leak appears.

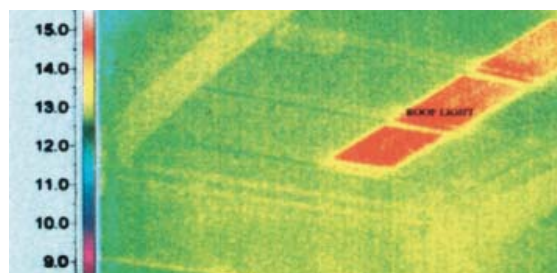


This photograph shows sandwich insulating panel with door and window openings. These openings can be easily identified as the rectangular areas are a bit warmer, which is caused by heat loss naturally more extensive in this area. The panels and joints of the system do now show any important defect and their function is good.

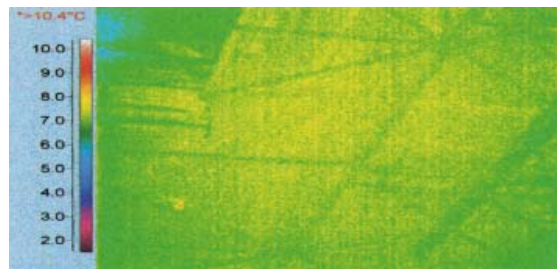


This photograph of the sandwich insulating panel wall outside shows uniform temperature of the surface, which proves the well performed insulation and state of joint. This example shows perfect performance of the designed structural element.

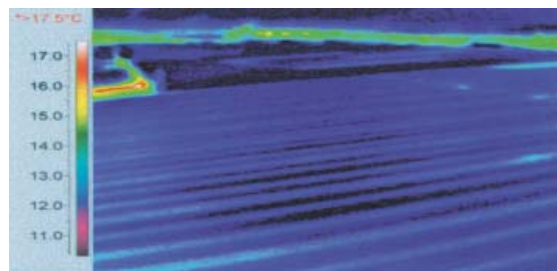
Roof – inside views



This photograph provides the inside view on the sandwich insulating panel. The outside temperature was higher during the research thanks to which a higher temperature gradient was reached. The red strip across the photograph is caused by sunlight radiation through the skylight. The sandwich insulating panels behaviour well and the joints show good sealing integrity.

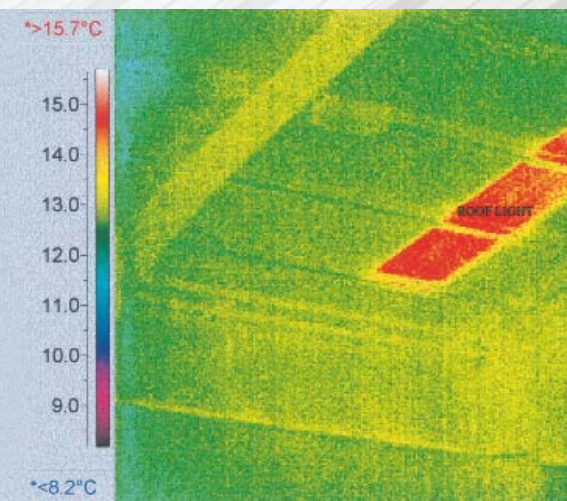


This system of roof sandwich insulating panels above the cooled store shows a high level of heat insulation without any mark of thermal failures. The insulation is of uniform efficiency and the joints seem to be leak-proof. The blue mark top left is caused by the skylight, which is not insulated so well.



This system of roof sandwich insulating panels above the cooled store shows a high level of heat insulation without any mark of heat failure. The insulation is of uniform efficiency and the joints seem to be leak-proof. The blue mark on the photograph top left is caused by the skylight which is not insulated so well.

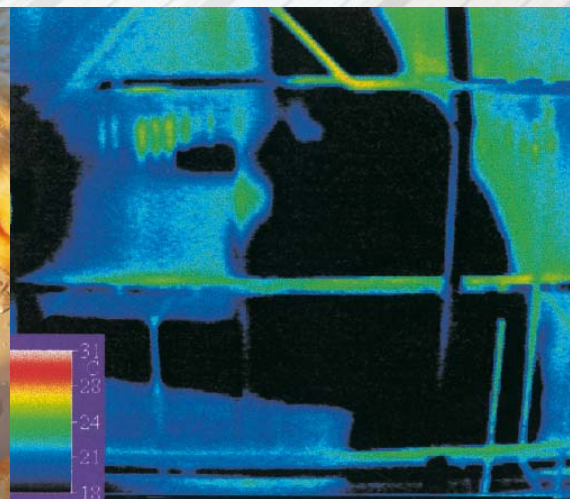
For example 1% moisture by volume in built-up man-made mineral fibre insulants can reduce thermal performance by up to 85% or more, increasing the U-value from 0.25 W/m<sup>2</sup>K to 0.47 W/m<sup>2</sup>K.



Thermographic image showing an insulated panel roof system indicating total insulation continuity.



Typical example of the effect of 1% moisture ingress (by volume) on mineral fibre insulant.



Thermographic image of a site assembled built-up man-made mineral fibre roof system. The large irregular black area within the image represents missing, misplaced or poorly performing insulation which is leading to significant cold bridging, loss of insulation continuity and major heat loss over the building's lifetime.

“The selection of system insulation and its lifetime performance is a fundamental design, construction and occupier issue”

## Thermal Performance

### Thermal Conductivity

To describe the insulation performance of any building material, the thermal conductivity unit  $\lambda$  [W/mK] is used as the most important measure. It indicates how much energy (heat) flows in a steady-state condition in one hour through a 1 meter thick material, if the temperature difference between the inside and the outside amounts to  $\Delta T = 1$  Kelvin.

Kingspan insulated roof and wall systems with PUR/IPN rigid foam insulation achieve values of  $\lambda \leq 0.022$  W/mK (mineral wool  $\lambda \leq 0.044$  W/mK) according to the EU specification EN13165 – “Thermal insulation products for buildings – factory made rigid polyurethane (PUR) products”.

This high insulation performance is achieved by the combination of a vapour diffusion-closed external skin with a closed cellular PUR/IPN rigid urethane core. The result is currently the best thermal performance of all well-known insulating systems in the building industry.

#### Example:

*An 8 cm PUR-composite wall panel has the same insulation performance as a 48 cm multilayer wall made from 36.5 cm thick brick-work plus 8 cm insulation and finished with plaster on both sides.*

The thermal storage capacity of Kingspan insulated roof and wall systems is very low due to the low density of the core material. Thus commercial buildings in intermittent use can be heated fast saving energy.

### Cold Bridges & Thermal Performance

Cold bridges are locally weak points in the structure of a building, through which more heat flows than the surrounding surfaces. Because cold bridges are often the cause of building damage, particular attention must be paid to them. They cause lower localised surface temperatures, resulting in the formation of condensation and mold/fungus.

Cold areas are uncomfortable, and bacteria or mould/fungus growth is very unhealthy. Cold bridges also represent a further enormous cost in the form of heat loss, which results in additional energy consumption and therefore additional CO<sub>2</sub>-emissions. Particularly with multi-layer insulation systems, missing insulation continuity combined with, poor assembly practice can increase the thermal transmittance coefficient U [W/m<sup>2</sup>K] enormously, resulting in significant heat loss.

By using constant wall thickness throughout the insulation envelope, and by the thermal separation of the internal and external skins, the highly engineered quality of Kingspan insulated panel systems prevents the formation of cold bridges.

### Thermal Failure & Increased Energy Operating Costs

For example, a gap caused by 3% of the total insulation volume missing would reduce U values as follows:

roofs – 0.25 to 0.33 W/m<sup>2</sup>K

walls – 0.35 to 0.43 W/m<sup>2</sup>K

#### 5,000 m<sup>2</sup> Building Example

Additional heat loss = 22%

Additional energy usage = 29.583 kWh per annum

Additional CO<sub>2</sub> emissions = 6.212 kg per annum\*

#### 10,000 m<sup>2</sup> Building Example

Additional heat loss = 23%

Additional energy usage = 53.464 kWh per annum

Additional CO<sub>2</sub> emissions = 11.227 kg per annum\*

\* Conversion of energy to Carbon emissions based on an average fuel efficiency.



“Lower Carbon Dioxide (CO<sub>2</sub>) emissions,  
through enhanced energy efficiency,  
reduces Global Warming”

## Thermal Performance

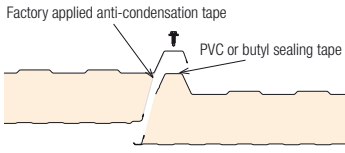
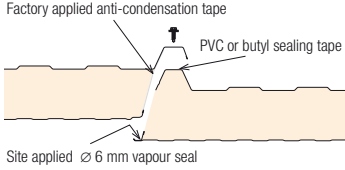
### Humidity

There is a close relationship between insulation performance and humidity control because of the high thermal conductivity of water, which is approximately thirty times larger than the conductivity of resting air. The thermal conductivity of insulating material increases as a function of its water content. Insulating materials with high capillary absorbency can hold up to 98% by volume of water.

*And an increase in moisture content of only 1% by volume can reduce the thermal performance of man-made mineral fibre insulation by up to 85%.*

In addition to the influence on the thermal performance, excess humidity can lead to fungus/mold growth and attack by vermin. Frost damage, corrosion, the solvent effect on other materials as well as dimensional changes can also be caused by moisture/humidity permeation.

It is important to recognise the significance of humidity and its potential for causing harmful condensation within a building. Typical temperature and humidity readings for some types of buildings are shown in the following table:

Building use	Relative Humidity at Internal Temperature			Standard & High Humidity Side Lap Seals
	15 °C	20 °C	25 °C	
Storage areas	< 50%	< 35%	< 25%	<b>Standard Humidity</b> 
Office,shops and most retail units	50–65%	35–50%	25–35%	
Dwellings with low occupancy	65–80%	50–60%	35–45%	
Dwellings with high occupancy e.g. sports halls, kitchen, canteens buildings heated with unflued gas heaters	80–95%	60–70%	45–55%	<b>High Humidity</b> 
Higher humidity (special use) buildings e.g. swimming pools, laundries, breweries	> 95%	> 70%	> 55%	

Kingspan insulated roof and wall systems are manufactured with factory applied anti-condensation/vapour control tape to control the humidity.



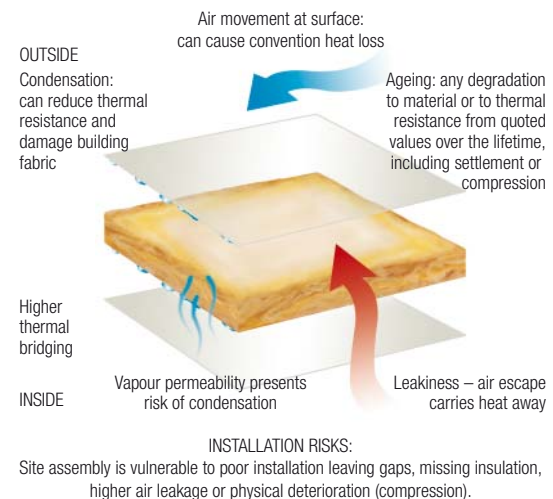
## Thermal Performance

### Condensation

Water vapour is water in its gaseous state. The higher the absolute content of water vapour, the larger the water vapour pressure. Water vapour always follows the steam pressure gradient. Ignoring the effect of gravity and other forces, water vapour will always move along the pressure gradient towards the point of lowest concentration. This migration process is called diffusion. Normally in “warm” buildings, the vapour pressure difference between the internal building climate and the outside causes diffusion of water vapour out of the building. If the water vapour reaches the dew point, it changes into liquid state and condenses as water.

Designers of chill and coldstores should consider the reverse condensation effect where the external temperature will normally be higher than the cold internal air (with lower vapour content) resulting in moisture migration into the building. In these circumstances, the vapour barrier has to be located towards the external skin of the panels.

The need for lower U-values and insulation continuity requires certainty of insulation performance over the building's lifetime and the removal of any risk of increased thermal conductivity, whatever the cause.



The largest risk factor is the potential for build up of vapour causing interstitial condensation within the insulation material which results in its physical degradation and can lead to thermal performance failure.

Kingspan insulated roof and wall systems utilise closed cell insulation between impervious metal facings which prevents any moisture or vapour ingress into the insulation core. This ensures long term thermal (U-value) reliability and insulation continuity. Designed-in quality guarantees the reliability of thermal (U-value) and insulation continuity.



## Thermal Performance

### Air Leakage Prevention

Air leakage prevention describes the ability of a building to prevent air from passing through it. Specifically, it is concerned with the movement of air through construction joints.

An airtight building envelope not only reduces heat loss, but also prevents vapour diffusion leading to improved thermal and acoustic performance, and better control of internal climatic conditions.

The physical reason for the passage of air through structural joints is the pressure difference between inside and out caused by the wind, and the temperature difference between the external and internal climates. Small wind velocities can produce surprisingly high differential pressures. Thermal pressure depends on the temperature difference and on the room height. The combination of wind and thermally induced differential pressure can add up to high peak values for pressure differential.

Air leakage through a building envelope should not be considered as acceptable natural ventilation. Air leakage into a building cannot be controlled or filtered and will not provide adequate or evenly distributed ventilation to that building. In addition to this, the warm air which is leaking out of the building will carry moisture which may condense within the building fabric leading to degradation. Ventilation of a building should be designed and should be based on the assumption that the envelope will be relatively airtight.

Up to 33% of HVAC costs on industrial and commercial buildings are caused by air leakage. Air leakage causes a particularly risk of condensation in multi-layer roof and wall systems. Thus small assembly and design errors with these systems can easily result in increased air leakage rate.

The designed-in quality of the KINGSPAN system substantially reduces air leakage by means of a unique “labyrinth” joint design and the factory applied joint sealants.

“The selection of a system of insulation for a building is a fundamental design, construction and owner issue. Its ability to perform over the lifetime of the building is critical in optimising energy efficiency and Carbon Dioxide (CO<sub>2</sub>) emissions.”

## Challenges to Insulation Performance

### Machine-Made Mineral Fibre Insulation

#### Rock fibre

- Vapour permeability presents risk of condensation
- Leakiness – air escape carries heat away
- Condensation can reduce thermal resistance and damage building fabric



#### Glass fibre

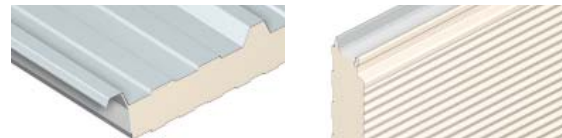
- Air movement at surface can cause convection heat loss
- Degradation to material or thermal resistance can occur through settlement, ageing and compression over the building's lifetime

### Installation Quality Risks

Man-made mineral fibre materials are vulnerable to poor installation leaving gaps or physical deterioration (compression).

### Kingspan Closed Cell Insulated Roof and Wall Systems

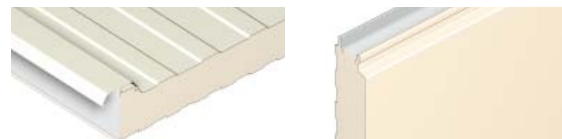
#### Closed cell insulation



- impervious facings
- No cavities or condensation risk



- No air movement
- Factory quality (no gaps or missing insulation)



- No settlement, ageing or compression of insulation

### Installation Quality Certainty

Factory, pre-engineered systems facilitate superior quality site installation.



Building fabric insulation and airtightness certainly play a vital role in optimising energy efficiency, lowering energy usage and reducing operating costs over the building's lifetime.

Additionally, significant capital cost savings can be made by downsizing HVAC plant and services at new build stage.

Kingspan's insulated roof and wall systems facilitate the construction of energy efficient and low Carbon Dioxide (CO<sub>2</sub>) emission buildings, providing environmentally sustainable construction.

## Energy Efficient Building Design

### Building Services

To achieve energy efficiency in practice and compliance with current regulations, the building and its services systems should be appropriately designed and constructed. Information should also be provided such that the energy performance of the building in use can be assessed. When designing building services installations, provision should be made to facilitate appropriate inspection and commissioning.

In large complex buildings, it may be sensible to consider the provisions for the conservation of fuel and power separately for the different zonal areas of the building in order to establish the measures appropriate to each area.

The form and fabric performance of the building plays a vital role in the achievement of in-use energy efficiency. Optimum energy efficiency can be achieved by utilising the superior lifetime thermal, air leakage and insulation continuity performance of Kingspan's roof and wall systems. This allows the design team to downsize HVAC plant, minimising energy usage and cost levels over the lifetime of the building. This also achieves lower Carbon Dioxide (CO<sub>2</sub>) emissions and maximises environmental sustainability for future generations.

The key areas for consideration are:

#### Heating/Cooling System Efficiency

The heating or cooling system of a building must be designed and installed to make efficient use of energy to enable conservation of fuel and power.

#### Space Heating Controls

#### Artificial Lighting

#### Air Conditioning, Mechanical Ventilation

Buildings incorporating air conditioning or mechanical ventilation must be designed and constructed so that:

- a) the form and fabric of the building do not result in a requirement for excessive installed capacity of cooling equipment; and
- b) fans, pumps, refrigeration equipment and other components are reasonably efficient and appropriately sized to have no more capacity for demand and standby than is necessary; and
- c) there are appropriate means of managing, controlling and monitoring the operation of equipment and systems.

If this is done, the requirements for energy efficiency of air conditioning and mechanical ventilation will be met.

### Inspection and Commissioning of Building Services Systems

The building services installation must:

- a) be capable of operating at the manufacturer's specified efficiency; and
- b) incorporate adequate provisions so that testing and commissioning can be carried out satisfactorily.

Written instructions must be provided for the building's occupier on the installed building services plant and controls so that it meets current regulations. Instructions must cover its method of operation, preventative maintenance, and the forecasting of annual energy consumption for the building.

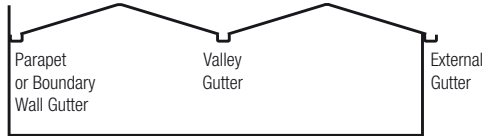
With regard to the commissioning of the building services, requirements will be met by certifying that commissioning has been done in accordance with the appropriate building regulations.

The requirements for the provision of information on energy efficient operation will be met by a self-contained building log-book containing the following details:

- a) a schedule of the floor areas of each of the building zones categorised by environmental servicing type (e.g. air conditioned, naturally ventilated); and
- b) the purpose of the individual building services systems; and
- c) the location of the relevant plant and equipment; and
- d) the installed capacities (input power and output rating) of the services plant; and
- e) simple descriptions of the operational and control strategies of the energy consuming services in the building; and
- f) operating and maintenance instructions that include provisions enabling the specified performance to be sustained during occupation.

Roofs are constructed in a variety of shapes, from a simple pitched arrangement with external gutters, to a more complex multi-span construction with valleys, hips, parapets or boundary wall gutters.

## Gutter Types and Location



Gutter layout and roof drainage requires careful consideration at the building design stage to guarantee reliable performance.

Eaves gutters are outside the building envelope and any failure or leakage would not normally mean water entering the building.

Failure of valley, hip, parapet and boundary wall gutters, which are an integral part of the roof, results in water pouring into the building damaging both the fabric of the building and its contents.

Therefore, correct gutter design, construction and in use reliability form a vital part of the project team's considerations. The design details for roof drainage are based on the recommendations in EN 12056-3:2000 Gravity drainage systems inside buildings – Part 3: Roof drainage, layout and calculation.

Kingspan design and manufacture a range of standard and customised internal and external gutter systems, see chapter Accessories.

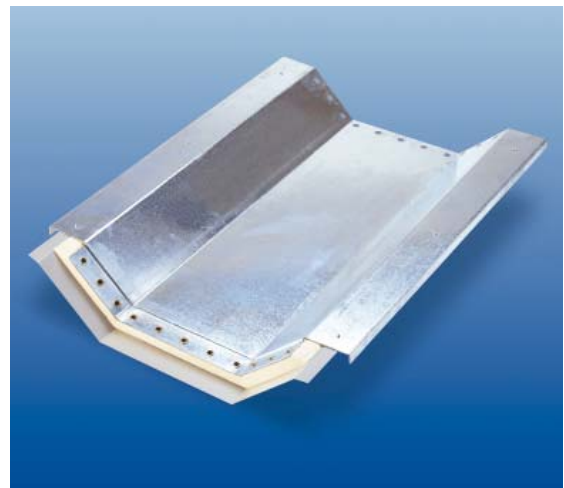
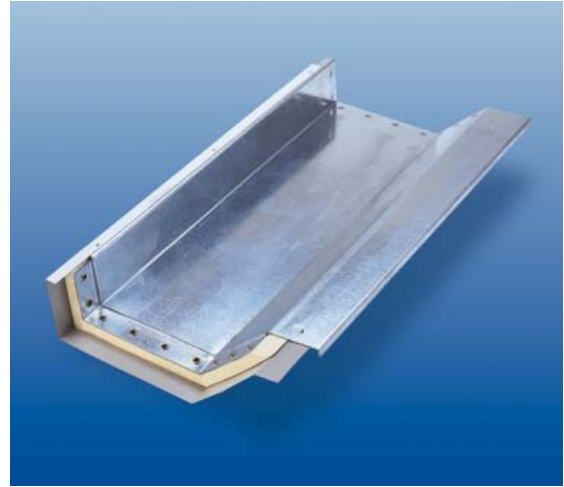
## Rainfall Rate

Rainfall rates have been recorded in many countries over the years, and this information has been used in EN 12056-3 to indicate where and how frequently particular rainfall rates are likely to occur. A rate of 75 mm/hr is suggested as the normal basis for calculation. This rate is generally suitable for eaves gutters.

Most gutter and drainage systems have to be able to deal with short periods of excess rainfall, provided they are correctly designed and maintained. Higher rainfall rates such as 150 mm/hr can be used if required to reduce overflow risks further, e.g. for valley, hip, parapet or boundary wall gutters.

## Design – General

To establish the correct gutter design and size it is necessary to calculate the rainwater discharge rate from the roof. This involves assessing the rainfall rate and the effective catchment area,  $A_e$ .

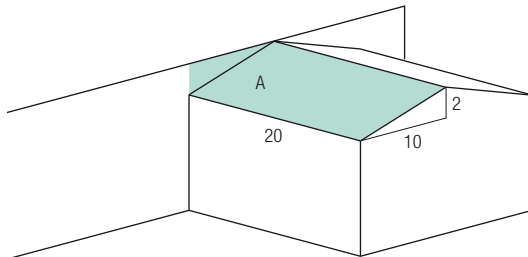


## Effective Catchment Area, Ae

The water drainage from a roof includes rain falling directly onto the roof and also wind driven rain running off adjacent roofs, walls and parapets which has to be taken into account.

The total effective area therefore is:

- the shaded roof plate area
- the shaded vertical elevation area



Note: All dimensions in linear metres

## Example:

The effective catchment area Ae for slope A is:

$$A = \left[ (10 \times 20) + \frac{(2 \times 20)}{2} + \frac{(2 \times 10)}{4} \right] = 225 \text{ m}^2$$

The gutter and downpipe arrangement has to be designed to provide sufficient capacity for the predicted discharge rate.

Gutter design is normally based on the following assumptions:

- Slope of the gutter is less than 1 in 350.
- The gutter has a uniform cross section.
- The outlets are large enough to ensure the gutter discharges freely.
- The dimension from a stop end to outlet should be less than 50x maximum water depth
- The dimension between outlets should be less than 100x maximum water depth.

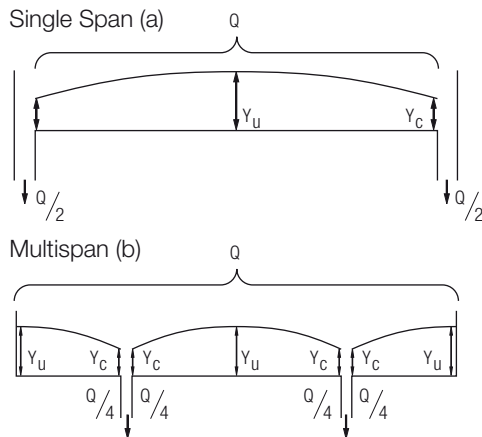


The depth of water in the gutter will vary from a maximum at the upstream end, to a minimum 'critical depth' at the outlet, depending on gutter shape. For rectangular section gutters the maximum water depth equals twice the depth at the outlet.

Valley, hip, parapet and boundary wall gutters should include an allowance for freeboard to allow for splashing and waves below the spill over level. EN 12056-3 recommends minimum freeboard depth between 25 mm and 0.3x total gutter depth up to maximum of 75 mm. A minimum 50 mm freeboard is often considered good practice.



### Typical Gutter & Downpipe Analysis



Note: that for the same discharge rate, arrangement b only requires half the capacity of arrangement a. This shows that outlets at stop ends can be less efficient

### Gutter Design

#### Eaves Gutters

Flow capacities for individual shapes and lengths for gutters, outlet sizes and downpipe arrangements can be calculated by designers. As eaves gutters are outside the building envelope, the design is less critical than for a valley, hip, parapet or boundary wall gutter. For this reason freeboard (excess capacity) is not usually calculated in eaves gutter designs.

#### Valley, Hip, Parapet and Boundary Wall Gutters

These are effectively part of the roof construction and the consequences of overflow or leakage are serious, so their correct design and installation are very important. As they are part of the roof, they must also be insulated to comply with thermal requirements with respect to excess heat loss, thermal bridging and the risk of condensation.

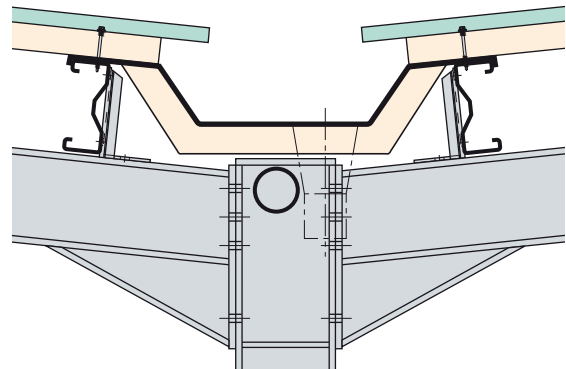
Gutters should be wide enough and sufficiently strong to allow foot traffic during installation and maintenance and to comply with Health & Safety Regulations.

Industry guides to good practice recommend minimum base widths of 500 mm for valleys, and 300 mm for parapet and boundary wall gutters. In general the shape of these gutters will be dictated by roof slope, design flow rate and the distance between downpipes. An additional 'freeboard' over the maximum water level is recommended to allow for splashing and waves (up to 75 mm).

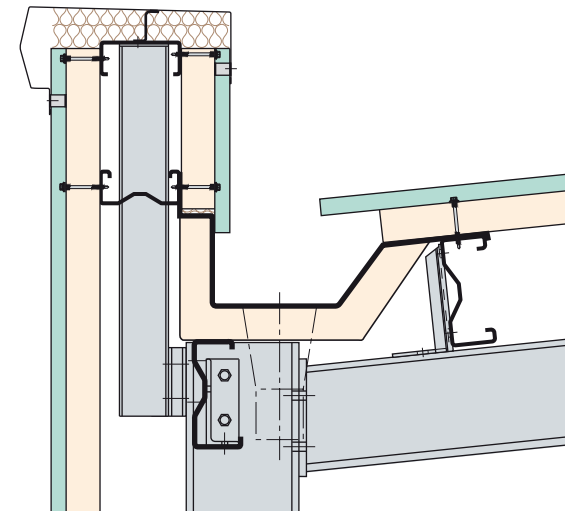
Gutters and outlets have to be dimensionally integrated into the building's structural/secondary steelwork.

### Kingflow Insulated Gutter Range

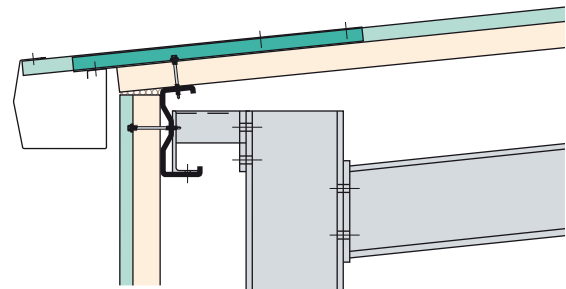
#### Valley Gutter



#### Parapet Gutter



#### Eaves – Highline Gutter

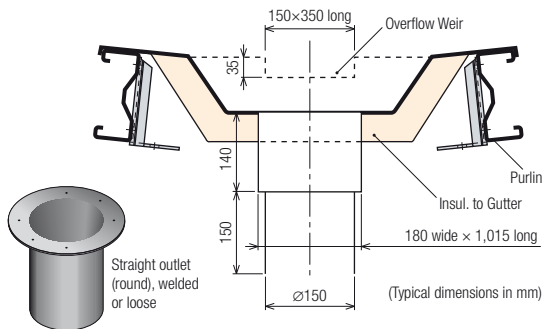


## Outlets & Overflow Weirs

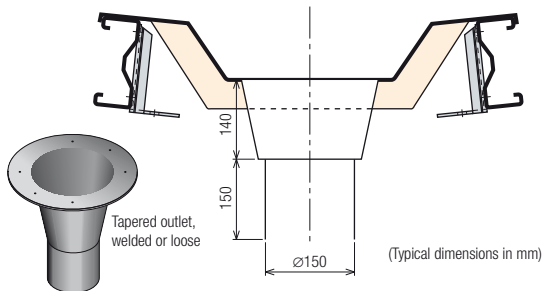
Outlets should be in the bottom of the gutter and they can either be directly into a pipe, or preferably via a box to ensure optimum drainage flow from the gutter.

EN 12056-3 defines how to determine the correct box and pipe sizes for a particular situation. Typically the diameter of a downpipe connected directly to the sole of a rectangular gutter should be approximately 75% of the width of the gutter.

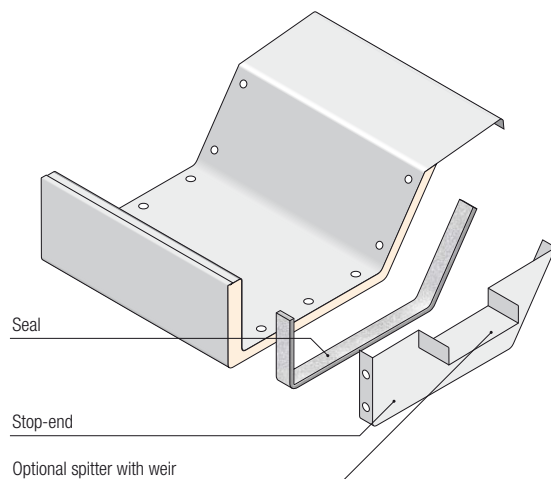
### Box Outlet



### Tapered Outlet



### Overflow Weirs



## Siphonic Rainwater Systems

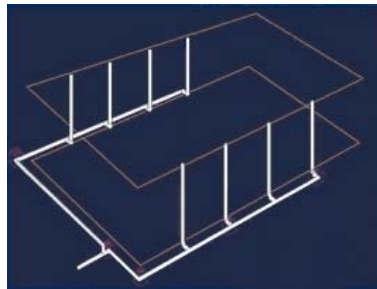
Where conventional gravity rainwater systems may cause obstructions inside a building because of reduced headroom below pipes under the roofs and/or position of vertical pipes, siphonic systems should be considered. Siphonic pipes are usually smaller in diameter than normal rainwater pipes and the system is driven by pressure differences which allows horizontal pipe runs to be used.

Siphonic systems have to be designed by the manufacturer to suit the roof layout with the collection area and outlet capacity balanced against pressures in the pipe system. Each pipe system has a maximum flow rate and also a minimum limit at which siphonic self cleaning action will commence.

Excess water at one outlet needs to be able to flow along the gutter to other outlets which introduces limits on smaller gutters. The system needs to be designed so that the minimum velocity in the system at the design rainfall shall prevent deposition in the pipework and ensure rapid commencement of the siphonic effect.

The large difference between average rainfall intensity and peak design rainfall calculated to EN 12056 in some regions of the British Isles often requires that two siphonic systems are fitted to valley gutters. One is designed to accept the normal rainfall range and the secondary system (which can be siphonic or gravity) is normally dry except in heavy storms.

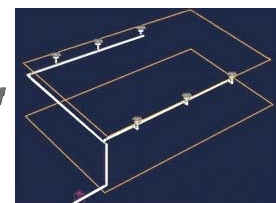
### Conventional Rainwater Gravity Drainage Method



Gravity

8 downpipes and internal underground drainage incorporating inspection chambers

### Self Priming Siphonic System



Siphonic

A typical siphonic outlet.



## Thermal Insulation

Internal gutter systems have to comply with thermal regulations as they are classed as part of the roof structure. Kingspan recommend an insulation U-value of 0.35 W/m<sup>2</sup>K which provides pre-melt drainage in the event of snow fall and ice formation.

This facilitates drainage of the roof system under winter conditions. In addition, analysis of condensation risk and thermal bridge heat loss is necessary.

## Durability

All gutters are subjected to severe corrosive conditions due to the frequency of wetting, and the accumulation of debris and dirt, which can retain water and moisture for extended periods. Internal gutters are used as walkways during and after construction and are subject to periodic cleaning. Any protective coating systems must therefore be resistant to damage.

Gutter replacement is disruptive and expensive as it involves stripping out parts of and possible replacement of the whole roof system.

Therefore, the planned lifetime for internal gutters should be 30 years, which should allow for periodic maintenance.

## Protective Coatings

External gutters

- Galvanised substrate – S220GD + ZA to EN 10214:1992
- internal coating 200 micron Plastisol.

Internal gutters

- Galvanised substrate – Fe P02G Z600 to EN 10143:1993
- single ply membrane
- internal coating 200 micron Plastisol.

## Site Installation

Site installation of gutter systems is a high risk activity which requires specific Health & Safety and CDM procedures and method statements.

## Maintenance

It is important to recognise that the performance of all gutter systems will deteriorate in time because of leaves, silt and other debris. The system should be designed with appropriate safety factors to allow for this, depending on risk of accumulation and frequency of maintenance. Regular scheduled inspections which should be at least once per year in most locations are recommended.



Fire safety risk assessment is essential for compliance with statutory regulations and standards, and for life safety occupants, business risk planning and property insurance assessment.

The guidance provided in this section provides a simple and authoritative source of information. The emphasis is on awareness and information with the aim of helping to clarify both statutory and property insurance requirements regarding the performance of Kingspan **FIREsafe™** roof and wall systems.



Kingspan roof and wall systems are used extensively in all building sectors. External roof/wall and internal temperature control panel systems are required to perform many functions:

- Thermally effective
- Limit air leakage
- Structurally efficient
- Provide fire safety
- Acoustically compliant
- Provide safe and fast build quality
- Ecosafe
- Hygiene and health
- Vitality

Kingspan certified **FIREsafe™** panel systems with IPN core achieve all this functionality and are widely recognised as well by investors, property insurers, designers and constructors for superior fire performance which reduces fire risk.

Kingspan panel systems have been tested and approved to European and country specific standards and comply with all building regulations. Furthermore, they comply with the property insurance risk requirements of LPCB (Loss Prevention Council Board in the UK) and the FM Global insurance company as follows:

- To comply with specific fire test standards, no flash over or fire propagation occurs.
- No flame spread occurs within the panel core.
- Kingspan **FIREsafe™** roof and wall systems are secured to the main/secondary frame members of the structure to protect fire fighters



45 years of real fire history indicates that rigid PUR insulated external roof and wall panels have an exemplary fire performance record. Collated analysis from real fires shows:

- There are no recorded incidents where external insulated roof and wall panels have caused or have been involved in the initial stages of a fire.
- External insulated roof and wall panels only become involved when an internal fire has reached a fully developed state involving total loss of building and contents.
- Due to the way they are fixed to the structure, the panels which form the external envelope retain their structural integrity until the structural frame fails.
- Misinformation has caused the fire risk of external sandwich panel envelopes to be sensationalised. Most significant fires and insurance losses have been related to buildings with internal compartments within the food processing industry.

Building regulations apply not only to the design and construction of new buildings but also to existing buildings if a material alteration or change of use is being made. It is the building regulations that are likely to have the main impact on the required fire performance of external cladding systems. Each country has its own regulations/standards for fire safety.

Recently Kingspan has introduced its new insulation core material "Isophenic - IPN" on the market. This foam has a special polymer structure which gives improved fire performance compared to PUR.

**Statutory fire safety legislation is primarily concerned with the protection of people from death or injury in fire. However, a fire that causes no physical injuries can still have potentially devastating effects on the viability of a business in terms of:**

- loss of stock
- direct damage to building
- lost customers
- loss of records
- lost production
- damage to public image

Therefore, where a fire has the potential to have a substantial impact on the viability of a business or cause large financial losses, consideration should be given to additional fire protection measures over and above those necessary to satisfy the minimum statutory requirements. Insurance premium discounts may be available where a high standard of fire protection is provided.

In some cases, insurance cover may not be readily available unless fire protection measures exceed the minimum requirements of building regulations.

## Myths and Misinformation

The property insurance market has been confused by conflicting information, mis-reporting and myths in relation to polyurethane panels. Probably the most damaging myth is that building insurance premiums can increase by up to 1,500% for polyurethane panel cladding and that some buildings are uninsurable. The reality is that these dramatic premium increases relate exclusively to buildings containing polystyrene panels. There is no justification whatsoever for such premium increases on buildings clad with polyurethane or isophenic panels.

Kingspan is available to support building owners and tenants when assessing fire risks and to help in negotiations with brokers/insurers.

A further myth is that fire brigades will not enter a building clad with sandwich panels. This is totally untrue, a situation confirmed by discussions with fire-fighters. The reality is that a fire brigade will perform a risk assessment on arrival at the fire. The result of this will determine their actions.

Clearly, panel system collapse and internal flashover is the biggest fear of fire-fighters. This is a particularly important consideration in relation to internal panel systems where the fire-fighters have to enter the building to fight the fire. The reality is that buildings clad in structurally supported (mechanically-fixed) external panels do not present a specific hazard, as the panels will not collapse until the structural steelwork collapses.

Published fire statistics tend to show that external claddings constructed from sandwich panels are not a major fire risk, particularly if the chances of an arson attack can be reduced and its effect minimised.

## Facts and Confirmed Research

Although the rigid urethane used in the panels is unsurpassed in its thermal insulating properties, it is basically combustible, like all organic substances.

But the historical fire performance and insurance loss statistics relating to the use of Kingspan polyurethane/isophenic (PUR/IPN) panels in the external envelope has been excellent. There is no evidence whatsoever to suggest that Kingspan panel systems are not fit-for-purpose and there is no link with higher insurer losses. This is proven by detailed insurer loss statistics and case studies on fires in buildings clad with such panels.

The following findings can be summarized from the research carried out on many real fires where Kingspan insulated roof and wall systems were in use:

- The panels do not contribute to a fire. They are only damaged in the immediate area of the fire and self-extinguish after the fire load has gone
- By forming a protective char layer, the fire is starved of oxygen between the metallic skins of the panel. The panels are thus self-extinguishing and do not contribute to a fire.
- Thermoset rigid urethane PUR/IPN does not melt or drip when exposed to fire. Thus, the danger of igniting secondary fires does not arise.
- The gases given off when PUR/IPN foam burns are less toxic than those given off by conventional building materials (e.g. wood)
- When used as roof cladding, the sandwich panels resist the spread of fire and reduce radiant heat
- Compared to mineral insulant or insulating material made from wood fibres, there is a substantially smaller risk of smouldering after the main fire is put out
- The additional fire load caused by PUR/IPN panels varies between 3 and 6 kWh/m<sup>2</sup> and therefore has very little effect on a fire. This very low value results from the low density of the insulating foam core which is approximately 41 kg/m<sup>3</sup>
- The results from the standardised tests used to determine combustibility are confirmed completely by the behaviour of the panels in practice

## Conclusion

The behaviour of KINGSPAN insulated roof and wall panels in a fire is similar to that of other fire-resistant building materials.

With respect to current fire regulations and the need to build passive fire protection in to a structure, insulated PUR/IPN panel systems are amongst the safest proven building methods.

## Combustibility of installed panel systems

In recent years, huge confusion has been caused by panel manufacturers and their suppliers making claim and counter claim about the non-combustibility or otherwise of their own and their competitors panel systems.

The real issue is not about the combustibility of the panel system or core directly – all have combustible elements. The real issue is how a specific system will perform in a real fire and whether it acts as a non-combustible building element by not contributing to fire propagation.

The simplest way of looking at this issue is to address the insulation core and the panel system separately.

With polystyrene and rock fibre panels, adhesives are used to bond the steel facing to the insulation. In rock fibre panels, the adhesive is normally polyurethane and levels of adhesive can be quite large to ensure a good bond and minimise the risk of delamination. As a direct result, panels with a rock fibre core can not be generally rated as completely non-combustible.

## Kingspan IPN foam

IPN foam is the abbreviation for Isophenic Kingspan's unique high grade index Polyisocyanurate insulation material. IPN and PUR visually look the same. Both materials belong to the same generic family of thermosetting materials. Kingspan IPN uses a unique formulation that gives a highly fire resistant product which is capable of passing insurance industry tests such as from LPCB and FM Global.

To achieve fire classification B according EN 13501, panels made with IPN core require very small quantity of added flame retardant. Essential advantages of Isophenic is the superior fire performance and the much lower production of toxic smoke in case of fire.



Section cut through the thickness of the panel with IPN core after 30 minutes exposure showing that the char occurs only in the area of direct flame impingement and there is no fire propagation.

## Fire Statistics in External Cladding Systems over a Five Year period

It is vitally important to understand and quantify the actual fire losses insured by insurers and break this down into individual sectors and panel systems.

The first issue to address is the breakdown between losses attributed to the use of external panel systems and those attributable to the use of internal panel systems.

The December issue of Fire Prevention contains an article by BRE (Building Research Establishment) which gives a truly independent and authoritative assessment of the situation

“Fire statistics show that external claddings constructed from sandwich panels tend not to be a major fire risk, particularly if the chances of an arson attack can be reduced and its effect minimised. It is important, for example, for fire safety managers to ensure that no combustible materials, such as pallets, are located less than 10 m from the external wall”.

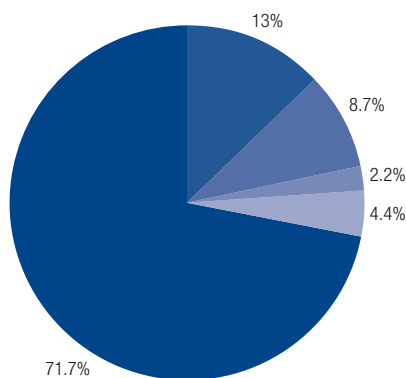
“According to the Fire Protection Association (FPA), over a five year period in the 1990's, the figure for total reported losses that were directly attributable to external claddings of all kinds was €12.6 mio, of which €9.3 mio was due to arson. The typical causes of these fires are set out in Table 1”. (Source: Courtesy of BRE)

**Typical Causes of Ignition of These Fires – Table 1:**

Number	Cause
33 (71.7%)	Arson/under investigation
6 (13%)	Electrical/gas
4 (8.7%)	Rubbish/smoking
1 (2.2%)	Spontaneous
2 (4.4%)	Unknown

Source: FPA

Note: The above was recorded over a five-year period. This is only a small fraction of the losses in the food industry over the same period (see Table 2) where fire spread through sandwich panels used as internal partitions and ceilings, leading to substantial losses.

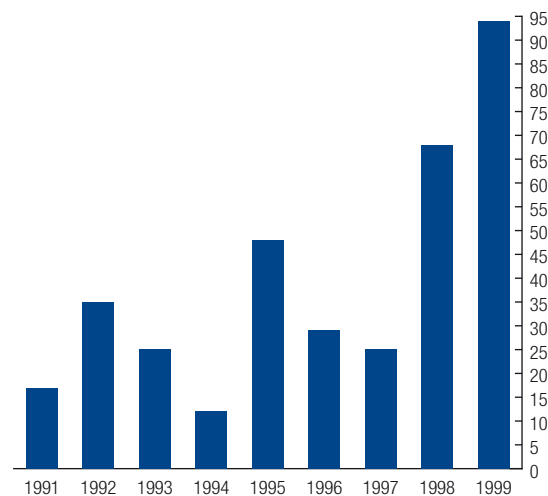


## Food Factories

**Property Losses – Table 2:**

Year	Loss (€ mio)
1991	17
1992	35
1993	25
1994	12
1995	48
1996	29
1997	25
1998	68
1999	94
<b>Total</b>	<b>353</b>

Source: FPA and others



“These losses do not include business interruption losses, which are typically about 50% or more than the values recorded for property damage.

Fire losses in food factories over the period 1991 to 1999 represent an average loss per year of €39 mio (see Table 2)

Most of the food factory fires during this period resulted from cooking risks or the malfunction of equipment. Stand-alone coldstores may be considered as a lower risk, subject to the risk assessment, which would take into account the financial exposure, building size etc. However, these types of coldstores could still be vulnerable to an arson attack or malfunction of refrigeration equipment leading to a fire”.

(Source: Courtesy of BRE)

The building envelope, roofs and walls, plays relatively little significance in determining the outcome of major fires. That is one of the major messages that have come out of the latest research into major fires in the commercial and industrial building sectors.

Conducted by EPIC [Engineered Panels in Construction], the research is believed to be the largest study of its kind to look at the relationship between major fire losses and the fabric of the building. The research studied nearly 400 fires with losses in excess of €726,000 over a 10-year period to 2001. Using Insurance Industry records, Fire Service reports, photographs and EPIC's own research base, half of these incidents could be analysed in terms of their construction. (See Tables 3 and 4).

*The research results show that only 3.4% of the fires involved rigid urethane roof or wall panels compared with an estimated 15% of building stock in this sector were constructed with panels over the last 25 years.*

*In the 6 cases identified, the panels only became involved once the internal fire had become fully developed. This is born out by large scale tests, which show that urethane panels are only gradually involved during the developing stage of a fire and are not affected until the fire is fully developed.*

*It is particularly significant that polyurethane panels were involved in 3.4% of the total fires and these fires accounted for 3.1% of the financial loss to insurers. In stark contrast polystyrene panels were present in 12.8% of the total number of fires but these fires represented 26.8% of the total insurance loss. This data confirms that insurer losses in fires involving polystyrene are higher than with other types of insulated panel systems – confirming the link between polystyrene panels and higher insurance losses.*

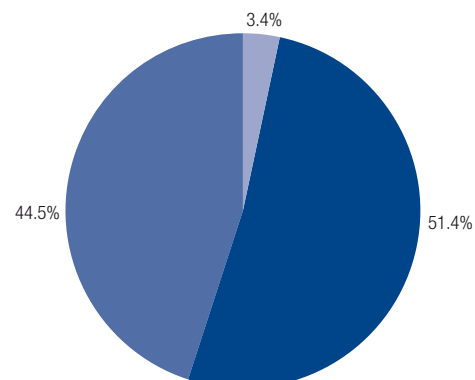
## Analysis of Major Fires by Number (1992–2001)

The second issue to address is the breakdown between different types of construction and panel systems. The following table addresses this issue in detail.

**Table 3:**

Type of Construction	No. of Fires €726,000 Over Loss	Additional Comments
Traditional – brick / slate & tile / asbestos / some metal	<b>92</b> (51.4%)	10 projects involved polystyrene panels installed internally
Metal cladding	<b>81</b> (44.5%)	13 projects involved polystyrene panels installed internally
Insulated panels (polyurethane)	<b>6</b> (3.4%)	3 projects originally reported as panels were found to be polyurethane lining board
LPCB Approved PIR Panels	<b>0</b> (0%)	

Source: EPIC

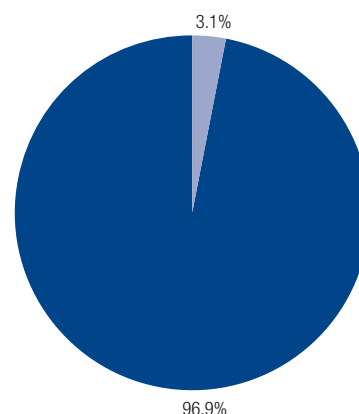


## Analysis of Major Fires by Value (1992–2001)

**Table 4:**

Type of Construction	Value of Fires € mio	Additional Comments
Traditional – brick / slate & tile / asbestos / some metal and metal clad buildings	<b>771</b> (96.9%)	€213.3 mio (26.8%) realted to buildings using polystyrene panels installed internally – primarily in the food industry
Insulated panels (polyurethane)	<b>25</b> (3.1%)	
LPCB Approved PIR Panels	<b>0</b> (0%)	

Source: EPIC





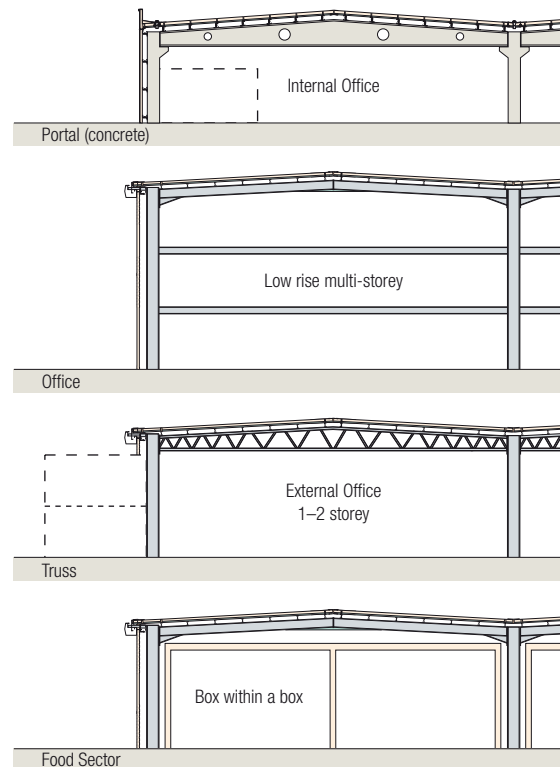
“Protecting business and property with  
**FIREsafe**<sup>™</sup> insurer approved system”

### Purpose Groups

- Industrial/Manufacturing
- Distribution/Logistics/Transport
- Commercial Office
- Retail
- Leisure/Sport/Hotels
- Education
- Healthcare
- MoD/Defence
- Student Accommodation
- Residential/Social Housing
- Utilities
- Public & Local Authority
- Justice
- PFI/PPP
- Refurbishment
- Food Sector (box within a box)

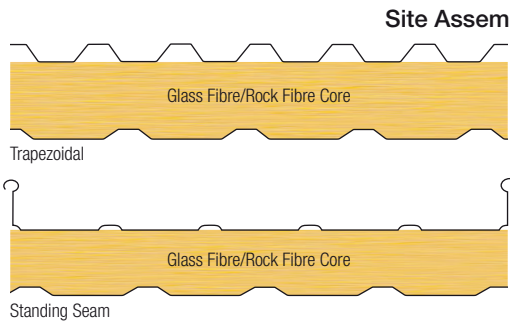
### Construction Methods

- Steel framed portal or truss type construction
- Single storey buildings with external insulated roof and wall cladding
- Single storey building with internal 'box within a box'
- Office low rise multi-storey construction

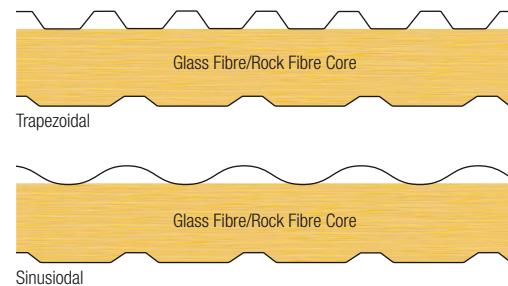


### Types of Insulated Roof & Wall Systems

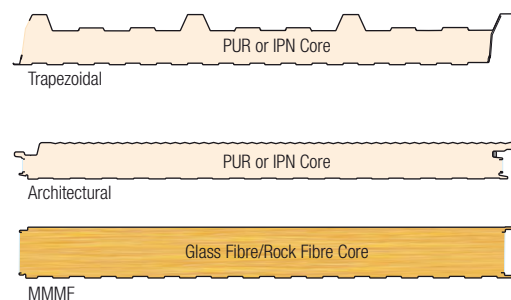
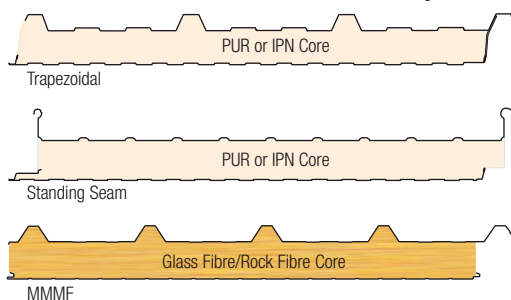
#### External Roofs



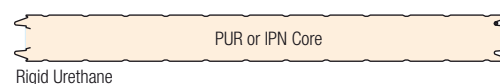
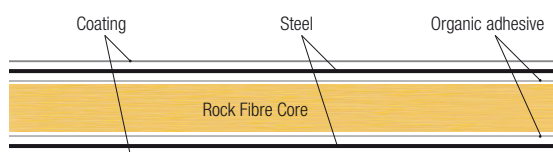
#### External Walls



#### Factory Pre-engineered Insulated Panels



#### Internal Walls, Partitions & Ceilings



## Fire Risk Assessment

### Risk Management Considerations

When considering building design and fire protection, it is strongly recommended that early and close liaison is established between the client, the building designer and the insurer. This will provide all parties with the opportunity of discussing and developing the most cost-effective passive and active fire protection measures appropriate to the proposed property and business protection needs.

### The Risk Assessment Process

Insurers will identify with the client the component parts of the business operation and the effect that loss of each will have, not only in direct financial loss terms but also on the profitability of the business.

The following is a broad summary of the aspects of the business that will need consideration:

#### Occupancy

Usage and Processes Involved;

- Fire load arising from the occupancy e.g. type of goods stored and storage heights proposed
- Premises layout, e.g. proximity of production storage

#### Hazardous Processes;

- Critical business process, equipment and/or components and stock, e.g. electronic equipment, high value components etc

#### Estimated Values at Risk

##### Buildings;

- Contents excluding stock
- Stock
- Business interruption exposure
- Surroundings
- Exposure from other Premises:
- Type of area, e.g. residential/industrial

#### Fire Protection

- Distance from the nearest public fire brigade
- Availability of adequate water supplies for fire fighting
- Fire detection/protection systems required to augment passive and active fire protection

#### Security

Site Security Requirements

- Arson risk



## FIRESafe & Insurer Approved Building Envelope Solutions

The Kingspan Fire safe concept applies to an insulated panel systems that provides the optimum solution for property and business fire protection. Kingspan's fire safe solutions are based upon Factory Mutual Global (FM) and the Loss Prevention Certification Board's (LPCB) rigorous fire test and accreditation methods. FM and LPCB systems are widely recognized by investors, property insurers, designers and constructors for their superior fire engineered performance thus reducing fire risks. Kingspan fire safe panels perform well in all these tests and with characteristic performance being:

- formation of stable protective char at high temperatures greater than 300 °C
- char core expands to fill any gap between facings
- no flash over
- panels are unaffected away from main fire source
- no flame spread – particularly in the core of the panel
- no fire propagation
- no panel collapse
- relatively small and acceptable smoke levels
- high levels of fire resistance – up to 60 minutes insulation and integrity is achievable with specific systems

Kingspan believes that to verify real behaviour of cladding systems in fire condition is to expose the composite products (with realistic joint details and fixings) to big scale fire tests.

### FM Global

FM Global, formally known as Factory Mutual is a major insurer with own test facilities and standards for building cladding systems and has a severe – test standard for assessing reaction to fire. This test standard is FMRC 4880 (1994) Approval requirements for Class 1 fire classification with no height restriction. Achievement of Class 1 with no height restriction is dependent on performance in a number of tests that include -

- ASTM E84 Surface Burning Characteristics
- ASTM D482 Ignition Residue tests
- ASTM E711 Oxygen Bomb tests
- UBC 26-3 Room Test
- FMRC Room Corner Test (25/50ft test)

## FM 4880: Full scale Conner Wall Test

This standard was developed to establish the hazard presented by sandwich panels. Its objectives are similar to LPS 1181 but it is considerably larger and is open on two sides. The 50 ft wall test is very severe. Two walls 15.24 m high with a small ceiling are lined with panels and a large fire source (345 kg dry timber crib) is positioned in the corner. To achieve approval there has to be no lateral fire spread to the edge of the enclosure or fire propagation to the

extremities of the panel construction and no ignition of the ceiling. The Kingspan FM approved panels are well within these limits proving that the panels do not promote the spread of fire. As a result of this test, and other large scale tests Kingspan wall, roof and ceiling panels are approved by FM Global for use without any restriction in height.



Fire is contained in the room corner – no evidence of fire propagation.

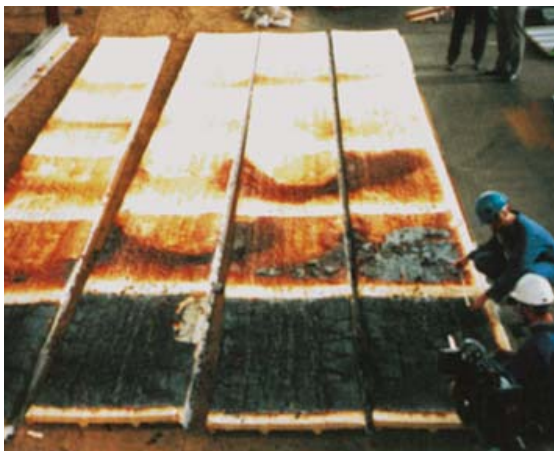


## LPCB

The Loss Prevention Certification Board (LPCB) provides stringent large scale fire testing, certification, approval procedures and guidance contained in the LPCB Design Guide for the Fire Protection of Buildings. These require that the approved systems/equipment are fit-for-purpose when needed.

Loss Prevention Standards (LPS) have been incorporated into other British, European and International Standards including

- British Standards (BS)
- International (ISO)
- European (EN)
- Underwriters Laboratories (UL)



## Benefits of insurer approvals

- Compliance with legislation
- Proven worldwide performance
- Risk management
- Research driven
- Independent
- No additional premium
- No additional excess
- No professional indemnity insurance restrictions

## LPS 1181

Kingspan panels are tested according to LPS 1181:2003 – Requirements and Tests for LPCB Approval of Wall and Ceiling Lining Products and Composite Cladding Products. This standard test method was developed on behalf of the insurance industry to evaluate the fire growth of insulated external cladding and roofing fixed to sheeting rails and purlins. The test is performed on an open fronted building, comprising two side walls, an end wall and a ceiling/roof.

A fire source is placed in the corner with a maximum heat output of 1 MW.

Failure is when flashover occurs or there is significant damage to the panel internally or on the surface.

The key parameters of the test include:

- Fully developed fire 1 mega watt fire load.
- Max temp > 1,000°C at internal liner.
- Assessment of internal & external flame spread, ignition and flashover conditions

## Main Structure Collapse & Complete Building Loss

These real fire case studies clearly illustrate that regardless of the fire performance of materials used in the construction of buildings, in the event of a major catastrophic fire occurring the structure will collapse causing property and business loss.

Therefore contents fire load risk and property/business protection can only be realistically prevented by adopting a holistic fire engineered approach to building design, construction and management of fire safety.



**Panasonic, UK:** Steel frame and site assembled mineral fibre roof and wall system. Structural failure leading to total building and contents loss.



**Boots, UK:** Steel frame supporting polyurethane roof and wall panels. Severe fire resulting from ignition of flammable aerosol containers



**Fiege, Italy:** Concrete frame - roof structure and metal clad wall. Structural failure leading to total building and contents loss

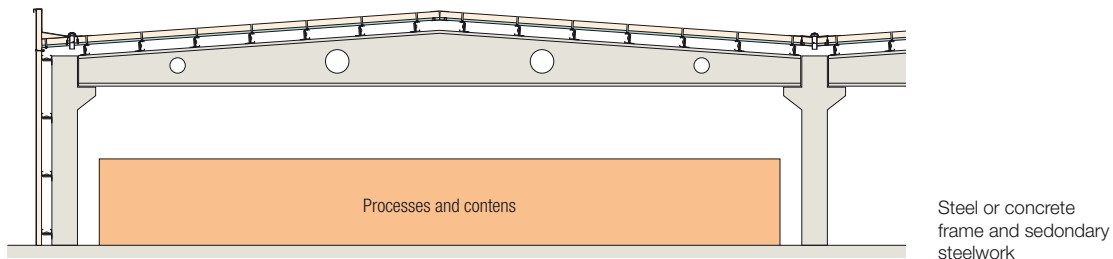
## Building Structure & Fabric Fire Protection

- The assessment of fire threat to life, the main structure and fabric of the building are based on reducing the risk of an internal or external fire starting, developing or spreading.
- This creates a focus on the building structure and envelope and the fire protection levels which are required relative to the fire risk.
- The importance of a threat to the structural integrity of the building in the event of fire has to be taken into account as any main structure failure leads to life safety threat and partial/total building loss.
- Therefore if the main structure is threatened by fire it can be expected to fail at temperatures between 500 °C and 600 °C at which point it is almost certain that the contents will also have been destroyed.
- The best way to protect life and the insured value of the business, contents and the property is to prevent the fire occurring or to suppress it.

## Fire Risk Assessment Priorities

### Structural Integrity of the Building Framework

- If unprotected from the impact of fire the main structure stability is threatened at 500 °C to 600 °C followed by collapse.
- Should the degree of fire hazard threaten the building structure's integrity, the best way to protect the insured value of the business, contents and property is to prevent the fire occurring or to suppress it with property protection sprinklers.
- Main structure building collapse has the greatest effect on the property, business losses, interruption and the safety of fire crews.
- Building Regulations now require higher levels of thermal insulation which in the event of a fire accelerate heat/temperature build up, therefore making the main structure more vulnerable to earlier collapse.



### Risks

- Process, contents and fire load hazard.
- Flashover point 600 °C
- Main structure stability is threatened at 500/600 °C.
- Property loss, contents and business/interruption losses.
- Fire crew safety.

## Insurer Approved Protection

- Fire risk assessment may indicate the need for property protection sprinklers to suppress the fire at source, this:
- Eliminates the risk of main structure failure and collapse.
- Eliminates total property, contents and business interruption losses.
- Eliminates fire crew risk.

## Real Fire Case Studies

### Clifton Comprehensive School, Rotherham - 30th July 2004

A serious fire took place in the roof void of a new school building in Rotherham. In this case Kingspan LPCB approved roof panels were exposed to an intense fire in an aerial walkway. The fire was investigated by Tenos and South Yorkshire Fire Service and again it was clear that the panels played no role in fire spread and actually played a key role in preventing fire propagation over a compartment wall. The fire took place just 6 weeks before the facility was due to open, the building contained many thousands of pounds of brand new computers and other equipment. The fact that there was no



smoke damage to the equipment and the building opened on schedule demonstrated the excellent fire performance of the cladding system.



### Eagle Global Logistics, Purfleet

A devastating fire at a large logistics warehouse operated by EGL (Eagle Global Logistics) in Purfleet, demonstrates the impressive fire performance of Kingspan's LPCB (Loss Prevention Certification Board) -approved panels, which played a significant role in preventing fire spread to an adjacent building. This fire completely burnt out the EGL building. Significantly, the Kingspan panels on the adjacent building, which was only 9 metres from the burnt out unit, played an important role in preventing fire spread. The severe heat and flames generated by the burning building were so intense that the paint coating on the Kingspan panels on part of the next-door building was burnt off but the PIR core did not ignite and no flames or smoke entered the adjoining building. An investigation by ACE Risk Consultants has concluded that the Kingspan panels that formed part of the external walls of the burnt out building did not play any role in the development and spread of the fire. It has also been reported that the coordinating fire investigation officer had nothing negative to say about the construction of the burnt out building



## Real Fire Case Studies



Image 1



Image 2



Image 3



Image 4

### Wharfedale Hospital, 5th July 2003

This is the first recorded fire in a building clad in LPCB approved PIR panels. This fire occurred in an extension to the hospital under construction. An arsonist ignited a solvent based adhesive poured over a large pile of combustible building materials that was stored in the ground floor of the facility. The ground floor was essentially open with the external cladding starting at the first floor level.

Kingspan commissioned Tenos to perform an independent investigation into the fire. This involved a visit to site and discussions with West Yorkshire Fire & Rescue. A detailed report is available.

The Tenos report concludes – “In spite of significant heat generated by the fire (sufficient to damage the intumescent coating and distort the steel beams); the orientation of the cladding panels directly above the fire; and the fact that the fire stopping was not in place; the cores of the panels as evidenced by photograph 2, 3 and 4 did not ignite; did not promote fire spread within the core or to the eaves and did not significantly contribute to the products of combustion.”

These photographs provide a record of the damage and include some explanatory comments.

#### Image 1

Side of the building exposed to direct flame impingement and smoke/heat damage from the ground floor. It is clear that the PIR core has not ignited and has played no role in the fire.

#### Image 2

The side of the building that experienced a bigger fire attack. Flames appear to have rise to the eaves – a height of approximately 10 metres. The external steel sheet has bowed and delaminated in the areas of flame impingement – however, there is no indication the fire has spread through the cladding.

Sections were cut out of the short panels in the middle of this photograph in order to inspect the steel column behind the panels. The next photograph shows this more clearly.

#### Image 3

Close-up of the inspection holes cut in the panel after the fire. The insulation core can be seen clearly and looks to be virtually unaffected by the direct flame impingement on the outer steel facing. The steel column was not affected.

#### Image 4

A panel that has been exposed to direct flame impingement on the outer sheet. The metal has been pulled away by contractors to inspect the PIR core. It is clear that the insulation core has been almost unaffected by the fire. Only light charring can be seen.

## Background to the European Directive

As a consequence of the European Construction Products Directive the adoption of the pan-European technical specifications, and the new European test methods, the panel industry and its supply base faces a period of change and adjustment. In particular, a new classification system is being introduced for all products to show reaction to fire and fire resistance performance.

## European Fire Test Standards

The European fire test standards have been adopted by the EU member states as national standards. This means for example that the fire resistance standard BSEN1363-1 (in UK) is a technical and editorial equivalence with DIN EN 1363-1 (in Germany) and ČSN EN 1363-1 (in the Czech republic). Existing national standards which were in conflict with the EN standards must be withdrawn or had their scope amended to restrict their use to products other than construction products.

## Fire Resistance

The following EU Standards are relevant:

EN 1363-1	Fire resistance tests – Part 1: General requirements
EN 1363-2	Fire resistance tests – Part 2: Alternative and additional procedures
EN 1364-1	Fire resistance tests for non-loadbearing elements – Part 1: Walls
EN 1364-2	Fire resistance tests for non-loadbearing elements – Part 2: Ceilings
EN 1365-1	Fire resistance tests for loadbearing elements – Part 1: Walls
EN 1365-2	Fire resistance tests for loadbearing elements – Part 2: Floors and Roofs

## European fire resistance classification system

**EN 13501-1** Fire classification of construction products and building elements – Part 1. Reaction to fire assesses how a specific material or composite product reacts when exposed to heat which can be in the form of direct flame impingement, radiant heat or high temperatures. Typical parameters normally measured include ignitability, flame spread and rate of heat release.

Euro Class	Test Methods	European fire test standard
A1	Flame resistance Caloric heating power	EN ISO 1182 EN ISO 1716
A2	Flame resistance Caloric heating power SBI	EN ISO 1182 EN ISO 1716 EN 13823
B	Fire flame spread (30s) SBI	EN ISO 11925-2 EN 13823
C	Fire flame spread (30s) SBI	EN ISO 11925-2 EN 13823
D	Fire flame spread (30s) SBI	EN ISO 11925-2 EN 13823
E	Fire flame spread (15s)	EN ISO 11925-2
F	No verify	

### Additional classification

- Classification s1, s2, s3 according to smoke development
- Classification d0, d1, d2 according to flaming droplet performance

### Typical results

- Mineral fibre: A2-s1,d0 or B-s1,d0
- Fire safe IPN achieves B-s1,d0
- Polyurethane (B2 & B3) likely to be B-s3,d0 or C-s3,d0
- Polystyrene panels likely to be C-s3,d2

The new “Reaction to fire” classification system does not fully assess the “real” panel performance.

Class A1 is the highest level of performance associated primarily with inorganic materials, whilst Class F indicates a material with essentially no resistance to ignition from a small flame.

**EN 13501-2** Fire classification of construction products and building elements – Part 2: Classification using Data from fire resistance tests, excluding ventilation services.

Fire resistance indicates how well a building member – for a stated period of time – can hold back the fire and prevent it from penetrating from one room to another. Classification of fire performance following a fire resistance test is expressed in terms of specific characteristics e.g.

- **R** – loadbearing capacity: is the duration for which the element can continue to carry the load during exposure to fire
- **E** – integrity: is the duration for which the element has the ability to contain the fire and to some extent the products of combustion
- **I** – insulation: is the duration for which the exposed face temperature of the element can stay below predefined critical value

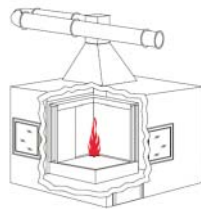
Additional performance parameters e.g. W – radiation, S – smoke leakage, may also be used.

The classification of a product as a result of a fire resistance test is included in a classification report, which is issued separately from the test report.

## SBI – Single Burning Item test (EN 13823)

The SBI test is a test method developed specially for the Euroclass system. This test is based on a fire scenario of a single burning item, e.g. a wastebasket, located in a corner between two walls covered with the lining material to be tested. The SBI test is used for construction products excluding floorings and is the essential test for determining the reaction to fire performance. Depending upon the results of the SBI tests, classification is done into classes A2 to D.

The classification parameters of the SBI test are fire growth rate index (FIGRA), lateral flame spread (LFS), and total heat release (THR600s). Additional classification parameters are defined for smoke production as smoke growth rate index (SMOGRA) and total smoke production (TSP600s), and for flaming droplets and particles according to their occurrence during the first 600 seconds of the test.



## Ignitability (EN ISO 11925-2)

In the ignitability test EN ISO 11925-2, the specimen is subjected to direct impingement of a small flame. The classification criteria are based on observations of the flame spread (Fs) within a given time and whether the filter paper below the specimen ignites due to flaming debris. In addition, the occurrence and duration of flaming and glowing are observed.

Both test methods are also used in the **EN 14509** - Self-supporting double skin metal faced insulating panels - Factory made products – Specifications, annex C.

EN 1364-1



ISO CD 13784 Part 2 Large Scale Test



ISO CD 13784 Part 1 Intermediate Scale Test



Façade Tests BSI Draft Test Method 01/540504



## Management of fire safety

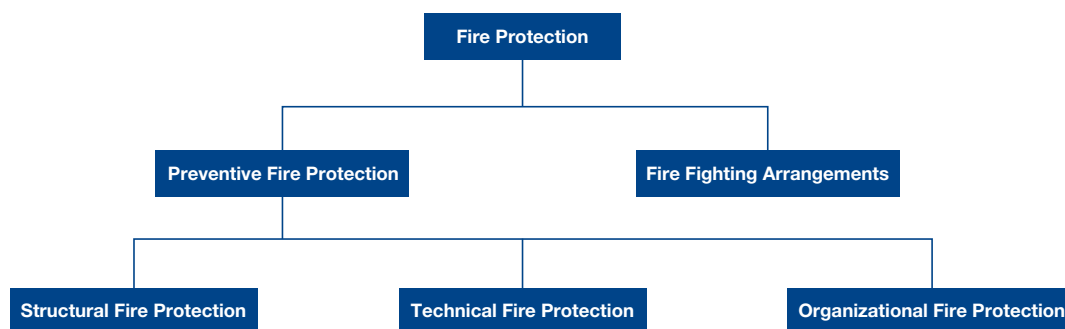
Particularly for commercial and industrial buildings, insurers recommend a holistic approach to fire protection that includes individual fire protection measures such as:

- formation of smaller fire zones by structural separation
- installation of automatic fire-extinguishing systems

- nomination of a fire protection manager for the building and
- holding sufficient supply fire-fighting water

These measures complement each other mutually. Each one is aimed at a specific objective and is justified in its own right, but they are integrated together with the goal of fire protection.

## Holistic approach to fire protection



## Frequently asked questions about IPN:

### Q: What is IPN?

**A:** IPN is the abbreviation for “Isophenic”, Kingspan’s unique high grade index Polyisocyanurate (PIR) insulation material.

### Q: What is the difference between IPN (PIR) and PUR?

**A:** These materials all belong to the same generic family of thermosetting materials. IPN has a special polymer structure which gives improved fire performance compared to PUR. Kingspan IPN uses a unique formulation that gives a highly fire resistant product which is capable of passing insurance industry tests such as from LPCB and FM Global.

### More detailed description:

Polyurethane consists in approximately equal shares of a polyol mix with an activator and additives as well as isocyanate (MDI). This proportion of ingredients corresponds to an index of 100. To achieve fire classification B2, panels made of PU foam with flexible facings require a relatively large amount of added flame retardants. These, however, will slow down the curing process.

The proportion of ingredients in IPN Isophenic and PIR (polyisocyanurate) is made up of at least 220 parts of isocyanate related to 100 parts of polyol mixture. This corresponds to an index of 220. While PU foams go through just one chemical process, i.e. the reaction of the polyol’s hydroxyl group with the isocyanate’s NCO group. IPN reacts twice. Three NCO groups each of the excess isocyanate form a ring structure. An ambient temperature of at least 60°C is required to start this reaction that is called trimerisation. For this reason, the corresponding plant parts need to be heated. Additionally, the reaction heat from the first chemical reaction is exploited.

To achieve fire classification B2, panels made with IPN core require no or just a very small quantity of added flame retardant depending on the index, as a thicker, protective carbon film is formed through the effects of heat due to the higher content of bound carbon. Furthermore, IPN compounds start to disintegrate at higher temperatures than PU compounds, as the trimerisation’s ring structure is very stable.

**Q: What is the meaning of Kingspan **FIREsafe**™?**

**A:** The Firesafe concept applies to an insulated panel system that provides the optimum solution for Property and Business Fire Protection. Panels

that are marked with the **FIREsafe**™ -Logo, are a sophisticated high performance **Noflame** core panel that will not promote fire spread, are self extinguishing and give off minimal smoke or toxic gas in a real fire situation. These panels meet both, the general EU-standard fire requirements and insurance approvals that provide realistic large scale fire tests.

**Q: What is LPC?**

**A:** LPC was purchased by the British Research Establishment from **ABI** (Association of British Insurers) & Lloyds in 2000. **LPCB** provide research, testing and Fire test Approvals. **LPS 1181** is a wall and ceiling test for insulated panels. LPCB are promoting the LPS 1181 test across Central Europe.

**Q: What is FM?**

**A:** Factory Mutual is a US based insurance company operating worldwide. They are recognised as having very stringent fire tests for roof and wall applications. Not only do Kingspan Firesafe panels have an FM approval but they are certified for buildings without height limitations. This criteria is very difficult to pass, and only a limited number of suppliers can provide this type of certification.

**Q: How do I identify panels on my building?**

**A:** This can be problematic on existing buildings. The first thing to do is to check if there are any building records, e.g. drawings to see whether the panel system is specified. In the absence of records an attempt should be made to uncover some panel core material. Great care should be taken to ensure that there are no possible sources of ignition. Mineral fibre and polystyrene are relatively easy to identify provided access to the core is available. It is not possible to visually tell the difference between PUR and IPN.

If the core is believed to be PUR or IPN Kingspan should be contacted and given as much information as possible to facilitate identification.

In buildings clad from the middle of 2004 it is easy to identify Kingspan panels from the UV ink markings on the lining (internal) side. UV torches are available from Kingspan.

**Q: How can I minimise or challenge insurance premium increases?**

**A:** In the current insurance market environment insurers are looking very closely at every risk. In relation to building insurance it is therefore vital to provide the insurer with detailed, comprehensive and accurate information about construction, occupancy and management of the building. If the building is being surveyed give the insurance surveyor as much assistance as possible. If there is insufficient information in the survey – for example about the panel core – the underwriter will always assume the worst. Kingspan can help in providing specification details & certification where appropriate.

**Q: In 'real' buildings the panel core is always exposed due to poor maintenance etc. Is this a fire risk?**

**A:** It is always good practice to inspect and repair damaged panel systems. Having said that the reality is that PUR and PIR cores are very difficult to ignite – in the case of a FIREsafe IPN core a high intensity propane torch cannot ignite the unprotected insulation core. This is in stark contrast to polystyrene where a very small fire source can ignite the material. This is then compounded by the tendency of polystyrene to shrink and melt leading to the formation of a cavity between the metal skins that can allow hidden fire spread. This phenomenon does not occur with IPN.

**Q: Do IPN panels produce toxic smoke in a fire?**

**A:** Every type of panel system has an organic content that is affected by fire. In the case of PUR, IPN and mineral fibre panels the major products of combustion are carbon dioxide and carbon monoxide because all contain organic components.

The most important point to recognise is that in the case of fires in buildings clad in PUR, IPN and mineral fibre panels the vast majority of smoke and toxic gas is generated by the burning contents of the building. The panels are not significantly affected until the fire is fully developed and the mass of material present in the panels can be very small compared to the burning mass in the building. Concerns about toxic gas and smoke emissions from the panels must be put into context compared to toxic gas emissions from all other burning elements within the building.

**Q: There seems to be a lot of confusion about the fire performance of composite panels. How can this be addressed?**

**A:** The current building insurance market has been characterised by general confusion resulting from conflicting information, misinformation, misreporting and myths. This document is aimed at clarifying these issues.

**Q: What is the difference between reaction to fire and fire resistance?**

**A:** Reaction to fire assesses how a specific material or composite product reacts when exposed to heat which can be in the form of direct flame impingement, radiant heat or high temperatures. Typical parameters normally measured include ignitability, flame spread and rate of heat release. Many national standards tests have already been replaced by the Euroclassification system. All these tests are relatively small scale and do not allow insulated panels to be tested in realistic as-installed configurations. A much more relevant reaction to fire test is the LPCB test LPS 1181. This is a large scale test which tests the panels in a realistic situation. The advantage of LPS 1181 is that the grading system covers both reaction to fire and resistance to fire, Resistance to fire is a measure of the passage of heat and flame through the thickness of a material and the test structure comprises a panel system fixed to a furnace. The European standard EN 1364 combined with EN 13501-2 is used to assess fire resistance.

Both reaction and resistance to fire play a key role in Building Regulations and Insurer Approved tests.

**Q: Isophenic is an organic material and therefore**

**IPN-FIREsafe™ panels are classified as 'combustible' in European regulations. Why should a fire officer, investor or architect accept Fire safe which has no acceptance by any country?**

**A:** The countries regulators and fire officers will have an influence; however insurance companies will also impact going forward. Kingspan along with the insurance companies will be promoting insurer approved panels

**Q: How are Kingspan FIREsafe™ panels classified in terms of combustibility?**

**A:** The UK insurance industry stated that a building clad in LPS 1181 approved panels can be classified as non-combustible building (ABI). Insurance companies themselves classify the panels as having limited combustibility.

**Q: What are the benefits of using Fire safe panels?**

**A:**

- Meets **severe** Insurer approved fire testing standards.
- **Non combustible** building performance (only UK!)
- Real fire case studies prove **excellent fire performance**,
- Possibility of **reduced insurance premiums** for new and refurbished buildings;
- Premiums will be higher if non-insurer approved panels are used on buildings
- **Competitively** priced panels
- Buildings clearly labelled for fire officers and insurance assessment



## Introduction

Kingspan insulated roof and wall systems consist of thin metallic skins, which are bonded to a light insulating core made from rigid polyurethane foam or mineral fibre.

For applications in the building sector, where high thermal performance and load bearing capacity is needed, Kingspan insulated roof and wall systems are used as load-bearing components in the construction of roofs and walls.

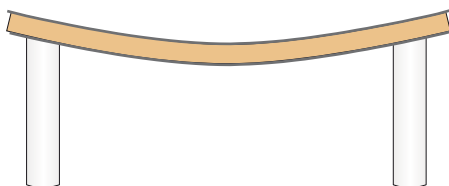
## Structural effect and properties

Sandwich panels belong to the generic group called “composite structures”. These are usually defined as multilayer structures with different mechanical properties for each layer. Sandwich panels consist of two thin surface layers of high density (usually steel internal sheet  $d=0,4$  mm, external steel sheet  $d=0,5$  mm) and a thick middle core layer of low density (for insulation). The advantages of such an arrangement are well-known. Compared to conventional roof and wall systems, which are built up on site, sandwich panel systems are prefabricated off-site, and are quickly assembled to the structure when they arrive on site.

The individual layers by themselves have limited flexural rigidity and cannot therefore bear loads. But by combining the two outer surface layers with the core, a shear rigid composite section is formed. The bending moment is carried by a force-couple in the stiff surface layers and the transverse forces are taken by the core layer.

The load-carrying capacity is further increased by bonding the surface skins to the core.

Through the bond, the strength of the steel skin is reinforced by the core, thus reducing the risk of wrinkling stress compared to a structure that is not bonded together. A good bond is required between the skin layers and the core and the core material itself must have appropriate elasticity and shear modulus.



Flexural rigidity of a PUR board without bonding between the steel skins and the PUR core

## Regulations

Extensive research carried out in Europe by Universities and Research Institutes since the initial development of insulated sandwich panels has established reliable design principles to predict panel performance. Following this work, the European Convention for Constructional Steelwork (ECCS) published in 1991 a document which establishes practical design methods – “Preliminary European Recommendations for the Design of Sandwich Panels (Document number: 66)”. This document was followed by another document published in 2000 by the ECCS – “Recommendations for sandwich panels”.

European standard EN 14509 – “Self-supporting double skin metal faced insulating sandwich panels – Factory made products - Specification” is a product standard which in particular covers “Self-supporting sandwich panels with double-sided metal facings and a thermal-insulating core”, so that standardised assessment criteria are available in Europe. Among others include Mechanical resistance to design loads and actions and combinations of actions. Both chapters are in detail solved in Annex E. There are not only the definition of mechanical values, but a number of other important characteristics, such as:

- Dimensional tolerances
- Thermal insulation
- Ageing and long-term behaviour
- Fire performance
- Water and air tightness
- Acoustic performance



Flexural rigidity is increased by bonding the steel skin layers to the core

## Design principles

For the design of composite panels, static analysis and/or full-scale testing must be used to ensure that structural integrity is satisfied at the ultimate limit state (maximum load capacity) and at limit state of serviceability (normal service loads).

Limit state analysis takes into account wind and snow loadings according to country specific standards and includes the following load cases which must be considered for all insulated roof and wall panel systems.

These are:

### Temperature Loading

Thermal expansion of the outer and liner sheets will be different as the inside and outside surface temperatures vary. As the insulation core is bonded to both faces, this differential expansion causes panel to bow. This can substantially affect the imposed loads, and so temperatures must be taken into account. The surface temperature in Summer depends on the external coating colour of a panel and the reflectivity of the panel surface.

For ultimate limit state calculations,  $T_{ext} = 80^{\circ}\text{C}$  for all colours has to be used. For serviceability calculations,  $T_{ext}$  may be taken as:

Very light colours	$R_g = 75\text{--}90\%$	$T_{ext} = +55^{\circ}\text{C}$
Light colours	$R_g = 40\text{--}74\%$	$T_{ext} = +65^{\circ}\text{C}$
Dark colours	$R_g = 8\text{--}39\%$	$T_{ext} = +80^{\circ}\text{C}$

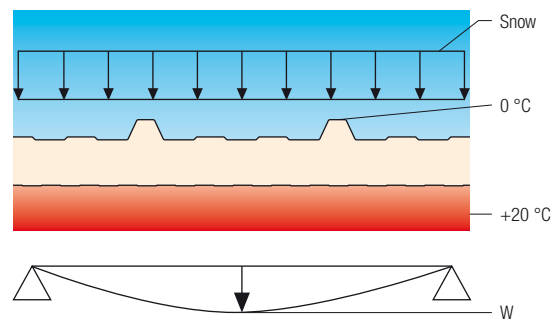
Where  $R_g$  = degree of reflection compared to magnesium oxide which is defined as 100%

The temperature of the external face in Winter depends on the location and varies between  $T_{ext} = -10$  and  $-30^{\circ}\text{C}$ . External Winter roof temperature is taken as  $0^{\circ}\text{C}$  as it is assumed to be covered with snow for the worst load combination. In general, the temperature  $T_{int}$  of the inside face may be taken as  $+20^{\circ}\text{C}$  in Winter and  $+25^{\circ}\text{C}$  in Summer for both ultimate limit state and serviceability limit state calculations.

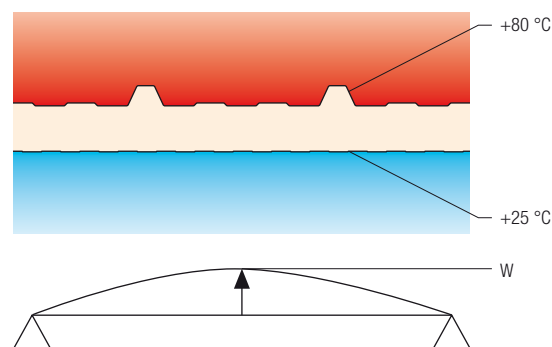
## Creep

The insulation core is a polymeric material which will slowly distort under long-term loads. Panel deflection, therefore, may continue to increase gradually under constant loading. This is known as creep. Roof panels can develop creep after prolonged periods carrying dead loads (eg snow). But wall panels are not subject to creep because there is never any long-term load. Creep is taken into account by applying a safety factor to the shear modulus of the core ( $G$ ) calculated according to the core material used and the type of load.

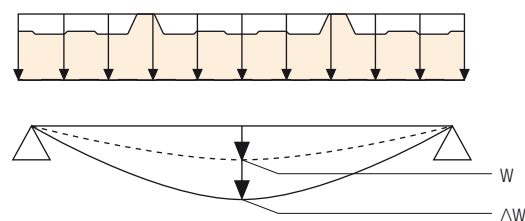
Load state in Winter  $\Delta T = 20\text{K}$



Load state in Summer  $\Delta T = 55\text{K}$



Creep in the core



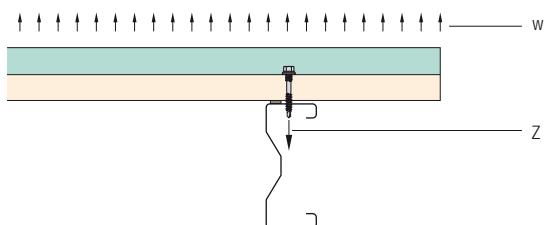
## Load Combinations

Component weight, snow, wind and temperature loads are considered individually and together in their worst combinations with appropriate safety factors in order to determine the allowable imposed loads.

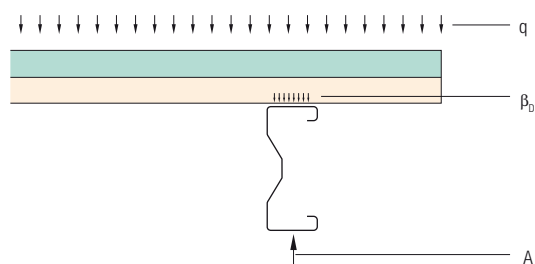
Kingspan's insulated roof and wall systems load span tables allow the designer to select suitable panel(s) and steelwork support spacing(s) for specific project applications with guarantee that panel will be able to transfer all loads including their possible combination.

**The following conditions also have to be checked:**

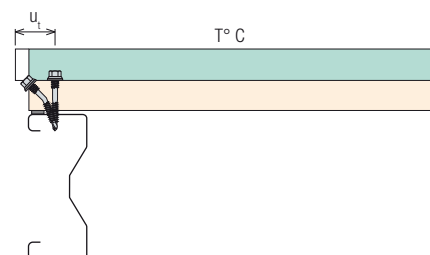
1. Fasteners at structural support (especially for wind suction in certain areas of the building)



2. Compressive strength of the core where it rests on the structure



3. Bending of the fastener caused by panel deformation



The sound insulation of a material is its ability to resist the passage of airborne and impact sound. Sound insulation plays a vital role in all types of buildings. It provides acoustic separation between rooms and between the outside world and the building interior.

All materials have different sound insulation properties that depend on their weight and physical build up. It is important to select the right material for the right application, and then construct the building to minimise weaknesses. Then the maximum sound insulation of the material can be realised. Often the degree of sound insulation achieved is limited by the paths that sound can travel to by-pass the material. This is called “flanking”

The purpose of acoustic control is to limit noise pollution from external sources or from activities within the building. Noise can be described as unwanted sound, the intensity of sound depends on pressure levels which are measured in decibels (dB).

The human ear responds to sound intensity which also depends on the pitch. Pitch frequency is expressed in cycles per second, hertz (Hz).

The following are typical examples of sound pressure levels:

- Ear drum pain threshold 140 dB
- Aircraft taking off 100 dB
- Pneumatic drill 90 dB
- Train 80 dB
- Vacuum cleaner 60 dB
- Office 50 dB
- Fridge 30 dB
- Sound Proof Room 10 dB

#### Effective acoustic control must tackle four different areas:

- Sound insulation for the building envelope to control noise break-in to the building or noise breakout from the building.
- Effective flanking noise control, where internal partitions meet the building envelope.
- Acoustic absorption when used in conjunction with profiled perforated steel liners or absorbent suspended ceilings.
- Effective control of rain noise when used in conjunction with roof tiles, profiled perforated steel liners or absorbent suspended ceiling combinations.

Most noises are made up of a number of individual sounds at various frequencies, all added together, so to get a better picture of the noise a graph is used to show the sound pressure level at various frequencies within the audible range.

The building envelope can play an effective part in controlling and absorbing sound energy by acting as a barrier to noise.

## Sound Insulation in Buildings

Sound insulation refers to the ability of the building fabric to resist the transmission of airborne and impact sound.

Airborne sound insulation refers to sound insulation between:

- a) vertically or horizontally adjacent rooms where the sound source is airborne, for example, loudspeaker, speech or TV; or
- b) the inside and outside of a building

Impact sound insulation refers to sound insulation between vertically adjacent rooms where sound source is an impact, for example, footsteps.

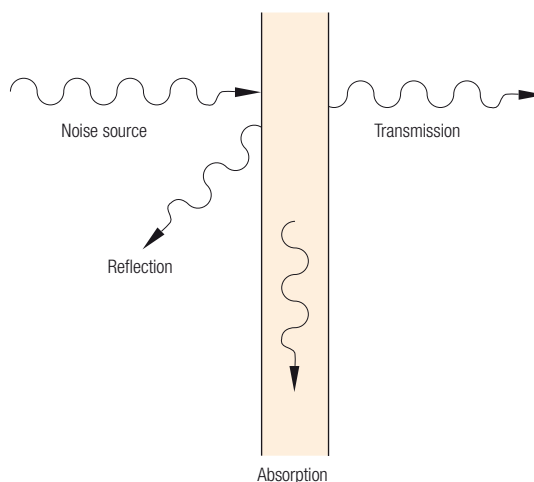
Airborne and impact sound insulation are determined by both direct and flanking sound transmission. Direct transmission is sound transmitted directly through a wall or floor element, and flanking transmission is structure-borne sound travelling down a wall or floor into another room.

## Noise Control Measures

There are ways which acoustic insulation can be used to control noise:

- Controlling Transmission Loss – Transmission loss is the reduction in the amount of sound energy passing through the building element or assembly-roof-wall-floor. This is expressed in decibels (dB). Noise can be either impact sound or airborne
- Controlling Sound Absorption – Typically hard surfaces have a characteristic of reflecting sound and amplifying noise reverberation.
- Internal lining and ceiling systems – Acoustic performance systems are available from specialist suppliers.

The sound absorption coefficient of materials varies with the sound frequency hertz (Hz).



Room Acoustics

Room acoustics usually refers to the acoustic quality of rooms in terms of their reverberation time and speech intelligibility. This is particularly relevant for educational buildings, offices, theatres, performance spaces, etc.

- Reverberation time is a measure of how long it takes a sound to decay in seconds. It is determined by the amount of sound absorption in the room and room volume.
- Speech intelligibility is determined by the position of the speaker and listener, room geometry, background noise level and reverberation.

Facade Sound Insulation

Roof and wall sound insulation concerns only the airborne sound insulation of the roof and walls of the building façade to:

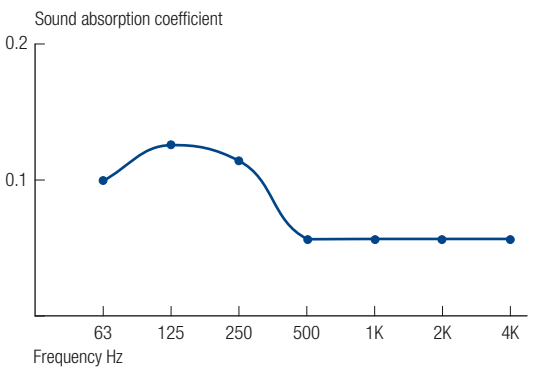
- prevent excessive transmission of external noise, for example, road traffic, rail traffic, aircraft, etc. from outside to inside
- prevent excessive transmission of internal noise, for example, machinery noise within industrial premises, from inside to outside

Sound insulation criteria are dependant on country specific regulations and client specification requirements which may also include Planning Authority constraints.

Sound Absorption

The sound absorption coefficient of a material defines how much sound it can absorb across the frequency range. The more sound absorbed, the less is reflected back into the room to cause reverberation.

Total absorption will occur if the material has an absorption coefficient of 1. The results for all Kingspan insulated panels are shown below.



Kingspan roof and wall panels with polymeric core have a minimum single figured weighted sound reduction index  $R_w$  of 25dB. For mineral fibre panels,  $R_w$  ranges between 30–32 dB.

Sound Reduction Index (SRI) tested						
Frequency [Hz]	125	250	500	1K	2K	4K
SRI [dB]	17.2	20.0	23.2	23.4	23.2	40.5



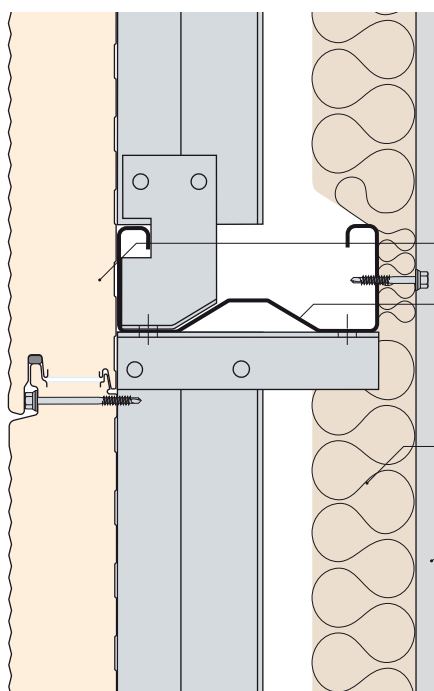
## Enhanced Acoustics

If improved acoustic performance is required, e.g. higher sound reduction values or reduced reverberation times, Kingspan insulated roof and wall systems can be constructed as indicated below.

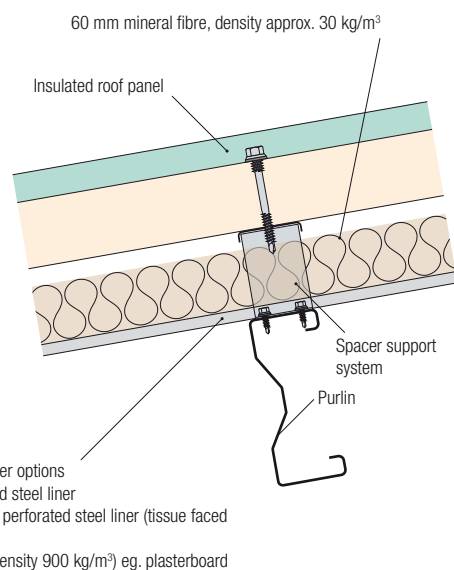
Two solutions are provided, one for low humidity environments where there is low levels of air moisture and/or reasonable ventilation, and the second is for higher humidity applications such as swimming pools.

### Low Humidity Application

Walls



Roofs



Predicted SRI (dB)

Construction Method	Frequency Hz						Rw
	125	250	500	1k	2k	4k	
Insulated Panel	14	19	24	27	34	43	25
a – 0.63 mm profiled steel liner	14	30	42	41	47	54	38
b – 0.7 mm profiled perforated liner	15	30	41	45	46	61	40
c – 12 mm board	25	41	47	53	56	57	49

Predicted Absorption Coefficients

Construction Method	Frequency Hz					
	125	250	500	1k	2k	4k
Insulated Panel	0.13	0.12	0.05	0.05	0.05	0.05
a – 0.63 mm profiled steel liner	0.53	0.11	0.08	0.06	0.05	0.05
b – 0.7 mm profiled perforated steel liner	0.64	0.86	0.91	0.90	0.94	0.80
c – 12 mm board	0.30	0.20	0.15	0.10	0.15	0.10

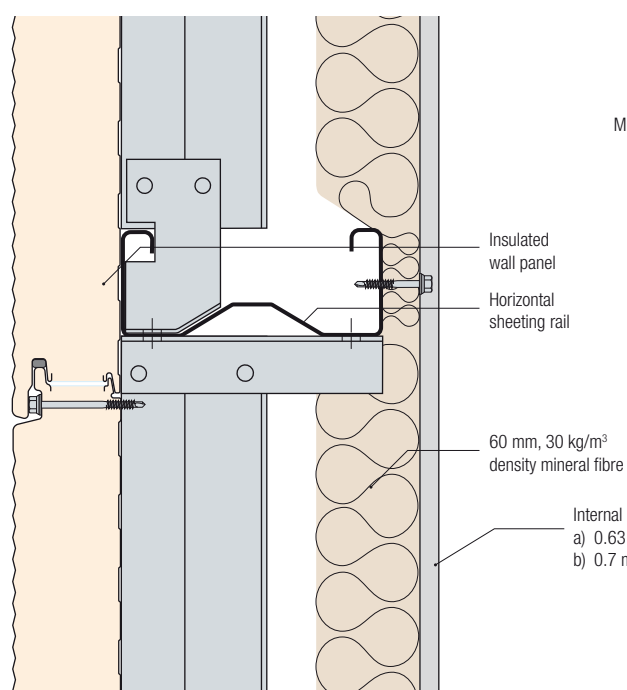
These designs are for enhanced acoustic performance in a high humidity environment, e.g. swimming pools, leisure centres, and other high humidity processing environments.

The construction is designed to prevent condensation occurring within the acoustic layer.

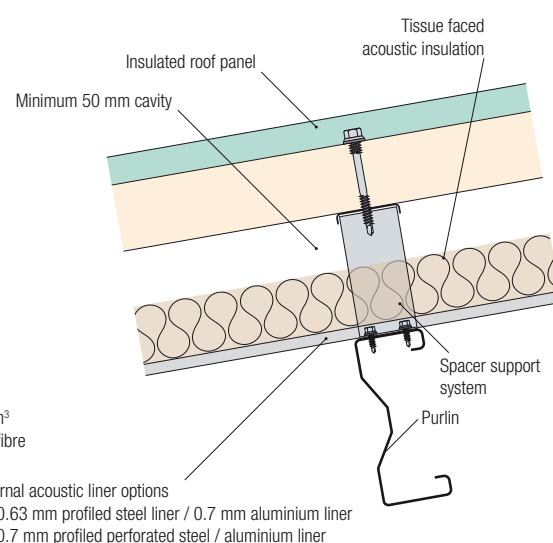
The construction is designed so that the thermal insulation requirement is provided solely by the insulated panels, and the acoustic layer is only used for acoustic absorption and sound insulation. To eliminate condensation in the cavity it is necessary to provide ventilation with air from inside the building. This can easily be achieved by incorporating extractor fans within the acoustic profiled liner.

## High Humidity Application

Walls



Roofs



Predicted SRI (dB)

Construction Method	Frequency Hz						Rw
	125	250	500	1k	2k	4k	
Insulated Panel	14	19	24	27	34	43	25
a – 0.63 mm thick steel liner	18	30	39	43	42	55	39
b – 0.7 mm thick perforated liner	15	27	38	42	43	56	37

Predicted Absorption Coefficients

Construction Method	Frequency Hz					
	125	250	500	1k	2k	4k
Insulated Panel	0.13	0.12	0.05	0.05	0.05	0.05
a – 0.63 mm profiled steel liner	0.53	0.11	0.08	0.06	0.05	0.05
b – 0.7 mm profiled perforated steel liner	0.64	0.86	0.91	0.90	0.94	0.80

Daylight is essential for healthy living not only for occupants, but for animals too (especially for stabled farm animals). It is an established fact that ample daylight creates a general feeling of health and well-being in the workforce and improves productivity and safety.

Every workplace should have suitable and sufficient lighting, which should, so far as is reasonably practical, be by natural light.

The most effective method of providing even, consistent daylight, particularly in large buildings, is through rooflights, which are up to three times more effective than windows around the perimeter of the building.

Diffused lighting should be used to provide even light distribution and avoid glare.



## Design Considerations

Design considerations should include:

- Fragility (both initially and after time) of selected rooflights.
- Light transmission and distribution analysis
- Thermal (U-value) level
- Risk of condensation including thermal bridging at rooflight perimeter and intermediate spacers
- Durability and functional life of rooflight system (profiled rooflights can be difficult to replace in metal roofs)
- Safe access for maintenance

## Typical Rooflight Layout Options

The layouts indicated are suitable for pitched and curved roofs.

**Chequerboard** – Most uniform light distribution, but most difficult to build.

**Ridge** – Reasonable light distribution on small span buildings, but subject to high wind suction loads. Normally barrel vault designs are supplied by specialist manufacturers.

**Ridge to Eaves** – Reasonable light distribution, good buildability, but subject to high wind suction loads at ridge and eaves.

Note: It is recommended that insulated panels should be used from ridge to the first purlin, downslope and from eaves to first purlin, upslope.

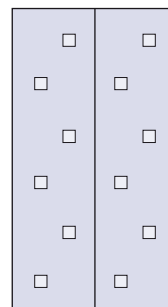
**Mid Slope** – Compromise between chequerboard and ridge to eaves avoiding high wind suction load areas.

## Application

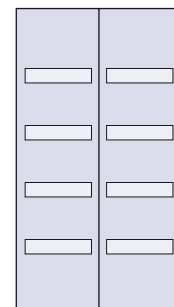
Double-skin rooflight panels can only be used in combination with Kingspan insulated panels on roofs with a minimum slope of 6° (10%) or more.

Kingspan do not recommend the use of rooflights in banks, i.e. side by side.

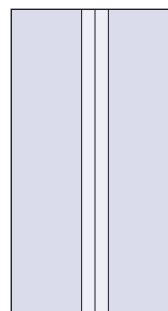
**Chequerboard**



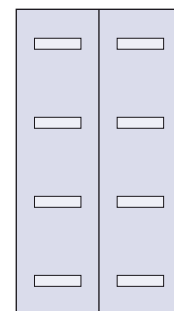
**Ridge to Eaves**



**Ridge**



**Mid Slope**



## Materials

In-plane rooflights (flush with the roof surface) are made to match the metal roof panel profiles using glass reinforced polyester (GRP) boards in accordance with EN 1013-2. The external/internal skins are 0.8 to 1.2 mm thick, and are connected to each other using polyethylene distance spacers.

## Heat Loss & Energy Costs

Rooflights can reduce the costs of artificial lighting. However, designers should note that rooflights are generally poor thermal insulators so there will be more heat lost through them than through the cladding itself. The benefit of providing some natural daylight must be balanced with increases in heating costs. The costs of heating a building are generally greater than artificial lighting.

## Light Transmission

Light transmission through a double skin rooflight will typically be between 70% and 80%. GRP sheets will generally give diffused light, with little glare. Polycarbonate is clearer, but more likely to increase glare and solar gain.

## Strength & Thermal Movement

Rooflights are not as strong as the metal roof panels around them. Double skin rooflights do not act compositely. This limits purlin spacings to approximately 1.5 metres and more fasteners with larger diameter washers are required to withstand wind uplift forces, particularly at ridge, eaves and verges. For example, on trapezoidal rooflights, primary fasteners with 29 mm diameter washers would normally be fitted in every trough across the profile at each purlin position. Where a rooflight overlaps onto a metal faced panel, it should be fixed with stitching fasteners with head/washer diameters of 12 mm, at a maximum spacing of 400 mm.

To accommodate differential thermal movement between rooflights and metal panels, care has to be taken to specify correct fasteners, washers and site drilled hole sizes.

Kingspan's rooflight construction details contain assembly, sealing and fastener instructions.

## Weatherproofing

In principle, where through-fixed metal cladding panels are used, the rooflights simply overlap at the ends and the sides in the normal way. However, rooflight material thicknesses are typically 2 to 3 times more than the external skin of cladding panels. This means that the overlaps do not "nest" precisely on top of each other. End overlaps are therefore more difficult to seal correctly and consequently there is increased risk of water ingress. Therefore rooflights should be specified as long as possible to minimise the number of end laps.

## Fire

The following table shows how various rooflight materials perform when subjected to high temperatures:

	GRP	Polycarbonate
Temperature range for continuous use	-30 °C to +120 °C	-40 °C to +120 °C
Softening temperature	140 °C	120 °C
Vents by melting	No	Yes

GRP is more resistant to high temperatures than the other rooflight materials, but each material has potential benefits in a fire.

## Lifetime Durability

Kingspan Rooflights have the following life expectancies:

- GRP up to 25 years
- PC up to 25 years

Life expectancy is dependant on the building's location, external and internal environment and correct installation. Regular cleaning during this period will help to maintain optimum light transmission.



The primary function of any roof and wall system is to keep the weather out, i.e. rain, snow and wind. This is achieved by using waterproof materials and by sealing joints, junctions and penetrations. Normally in practice it is the roof of the building which is more susceptible to leak risk than the walls because on vertical cladding water simply runs off and is less likely to leak through joints etc. However joints on horizontally laid cladding have to be designed and constructed correctly to avoid weather ingress.

Leak risk on roofs is related to site location, exposure and increases on lower pitches as the roof is drained more slowly.

For example tiles can be used on steep slopes and no seals are necessary but on flat/low pitched roofs the material and joints must be 100% waterproof.

#### Metal Roofs Risk Points:

- Side and end lap joints
- Sealants
- Fasteners and attachment strength
- Rain run-off and wind driven snow
- Penetrations for rooflights and apertures
- Perimeter trims
- Coatings and maintenance

Kingspan's 35 years of experience in the metal roof systems demonstrates that KS1000 RW roof systems are reliable for roof slope applications of 4 degrees and above. For roof slopes below 4 degrees, KS1000 TOP-DEK and KS1000 X-DEK solutions are essential as they have no exposed through fixings and sheeting overlaps.

**Kingspan roof systems are suitable for the following roof slope applications:**

Product	Roof with one panel in the slope direction	Roof with two or more panels in the slope direction
KS1000 RW	≥ 4° (7%)	≥ 6° (10%)
KS1000 X-DEK	≥ 0.5° (1%)	≥ 0.5° (1%)
KS1000 TOP-DEK	≥ 0.5° (1%)	≥ 0.5° (1%)
KS1000 FF	≥ 5° (8.5%)	≥ 8° (14%)
KS1000 RT	≥ 12° (21%)	≥ 20° (36%)
KS1000 RW/GRP40	≥ 6° (10%)	≥ 6° (10%)
KS1000 FF/GRP40	≥ 8° (14%)	≥ 8° (14%)
KS1000 Polycarb Rooflights	≥ 8° (14%)	≥ 8° (14%)

Note: The finished roof slope takes all normal deflections into account. To achieve the correct finished slope the steelwork will have to be designed with greater fall, e.g. 2° to achieve a 1.5° finished slope. This is dependant upon span and to be checked with engineer.

Trapezoidal sheeting minimum length of overlap		
Roofslope		length of overlap in mm
≤ 3°	< 5%	Without overlap
3° – 5°	5% – 9%	200
5° – 20°	9% – 36%	150
> 20°	> 36%	100

#### Design, Construction & Workmanship

The design and construction details shown in the roof and wall sections have been developed to provide robust and reliable weatherproof solutions using Kingspan's range of insulated roof and wall systems.

Particular emphasis has been given to selecting sealant and fastener types co-ordinated with dimensions and positions which will be functional given a superior standard of on-site workmanship.

#### Surface Coatings

The range of surface coatings available on Kingspan's insulated roof and wall systems are selected for their proven durability when exposed to various weather conditions.

## Material Performance

External Coatings	Life Expectancy	
	First Maintenance	Overall
Spectrum™	25*	40+*
PVDF	20*	40+*
Plastisol 200 µm	15*	40+*
Polyester*	15*	30+*

Note: Coating lifetime warranties are project specific and dependant on building location, environment, orientation, roof pitch and colour etc. Consult Kingspan Technical Services at desing stage.

\* Subject to location, building orientation, roof slope, etc.

Gutters	Life Expectancy	
	First maintenance	Overall
External	N/A	30+
Boundary Wall, Valley & Hip	N/A	30+
Fasteners	Life Expectancy	
	10	
Carbon steel	25+	
Austenitic Stainless steel		
Sealants	Life Expectancy	
	20+	
Pre/formed Butyl tapes	10–20	
Gun-grade silicone		
Profile fillers	Life Expectancy	
	15	
Polyethylene	20+	
EPDM		
Rooflights	Life Expectancy	
	25	
GRP	25	
polycarbonate		

## Building Physics Performance

	Life Expectancy
Thermal – U-value	in excess of 40 years
Insulation Continuity	
Air Permeability	
Structural	
Fire	
Acoustics	

Note: Lifetime Periods indicated are subject to compliance with Kingspan's design, specification and construction details.

## Factors Affecting Durability

Most building materials are normally subjected to a variety of changing conditions which will gradually affect them.

These effects can be controlled by careful selection of materials and desing details so that it is possible to construct metal clad buildings which require minimum maintenance, even in relatively harsh environments.

Moisture and high temperature are arguably the most aggressive of environmental conditions.

### Moisture

To reduce the potential for deterioration, moisture on surfaces and within constructions should be avoided, if at all possible.

However, if it cannot be avoided then the wetting time should be kept to a minimum.

Thus the steel components in metal cladding systems are usually coated in a zinc/alloy (galvanised), and the cladding sheets themselves have additional coatings, not only for aesthetic appearance, but also for additional protection for moisture.

### Temperature

Temperature can affect the life of coatings and is an important desing and lifetime consideration. In general, higher temperatures will cause faster degradation. Temperature of external facings depends on colour, as in Central Europe in sunny summer time conditions dark coloured faces can reach temperatures of 80 °C, whilst light colours may only be 55 °C under same conditions. This means that dark colour are less durable than the lighter ones.

### Fasteners, Sealants & Fillers

All fasteners, sealants and fillers detailed in the model specifications have service lives as indicated opposite.

### Rooflights

GRP and Polycarbonate rooflights will not have the same life span as the rest of the roof system because of the effects of UV radiation. Specifiers and building owners should plan to replace them after 20 to 25 years, depending on the environmental conditions and manufacturer's recommendations.

### Ancillary Elements

Ancillary elements (e.g. apertures, lovsres and vents) lifetime period should be the same as the roof and wall envelope.

### Warranties

Product warranties are provided by Kingspan of specific projects when required.

### Maintenance

To achieve the best long term performance the building should be inspected routinely, any accumulation of debris should be removed from roofs, and any mechanical damage should be touched up.

## Fibre-free System

- Closed cell core with autohesively bonded metal facings
- Food & Hygiene Safe insulation core resists moisture ingress and any risk of toxic mould and bacteria growth
- No risk of building's or employers liability insurance cover exclusion for presence of toxic mould
- No release of fugitive fibres into internal environment

## The wall and ceiling system must effectively perform the following functions over the lifetime of the building.

- Food & Hygiene safe – antibacterial coatings available
- Firesafe System
- Provides a thermal, vapour and airtight barrier
- Resists moisture ingress
- Suitable for wash and clean down
- Walk-on ceilings
- Lightweight construction
- Low energy operating costs

Hygiene is the practice of cleanliness in order to maintain health and prevent disease. It is therefore an important consideration in buildings where food is processed. It is equally important for other processes which require a clean environment, such as the electronic and pharmaceutical industries.

Panels must therefore be easily washed and cleaned and should not be prone to surface or interstitial condensation, as this could lead to the formation of bacteria and mould growth on the surface or within the construction.

## Insulated Roof, Wall and Ceiling Systems

Kingspan Insulated Panels comply with the current EU Food Hygiene Regulations because they are totally filled with non toxic, homogeneous, closed cell insulation, and they eliminate cold bridges, which ensure that both surfaces are separated and interstitial condensation will not occur.

They are supplied with Foodsafe Coatings to their liners, which are specially designed for the hygiene requirements of food processing applications and compliance with the food and hygiene regulations.

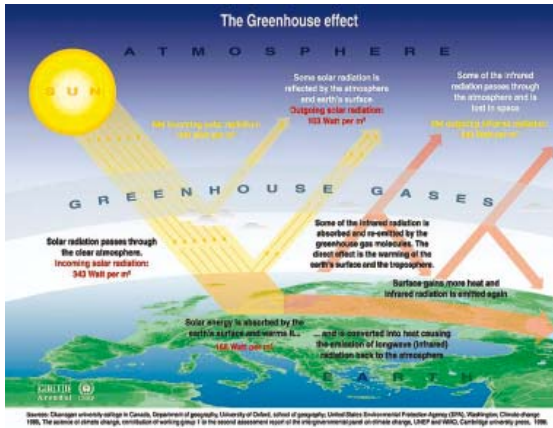
The core material used in the panels can be termed as non-deleterious. It is free of any CFC or HCFC ingredients. It has a low permeability and therefore absorbs little water. It has good resistance to a wide range of chemicals, solvents and oils is immune from attack by mould, mildew and vermin infestation, which are all important features and are essential for hygienic applications.

All joints between individual panels and internal trims have to be effectively sealed to the same hygiene specification standards. The inherent structural rigidity of the panels permits these seals to be reliably installed, and ensures they will not be broken by movement of the panels.

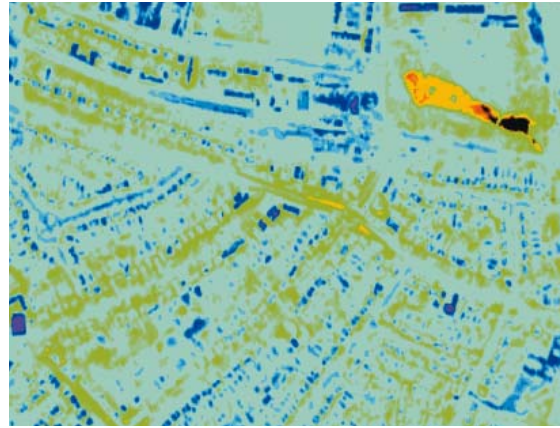


	EU Legislation	Stipulated Temperatures of Products	Premises/Products/Transport
Trade in Fresh Meat	Council Directives 91/497/EEC	Fresh meat carcasses cut etc +7 °C	Abattoirs cutting plants and transport vehicles
		Frozen meat –17 °C	Coldstore Chambers where an internal temperature of –17 °C must be achieved and maintained
Trade in Fresh Poultry meat	EU Council Directives 92/116/EEC	Fresh poultry meat +4 °C (maximum)	Poultry slaughterhouses and cutting plants and transport vehicles
Trade in Heat Treated Milk	EC Council directives 95/46/EEC	Raw milk, heat treated milk and milk products 8 °C for raw milk shortage and 6 °C for longer storage. During transport not more than 10 °C, on arrival to be cooled to 5 °C. Pasteurised milk at 6 °C during transport and storage	Dairies, milk products production plants and in transport vehicles
Trade in Meat Products	EC Council directives 92/5/EEC	Ambient working temperature less than 12 °C  Minced and cut products +2 °C –18 °C –12 °C	Cutting and preparation rooms  Chilled products Deep frozen products Frozen products  Temperature of products should be clearly shown on labelling and the products must be stored and distributed at those marked temperatures
Trade in Egg Products	EU Council Directive 91/684/EEC	+4 °C –18 °C –12 °C +15 °C	Chilled Deep Frozen Frozen Dehydrated (Dried Eggs) All egg products must be stored and transported at these temperatures
Trade in Fishery Products	EC Council directives 97/79/ES 95/71/ES	That of melting ice  –18 °C	Fresh fish and fishery products  Frozen products (during transport 3 °C tolerance margin)
			<b>Coldstores MUST have temperature recorders</b>
Trade in Live Bivalve Molluscs Trade in Rabbit Meat, Game Meat and Wild Game Meat	EC Council directives 92/5/EEC	At temperatures which do not adversely affect the quality of product +4 °C (rabbit meat) –12 °C (rabbit meat) +4 °C (small game) +7 °C (large game) –12 °C	During transport and storage  Chilled Frozen Chilled Chilled Frozen game

## Sustainable Construction To Protect The Environment



The Greenhouse Effect



Buildings are responsible for 50% of the EU's energy consumption – Aerial thermographic image of heat loss from a city

### Sustainable Construction Principles

- Understand sustainable development and client benefits
- Adopt whole lifecycle thinking
- Design and construct to minimise environmental impact
- Select the most sustainable construction methods and solutions

**Sustainable Construction encompasses issues as diverse as:**

- Orientation of buildings
- Materials of construction
- Construction techniques
- Utilisation of Information and Communication Technology (ICT)
- Community involvement
- Local sourcing

### What is Sustainable Development?

The classic definition of sustainable development comes from the Brundtland Report of the World Commission on Environment & Development of 1987, *Our Common Future*: "Sustainable development is development which meets the needs of the present generation without comprising the ability of future generations to meet their own needs."

### The Greenhouse Effect

The greenhouse concept is simply that the composition of the gases that make up the atmosphere enveloping the earth is crucial to the existence of life, by acting as an insulator. This is because a precise gaseous composition allows heat which is radiated from the sun to be trapped in by the earth. Furthermore it allows the specific temperature range for life to flourish, as it allows the right amount of heat loss as well as retention to keep the balance of life stable.

### Global Warming & Climate Change

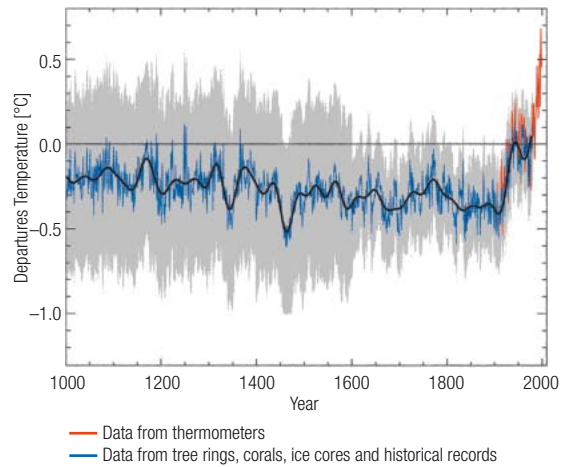
While the Greenhouse Effect in balance is a good thing, the creation of an imbalance through the excessive emission of man-made greenhouse gases disturbs the balance. Accordingly, humanity currently faces one of its greatest challenges ever as accumulating greenhouse gases cause climate change and sea level rise. The most recent report confirms there is now very little doubt that man-made carbon dioxide is the main cause of climate change.

*"Greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities, causing surface air temperatures and surface ocean temperatures to rise. Temperatures are, in fact, rising... Human-induced warming and associated sea-level rises are expected to continue throughout the 21st century".*

Source: national Academy of Sciences report on global warming to the Bush Administration, June 2001 – <http://www.nationalacademies.org>

## Sustainable Construction To Protect The Environment

Variation of the Earth's Surface Temperature over the Past 1,000 Years



Figures from 1961 to 1990 are average  
Source: Intergovernmental Panel on Climate Change

**Unsustainable economic activity has widespread undesirable impacts including:**

- air pollution
- ozone depletion
- land, coastal and marine degradation
- ecosystems damage
- deforestation, habitat loss and depletion of natural resources
- fresh water availability loss
- desertification



Desertification and poverty



Deforestation



Rising sea levels

## Sustainable Construction To Protect The Environment

### Sustainable Insulation Achieves Energy Savings and Climate Protection

In use energy savings are the most important issue because fossil fuel energy usage is leading to global warming and rising sea levels, raising the very real possibility of catastrophic climate change which might destroy life as we know it.

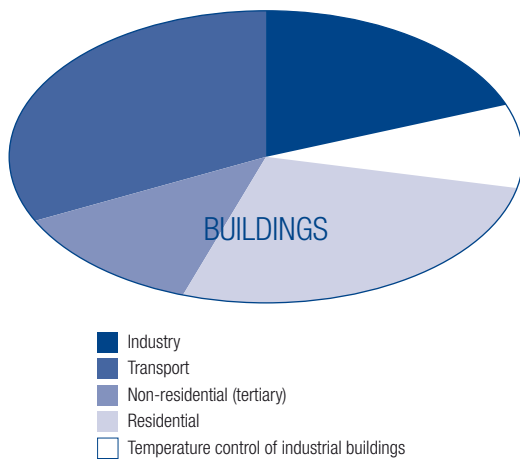
Increased insulations and higher air tightness requirements were introduced as keys to reducing energy use in buildings. This is consistent with its policy to promote sustainable construction principles.

Rigid urethane insulated roof and wall systems optimise thermal efficiency and contribute to air-tightness criteria, thereby preventing unnecessary heat transfer. This provides substantial CO<sub>2</sub> emission savings and contributes to the Government's goals of minimising global warming and consequential climate change.

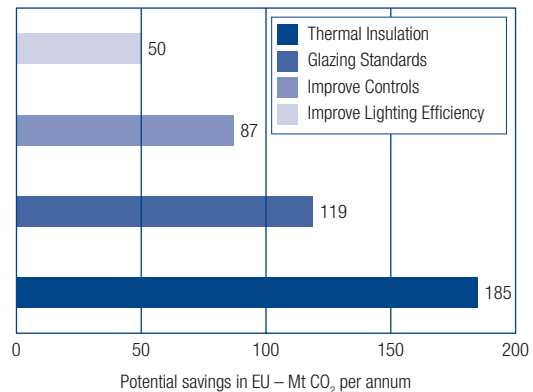
An additional value of insulated roof and wall systems is that they maintain their exceptional thermal performance throughout their lifetime, which is a key requirement for any sustainable solution.

Kingspan's insulated roof and wall systems can reduce energy use by up to 60%. This enables M&E heating and cooling space systems to be designed to optimise energy efficiency and reduce CO<sub>2</sub> emissions.

### Buildings are Responsible for 50% of EU Energy Use (Including Industrial Buildings)



### Insulation shows the Greatest Potential Savings of CO<sub>2</sub> Compared to other Building Efficiency Measures



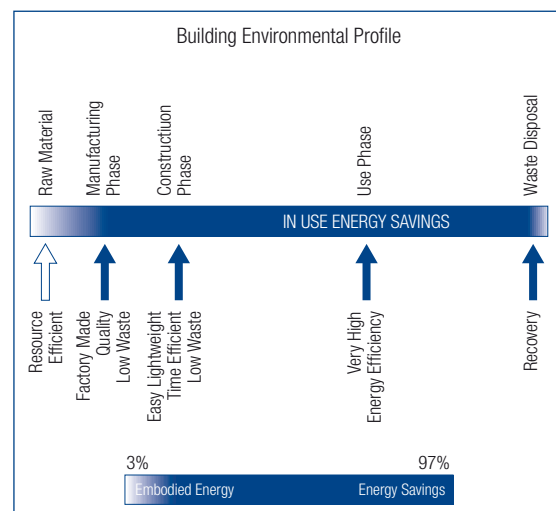
## Sustainable Manufacture and Site Installation

Off-site pre-fabrication provides factory quality systems achieving higher quality, faster and safer site installation.

Additionally these solutions provide lower site costs, reduced construction programme times and greater certainty in project delivery.

Pre-engineered solutions are delivered to the construction site with the correct dimensions and therefore there is generally no site wastage.

## In Use Sustainability



## Sustainable Construction To Protect The Environment

### Embodied Energy

There is a common misconception that the most important factor in a material specification is the embodied energy of the material. For base construction materials, the replacement of one material with an equivalent with lower embodied energy will of course reduce the overall energy impact. However, achieving low energy demand in use is the most important factor and must be optimised first.

Embodied energy can be particularly misleading for energy efficiency materials and systems – where the embodied energy will typically only be in the order of 1%–3% of the energy saved over the building's lifetime.

This very clearly indicates: thermal (U-value) and low air leakage are first, and longevity of performance over life is second, these are the key environmental issues for choosing insulation materials.

### Insulation Material Selection

There is a large array of different insulation materials, from many different sources and with different properties. What matters most is that the materials will last a long time and provide high levels of performance throughout.

What is most significant is the thermal and air leakage performance design and specification. On the level of the material choice, there are three key points for selecting insulation materials:

- Choose a material with long life, sufficient durability and minimum failure risk (to maximise energy and carbon benefits).
- Choose a material with zero ozone depletion potential (ZODP) (a global pollution issue).
- Where thickness is constrained, choose the best thermal insulator appropriate to the construction type (to optimise U-value and energy savings).

### Insulants Durability & Failure Risk

Now that lower external envelope U-values have been demanded by Buildings Regulations and Norms, the most important issue in selecting insulants is longevity of thermal and air leakage performance. Therefore failure risk of insulation materials is a key issue in optimising energy efficiency and achieving lower CO<sub>2</sub> emissions.

#### Site Assembled Machine-Made Mineral Fibre Built-up Systems

The biggest risk factor is moisture build-up (whatever the cause), which increases thermal conductivity.

Mineral fibre materials have design issues relating to their open structure – they are vapour and air permeable.

#### Moisture Build-up in Insulant

Wetting caused by condensation, leaking cladding or leaking pipework. Will cause large increases in conductivity.

#### Compression

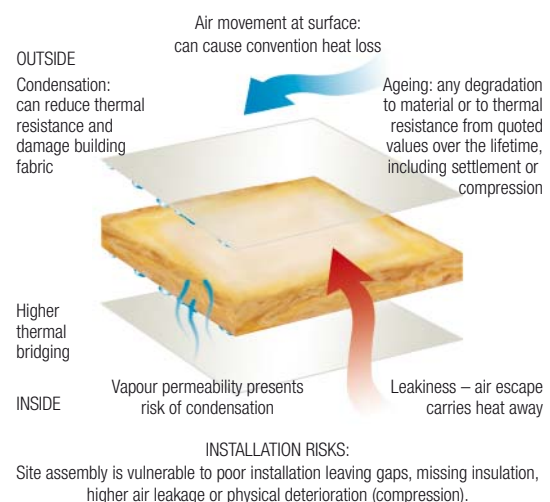
Lower strength products with lower binder content offer compression risk—e.g. in flat roof applications. Good specification should avoid this problem.

#### Air Movement

The open structure means that surface air movement and air moving through may reduce the insulation value, though some products use facings to prevent this.

#### Kingspan Insulated Roof and Wall Systems

Kingspan's off-site pre-fabricated roof and wall systems provide optimum sustainable lifecycle construction from design through factory manufacturing, site installation, building use and end of life recycling.



## End of Life Solutions

Kingspan takes the issue of end-of-life very serious and has been working with industry experts in waste management and disposal for many years.

Assessing the whole life cycle of building systems is critically important in addressing their impact. In 2006, Kingspan Insulated Panels began a process with the UK Building Research Establishment (BRE) to identify and assess the environmental effects of Kingspan's key panels from 'cradle to grave'. Panel systems profiled so far have achieved a Green Guide to Specification 'A' rating which importantly includes end-of-life.

## The Steel Construction Institute Report

The SCI is an independent, member-based organisation. It is probably the world's largest research and technical organisation supporting the use of steel in construction. The objective of The Steel Construction Institute is to develop and promote the effective use of steel in construction.

SCI prepared for Kingspan Insulated Panels a report on the review of the end-of-life disposal options for steelbased building envelope systems.

One of the key outcomes of the report is that the recycling of insulation core from all types of metal cladding systems is problematic. The research found that current demolition practice is thought to result in the insulation going to landfill – whether it be PUR, IPN, rock fibre or glass fibre. Further to the SCI report is worth pointing out that metal clad construction can be easier to dismantle and separate into component parts than many traditional building systems. This provides the potential for recycling all elements of the system subject to cost and technical viability.

## Re-use of Kingspan Insulated Panels

Studies into the re-use of insulated panels have indicated that the potential for re-use from both an economic and technical point of view can be limited by some factors, however, Kingspan Insulated Panels have demonstrated cases where insulated panels have been reused particularly on buildings where aesthetics are not vitally important. Re-use of Kingspan panels at end-of-life is always the preferred option and as the two case studies below show it is a viable option. Using insulated panels in this manner at end-of-life has many benefits including significant financial savings for all involved.

Insulated roof and wall panel systems have a very long lifetime which exceeds 40 years. Re-use of construction products offers even greater environmental advantages than recycling.



### Project A - Mac-Fab Systems

Building Type: Industrial  
Location: Co. Monaghan, Ireland  
Kingspan Panel: AWP - KS1000 MR  
Original Panel Use: Retail  
Original Panel Location: Liffey Valley Shopping Centre



Dublin, Ireland

### Project B - Clinton Engineering

Building Type: Industrial  
Location: Kells, Co. Meath, Ireland  
Kingspan Panel: KS1000 RW  
Original Panel Use: Commercial  
Original Panel Location: UK

## End-of-Life Management – Current Production

All Kingspan insulated panels produced since 2004 including current production are classed as nonhazardous and do not contain CFCs or HCFCs, i.e. ozone depleting substances (ODS).

The cost of processing panels through shredder plants is approximately cost neutral with the transport costs from site being covered by the scrap value of the steel. Economics for specific buildings will be dependant on transport distances, and the market value of steel scrap at the time of disposal.

Shredder plants offer a proven solution for dealing with insulated panels incorporating non-ozone depleting blowing agents and are suitable for Kingspan insulated panels which can be safely processed as a co-feed with other scrap materials.

Steel and aluminium can be recycled again and again without any degradation. The steel or aluminium external and internal facing sheets are removed and fully recyclable through the steel or aluminium manufacturing route, without further burden to the environment nor increase in dioxin levels. Current evidence suggests that 84% of steel and aluminium used in construction is recycled.

### Dismantling Panels

As Kingspan insulated panels comprise of pre-fabricated single component units site experience has shown that both roof and wall panels at end of life are relatively easy to safely remove from a building and transport to a recovery centre. Dismantling site assembled multi component installations may be problematic owing to issues surrounding the fragility of the roof system and it's component parts. Critical to this assessment of the viability of dismantling rather than demolition is information on the structural characteristics of the top sheet, liner sheet and system as a whole.



## End-of-Life - ODS Containing Panels

Since January 2004 all Kingspan insulated panels have been manufactured without any Ozone Depleting Substances (ODS). Some panels were manufactured with ODS before 2004 and current legislation governing the recovery of ODS – EC Regulation 2037/2000 - requires recovery of ODS to be carried out 'if practicable'.

As a result of the excellent long term thermal and structural performance properties offered by insulated panels, there are currently only very small quantities of ODS containing panels entering the waste stream, however as we reach the end of the next decade this will have changed and we need responsible solutions for the end of life disposal of these panels.

This involved extensive research into the disposal of ODS containing insulated panels through the use of existing refrigerator recycling plants, which is our recommended method of disposal, where viable.

### Refrigerator Recycling Plants

A commercial service for dealing responsibly with the legacy of CFC and HCFC containing insulated panels at their end-of-life is now available. Kingspan is aware of a number of projects where panels have been re-processed successfully using refrigerator recycling plants.

A major advantage of fridge recycling plants is that the recovered insulation is clean and dry – in the ideal form for recycling/reprocessing, although current economics determine that most goes to landfill. The use of fridge plant processing has future potential to go a long way towards establishing a 'closed-loop' resources flow, thus avoiding landfill.



## Kingspan Insulated Panels Sustainability Vision

It is the long-term interests of business to act responsibly towards the environment and the communities in which Kingspan operate.

Kingspan Insulated Panels is fully committed to developing, researching and investing in environmental standards and practices so as to install a framework for activities, product design, services and decision making that supports sustainable construction.

Kingspan vision is: **“To be a global leader in sustainable business and establish a leading position in providing sustainable, renewable and affordable best practice solutions for the construction sector”**

### Kingspan ECOsafe Insulated Panels

- Specific Kingspan ECOsafe insulated panels are independently audited and certified by the BRE as Green Guide ‘A’ Rated (within the highest performing specification section of the Green Guide to Specification).
- Kingspan ECOsafe insulated panels are the result of extensive research and development work to provide an optimised and sustainable solution for our customers.
- All Kingspan ECOsafe insulated panels have a low GWP (Global Warming Potential) and help to deliver optimum performance in environmental assessment methods such as BREEAM.

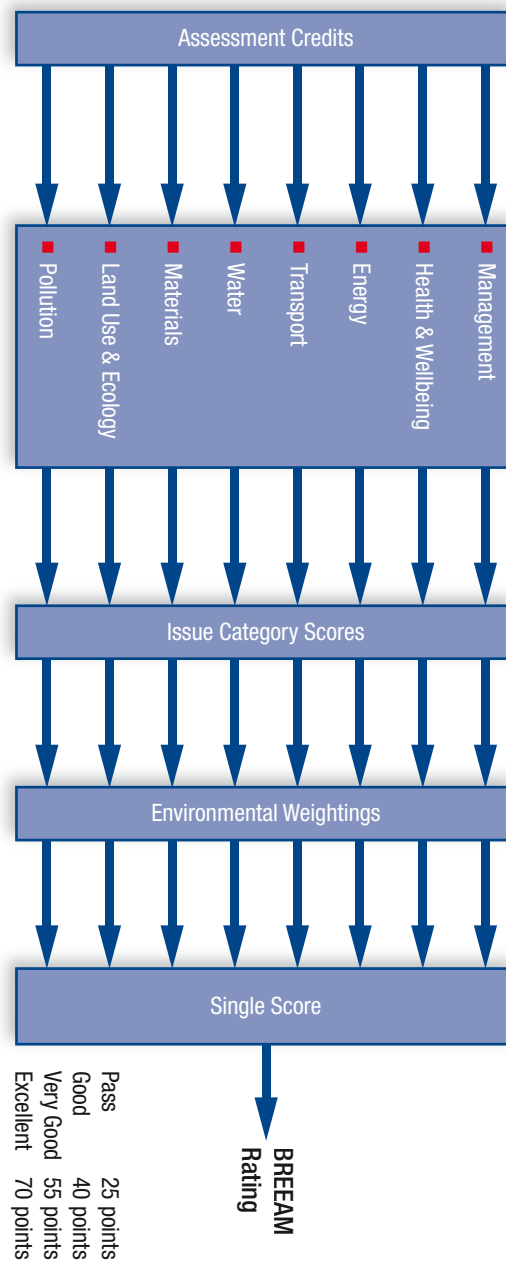
### Kingspan ECOsafe Insulated Panels & BREEAM

The Building Research Establishment (BRE) Group is a world leading research, consultancy, training, testing and certification organisation delivering sustainability and innovation across the built environment and beyond.

The BRE Environmental Assessment Method (BREEAM) is the world’s longest established and most widely used environmental assessment method for buildings. It sets the standards for best practice in sustainable development and measures achievement created by BRE in 1988. Current BREEAM schemes include offices, retail, industrial, schools, courts, prison accommodation, multiresidential, hospitals, homes (Ecohomes), existing housing portfolios (EcoHomesXB) and bespoke buildings.

#### BREEAM Credits & Kingspan

All Kingspan insulated panels qualify for additional credits in BREEAM schemes. BREEAM schemes use a scoring system to deliver an overall building rating of Pass, Good, Very Good or Excellent depending on credits scored.



## Kingspan Insulated Panels Sustainability Objectives

### Kingspan Insulated Panels Long-term Sustainability Objectives

Kingspan Insulated Panels aims to adopt and apply best practice sustainability principles by ensuring environmental, social and economic parameters are considered in an integrated way in product and service delivery.

#### ■ Sustainable Product Stewardship

Ensure sustainability is considered in the design and manufacture, and promoted in the installation, use and disposal of Kingspan Insulated Panel's products and services.

#### ■ Carbon Management

Measure and actively reduce Kingspan Insulated Panels' carbon footprint with the long-term aim of going beyond carbon neutrality.

#### ■ Optimise use of Resources

Minimise waste, harmful emissions and water usage associated with the manufacture, distribution and, where possible, the end-of-life management of Kingspan Insulated Panel's products and services.

#### ■ Sustainable Building Design

Consider best practice sustainable building design when constructing or refurbishing Kingspan Insulated Panel's manufacturing facilities and ensure the sustainable management of all sites used by Kingspan Insulated Panels.

#### ■ Ethical Procurement & Supply Chain Management

Develop an ethical procurement strategy for procuring materials and services. Engage with prioritised suppliers and contractors to ensure that they operate to similar sustainability standards and seek to build long term relationships with key suppliers and contractors.

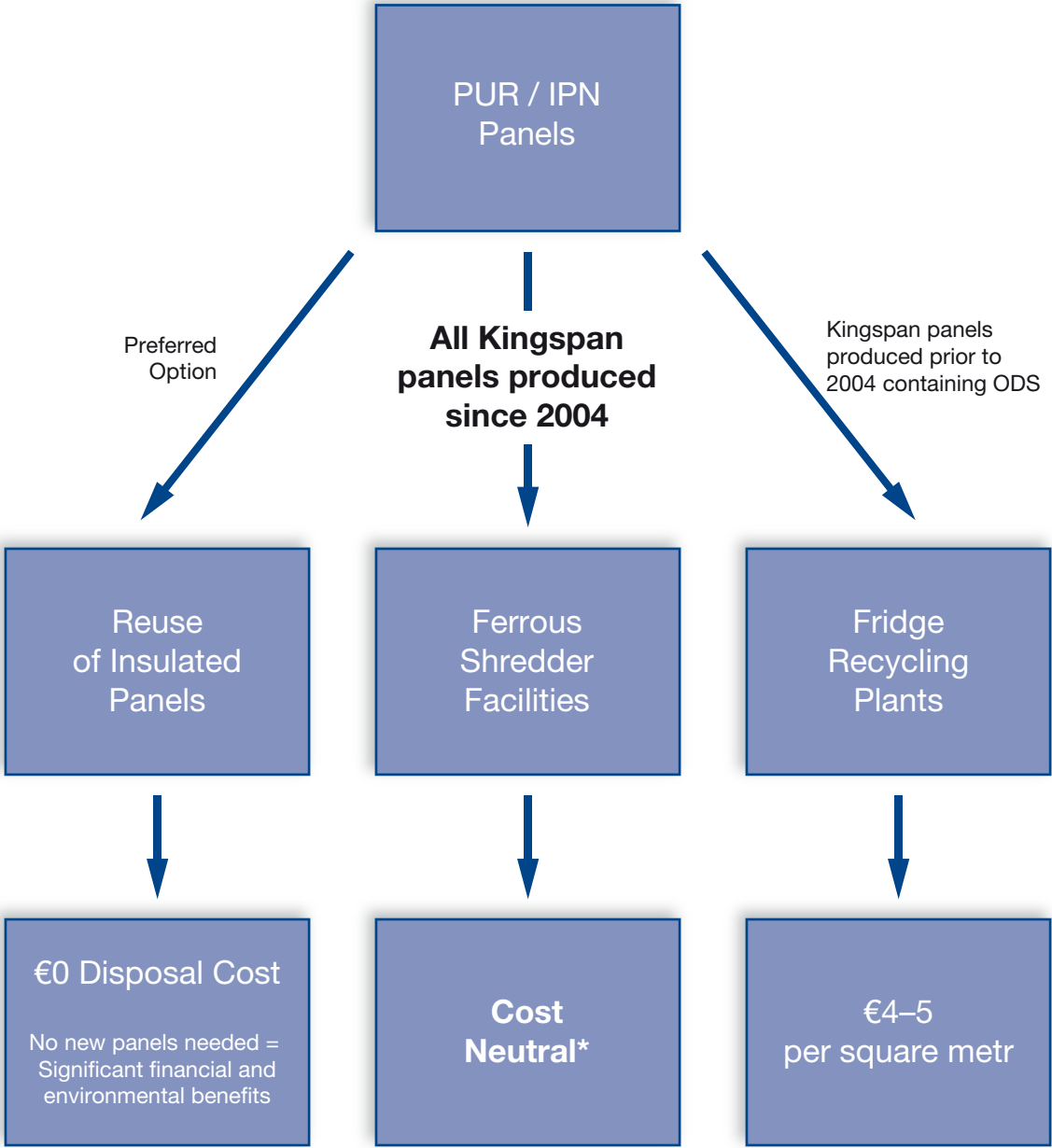
#### ■ Stakeholder Engagement

Engage key stakeholders in Kingspan Insulated Panel's Sustainability Strategy and ensure our employees are fully involved in helping deliver the Sustainability Policy.

#### ■ Social Responsibility

Support Kingspan Insulated Panel's employees and uphold our corporate social responsibility to the communities in which we do business.







Kingspan Insulated panels are manufactured in state-of-the-art facilities under a quality system which meets the requirements of ISO 9001:2000, ensuring long term reliability and service life. Our goal is to not only meet the requirements of this standard, but to be ahead of it.

In order to provide our customers with products of high quality, all used products have to comply with the legal standards like the European Standard EN 14509 and must be labeled with the CE-Mark. It simply confirms that the product meets the requirements of the EN 14509.

The new European standard EN 14509 for self-supporting double skin metal faced insulating panels – Factory made products – Specifications was published recently. It is the regulating standard for composite panels within Europe.

The EN 14509 specifies requirements for factory made composite panels for following applications:

- Roofs and roof cladding
- External walls and wall cladding
- Walls (including partitions) and ceilings within the building envelope

The used materials have to be tested according to the test methods as described in the EN 14509. All materials have to meet the requirements stated in the standard, as there were:

- Mechanical properties of a face
- Mechanical properties of a panel and its core material:
  - Shear strength and modulus
  - Compressive strength and modulus
  - Reduced shear strength
  - Cross panel tensile strength (and modulus)
  - Bending moment capacity and wrinkling stress
  - Bending moment over a central support
  - Creep coefficient
  - Cross panel tensile modulus at elevated temperatures
- Density
- Thermal transmittance
- Durability
- Reaction to fire
- Fire resistance
- External fire performance – roofs
- Water permeability
- Air permeability
- Airborne sound insulation
- Sound absorption
- Dimensional tolerances

The CE-Mark is a legally demanded proof of conformity and indicates that the labeled products meet the requirements according to the EN 14509. The CE-Mark contains information regarding the manufacturer, the name of the product and its properties. It should be affixed on every package which is delivered to the customer. When distributing products within the EU it is a must that goods are labeled with the CE-Mark.

The manufacturer of the composite panels is responsible that the required values in the EN 14509 are achieved. The CE-Mark is the confirmation that the composite panels were produced according to EN 14509 and that the properties of the used materials are matching these requirements.



Kingspan Kereskedelmi Kft., Horka dűlő 1, 2367 Ujhartyan

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Metal faced insulating panel for use in buildings

Reference	KS1150 TF	Wrinkling stress (external face)	
Insulation	IPN	- in span	187 Mpa
Density	38–45 kg/m <sup>3</sup>	- in span, elevated temperature	168 Mpa
Thickness	100 mm	- at central support	150 Mpa
Facing: Steel EN 10326		- at central support, elevated temperature	135 Mpa
external	0.5 mm	Wrinkling stress (internal face)	
internal	0.4 mm	- in span	149 Mpa
Steel grade	S280 GD	- at central support	130
Profilation		Reaction to fire	B-s1, d0
external	M		Details in technical guide and assembly conditions
internal	I		
Coating		Fire resistance	
external	PES, PVC, PVDF, PUR	Roofs	N/A
internal	PES, PVC, PVDF, PUR	External walls	EI20-ef (o→i), EW15 (i→o), EI15
Mass	13.50 kg/m <sup>2</sup>	Internal walls	NPD
Use:		Ceilings	NPD
Roofs	N/A		Details in technical guide and assembly conditions
External walls	YES	External fire performance	N/A
Internal walls	YES		N/A
Ceilings	YES		N/A
Thermal transmittance	0.2 W/m <sup>2</sup> K	Water permeability	NPD
Mechanical resistance		Water vapour permeability	Impermeable
Tensile strength	0.06 MPa	Air permeability	NPD m <sup>3</sup> /m <sup>2</sup> h
Shear strength	0.14 MPa	Aurborne sound insulation	26 (-3;-4) dB
Reduced long term shear strength	0.06 MPa	Sound absorption	NPD
Shear modulus (core)	3.65 MPa	Durability	N/A
Compressive strength (core)	0.10 MPa	Resistance to point and access loads	Suitable for repeated access without additional protection
Creep coefficient t = 2,000 h	2		
Creep coefficient t = 100,000 h	7		
Bending resistance in the span			
+ve bending	9.75 kNm/m		
+ve bending, elevated temperature	8.76 kNm/m		
-ve bending	6.08 kNm/m		
-ve bending, elevated temperature	6.08 kNm/m		

Example for CE marking

# Material Specifications

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## Coloured Coated Steel

The construction industry is supported by the manufacture of high quality, competitive products and by expert technical service. Our service and quality commitment is based on a policy of working closely with our customers, applying quality assurance practices to all our activities, and achieving technical excellence through research, product development and capital investment.

The extensive range of plastic coated steels available is a product of that commitment.

## Steel as a Profile Material

Steel, with its combination of flexibility, durability, strength-to-weight ratio and economy, is an ideal material for profiled cladding. To avoid the rapid corrosion of steel, a metal coating can be applied to protect it from moisture and oxygen. Such coatings need to be sufficiently impermeable, tough, abrasion resistant and must bond strongly to the surface they are required to protect.

Coating steel with a zinc layer is called galvanization. There are many variants of galvanizing which can involve zinc alloys rather than pure zinc.

Zinc coatings have excellent corrosion protection, because they protect the steel in two ways:

- with a barrier effect
- by cathodic protection

## Barrier effect

The barrier effect is achieved by physically sealing off the steel surface with a coating with better corrosion resistance. The zinc layer itself forms a self-protecting film off airily impermeable corrosion products such as zinc oxide. This protects the steel (and the zinc) from the harmful affects of oxygen, corrosive gases and liquids in the atmosphere.

## Cathodic protection

The second principle is cathodic protection. If the zinc coating is damaged (by weathering, pores, cracks, scratches, cut edges), then the anodic nature of zinc becomes effective in providing protection.

Since zinc has a lower chemical potential than iron, the zinc will be attacked and dissolved first. The zinc dissolve to form zinc hydroxides and zinc oxides (white rust), which unlike iron oxides (red rust) form a protective layer, which slows down the corrosion process.

## Options for galvanic protection

### Galvalloy

Galvalloy is strip steel which has been hot-dip coated with a 255 g/m<sup>2</sup> eutectic alloy comprising approximately 95% zinc with 5% aluminium, combined with other elements, to EN 10214:1995.

### Hot-dip zinc

Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – polyester, PVDF, Plastisol and Plastisol Foodsafe.

### Galvatite

Galvatite is hot-dip zinc coated steel to EN 10147:2000 with a standard minimum coating mass of 275 g/m<sup>2</sup>.

A structural grade of steel with a guaranteed minimum yield strength of 280 N/mm<sup>2</sup> is used for all products.

Substrate designations are:

Galvalloy – S280 GD+ZA according to EN 10214

Galvatite – S280 GD+Z according to EN 10147

## Coated Products

The customer can be certain that each coating system has been comprehensively tested and evaluated in the extensive research and development facilities of our suppliers. These finishes have been developed over many years for a variety of applications, and therefore have different performance characteristics. The descriptions that follow are aimed at distinguishing these differences.

Coated products for exterior roofing and cladding are composed of a galvanised steel substrate which is then treated/primed on both sides. Different proprietary topcoats are then applied to the weather side and to the reverse side (commonly referred to as the back-coat). Different galvanising systems and coating products are used for different applications.

## Roofing & Cladding Products

Potential specifiers and users of these products should refer to the exterior coatings table on next page for typical properties.

## Coloured Coated Steel

### Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics. Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours. Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

### PVDF

PVDF offers unequalled colour and gloss retention because of its exceptional UV resistance. The coating thickness is typically 25–35 µm and it offers good corrosion resistance. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

### Polyester

Polyester is a universal, economic coating system suitable for exterior and interior applications. For interior applications, the coating thickness is typically 15 µm, and for exterior applications, 25 µm.

### 200 Micron Plastisol

200 micron Plastisol is a 200 µm (nominal thickness) high performance plastisol coating system with leather grain finish. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore a very high scratch resistance.

## Coated Steel Coil

### Typical Properties of Exterior Coatings

Coating	Nominal Thickness [µm]	Gloss [60°]	Pencil, Hardness	Clemen Scratch Resistance [kg]	Adhesion of the coating [T-bend]	Resistance to cracking on bending [T-bend]	Impact resistance [J]	Corrosion resistance		UV resistance category
								Salt spray test [h]	Corrosion resistance category	
Polyester	25	30 GU	HB-H	≥ 2 kg	≤ 2T	≤ 3T	18	360	RC3	RUV2
Plastisol	200	N/A	4–6 B	–	≤ 1T	≤ 3T	very good	1000	RC4	RUV2
PVDF25	25	30 GU	HB-H	–	≤ 1T	≤ 2T	18	360	RC3	RUV4
PVDF35	35	30 GU	HB-H	≥ 2 kg	≤ 1T	≤ 2T	18	500	RC4	RUV4
Spectrum™	60	30 GU	F-H	≥ 3 kg	≤ 1T	≤ 1.5T	18	700	RC5	RUV4

Notes: The figures contained in this table are typical properties and do not constitute a specification.

### Test Specification for Exterior

Nominal thickness	EN 13523-1
Gloss	EN 13523-2
Pencil hardness	EN 13523-4
Scratch resistance	EN 13523-12
Taber abrasion	EN 13523-16
Flexibility: Minimum bend diameter	EN 13523-7
Impact resistance	EN 13523-5
Corrosion resistance: Salt spray	EN 13523-8
Corrosion resistance	EN 10169-2
UV resistance	EN 13523-10

## Coloured Coated Steel

### Products for Food Processing Plants and Cold Stores

Food processing plants and cold stores have special requirements. They need surfaces which are safe in contact with food and which are easy to clean. Cold stores require good insulation properties. We offer a range of products suitable for cladding the interiors of food processing plants, cold stores, and other areas where contact with food is likely. These products are:

- Stelvetite Foodsafe
- Satin Plastisol
- Smooth Polyester
- Textured Polyester

All these products have a white finish. Consult Kingspan about the availability of other colours.

The exposed or working surfaces of these products are non-toxic and resistant to both pink and black mould, as well as being attractive, durable and easy to clean. The Stelvetite Foodsafe surface is chemically inert and is safe for continuous contact with unpacked foodstuff.

These products have a grey polyester back-coat suitable for bonding to the insulation foam. This allows them to be used for the manufacture of insulated panels. Subject to minimum order requirements, other back-coat systems may be available. Whichever back-coat is specified, the user should check with suppliers to ensure that the backcoat, the foam, and adhesive are compatible. The coating system for the exposed surface of an insulated panel should be selected according to the internal environment.

The steel substrate used on these products is Galvatite hot-dip zinc coated steel to EN 10142:1991 (Fe P02 G quality) with a total zinc coating of 275 g/m<sup>2</sup>. These products are not suitable for use outdoors.

#### Availability

The very large number of colours and coating systems in the product range may mean that not all of them are held in stock at one time by the supply chain. Early consultation with the supplier is the best way to ensure that the material selected will be available at the required time.





## Rigid Urethane Insulation Core

### Introduction

Rigid urethane insulation has been used in the building and construction industries since the 1950's. Over the past 45 years, in excess of 500 million square metres of insulated panels have been manufactured by the continuous lamination process and have been successfully used in roof and wall cladding applications worldwide.

The superior long term performance of metal faced insulated panels with rigid urethane cores is now widely recognised by building investors and designers when compared with site assembled, multi-part, built-up cladding systems. This has resulted in significant growth for this type of construction system.

The main reasons for this growth are:

- Increasingly stringent building regulations, which in many countries require the use of insulation to comply with energy efficiency and CO<sub>2</sub> emission targets.
- The rising cost of fuel and energy. Effective thermal insulation can reduce HVAC/heating costs by up to 40% wherever it is installed.
- The environmental cost of energy production is also a factor which now needs to be considered. The burning of fossil fuels for energy production is estimated to contribute 80% of the world's CO<sub>2</sub> emissions. These green-house gases contribute to the problem of global warming, and so the conservation of energy is the most direct and cheap way to reduce CO<sub>2</sub> emissions and thus control global warming.
- Industry experts estimate that worldwide insulation of buildings to optimum standards could reduce global energy requirements by more than 10%.
- Rapid site assembly and early completion of a building project is demanded by investors and insulated sandwich panels provide 'single fix' fast on-site installation.
- Investors require superior specification, low maintenance and long-term product performance.

### Thermal Performance

Rigid urethane insulation has one of the lowest thermal conductivity ratings of any insulant. This makes the retention of heat more efficient, and facilitates the effective maintenance of a temperature controlled environment such as a chill store.

The matrix of the insulation core has a closed cell structure that guarantees reliable thermal performance over the lifetime of the building.

### Environmental

#### Non-Deleterious

The rigid urethane insulation core used by Kingspan is CFC and HCFC free which fully complies with the Montreal and Kyoto Ozone Depletion Summit Protocols. Kingspan rigid urethane insulation cores can therefore be termed as 'non-deleterious'.

In health terms, the products are fully cured thermoset (cross-linked) polymers which, under normal conditions, do not emit noxious fumes and are safe to handle. In environmental terms, the products do not emit damaging gases nor do they leach into the environment during their lifetime. Being some of the most efficient insulants available to the construction industry, they actively contribute to the saving of energy and through this save significant amounts carbon dioxide emission.

### Strength

Rigid urethane insulation provides a high level of compression and shear strength, which are essential requirements for insulated sandwich panels.

### Ageing

Insulation panels faced with impermeable materials such as steel shows minimal change to the thermal conductivity of the insulant over the life of the installed cladding system.

### Water Absorption

The water vapour permeability of rigid urethane insulation is very low due to its closed cell structure. Permeability is further reduced by the metal skin of a panel which acts as a moisture barrier.

### Fire Performance

See Building Design Section for detailed fire performance information.

Like all organic building materials – wood, paper, plastics, paints – rigid urethane insulation is combustible, although its ignitability and rate of burn depend largely on the fire resistance properties of the material used to skin the panels.

The most effective fire resistance can be obtained using a fire rated rigid urethane insulation. By careful blending the urethane with certain additives, it is possible to formulate rigid urethane systems that achieve the fire standards required by National Regulations and the more demanding requirements of the insurance industry.

## Rigid Urethane Insulation Core

There is a constant drive from insurers and building owners to improve the performance of fire rated roof and wall panel systems. In response to this Kingspan has developed, tested and obtained approval for a wide range of fire rated products for roof and wall application. Insulated panels with fire rated cores have performed well in actual fires and do not contribute significantly to the fire load in the building. They have an excellent track record as roof and wall cladding systems with over 45 years of history. Tests carried out in the UK, Germany, France and the USA all conclude that well designed fire rated insulated sandwich panels have excellent fire resistant properties

Kingspan can supply **FIREsafe™** specification products approved by/to the following building norms, certification authorities and insurers;

### Building Norm Compliance Certification

- Czech Republic
- Slovakia
- Poland
- Hungary
- Germany
- Holland & Belgium
- UK
- Republic of Ireland

### Property Insurer Approvals

- Loss Prevention Certification Board (LPCB)
- FM Global (FM)

### Adhesion to the Panel Skin

During the time between mixing and the achievement of its final cured state, rigid urethane insulation is extremely adhesive, which allows it to bond effectively to a wide range of insulated panel skins. The adhesion is so strong that the bond strength can be higher than the tensile or shear strength of the insulation itself.

### Weight

The light weight of rigid urethane sandwich panels is an important contribution to the achievement of lighter and cheaper building structures due to the lower dead loads. Site assembly is also faster and incurs lower cost due to ease of handling. And transport costs are kept to a minimum because of lower product volume and increased load utilisation.

## Chemical Resistance

Rigid urethane insulation provides excellent resistance to attack from a wide range of chemicals, solvents, and oils.

## Biological Resistance

Rigid urethane insulation does not support fungal growth and is immune from attack by mould, mildew and vermin infestation. This is essential for hygiene applications.

## Manufacture

Rigid urethane insulated sandwich panels are manufactured under quality controlled conditions to the highest ISO quality standards prior to delivery to the construction site. This guarantees a superior installed cladding system with long term performance.

## CFC & HCFC Removal

Kingspan has developed and manufacture zero ozone depletion-potential (ODP) IPN insulated panel systems.



## Rigid IPN Insulation Core

IPN is the abbreviation for “Isophenic”, Kingspan’s unique high grade index Polyisocyanurate (PIR) insulation material.

Like PUR, IPN belongs to the same generic family of thermosetting materials. IPN has a special polymer structure which gives improved fire performance compared to PUR. Kingspan IPN uses a unique formulation that gives a highly fire resistant product which is capable of passing insurance industry tests such as from LPCB and FM Global.

## Non-Deleterious Specification

### Rigid IPN Insulation – A Commentary

#### Non-deleterious – A Definition

“Deleterious (adj) – hurtful or destructive; destructive; poisonous (from the Greek ; deleterious).” Chambers Twentieth Century Dictionary.

Kingspan IPN rigid urethane insulation cannot be classified as deleterious and should be termed as ‘nondeleterious’.

In health terms, the products are fully cured thermoset (crossed-linked) polymers which, under normal conditions of use and temperatures, do not emit noxious fumes and are safe to handle<sup>1</sup>.

In environmental terms, the products do not emit damaging gases nor do they leach into the environment during their lifetime<sup>2</sup>. Being some of the most efficient insulants available for construction use, they actively contribute to the saving of energy, fossil fuels and, therefore, large scale carbon dioxide emission and global warming. A modern approach to assessing this is the Total Equivalent Warming Impact (TEWI), and it can be readily demonstrated that during the average lifetime of construction products, the net effect is very positive, including all energy involved in raw material production, fabrication, and disposal of the insulants<sup>3</sup>.

Kingspan rigid urethane insulants consist of numerous tiny closed cells bound together. These contain a gas trapped in the cells which assists the insulation value of the products. This gas remains within the cell during the lifetime of the products<sup>4</sup>, and can be recovered or completely incinerated at the end of the useful life of the product if requested<sup>5</sup>. Following the Montreal Protocol in 1987 regulating the production and use of Chlorofluoro Carbons (CFC’s) and Hydro Chlorofluoro Carbons (HCFC’s), which products had been implicated in deterioration of the stratospheric ozone layer, these gases are no longer used in Kingspan rigid insulants. All Kingspan products now use blowing agents that have an Ozone Depletion Potential of Zero (Zero ODP).

#### References:

1. Buist, J.M. & Hurd, R. “Polyurethane Foams: The Contribution to Heat Insulation” The proceeding of the Institute of Refrigeration, Vol. LVI, (1959–60)

2. Martens, R & Domsch, K.H., Water, Air & Soil Pollution, 15, (1981), 503.
3. AFEAS/DOE “Energy and Global warming Impacts of CFC Alternative Technologies” (1991)
4. Ball G.W., Simpson A. & Fleming H., Cellular Polymers (16)2, (1997), 110.
5. Vehlow, J., Jay, K., Rittmeyer, C., & Stieglitz, L., Third International Conference on Municipal Waste Combustion, Williamsburg, VA, (March 30–April 2, 1993)

## Energy Efficiency and Pay Back

The energy saving contribution of rigid urethane IPN insulation is a very positive factor, as the fuel saved by insulation is many times greater than the fuel cost of producing the material initially. This can be demonstrated by the following example:

It takes 5 kg of oil to produce 1 square metre of IPN wall insulation at 40 mm thickness. Over a 50 year building life the insulation will save 230 kg of heating oil, so it has repaid its original cost by a factor of 46. Working to this principle rigid urethane IPN insulation, with one of the lowest thermal conductivity values offers the greatest potential for energy saving.

## Conclusion

Rigid urethane insulation therefore emerges as a unique material, which is perfectly suited for the insulating core of building panels.

It combines strength with a very low thermal conductivity, and its ability to bond itself to facing materials during the production process makes it ideal for the mass production techniques used today.

Kingspan insulated roof and wall systems, preengineered in this way, provide a durable, economic, ‘fit for purpose’ roof or wall cladding solution.

## Mineral Fibre Insulation Core

### Introduction

Mineral wool insulant actually comprises mineral rock fibres bonded together with varying proportions of thermo setting resins to form the insulant materials, which can be used for insulating sandwich panels.

### Processing

Mineral fibre is manufactured by melting diabase volcanic rock with other raw materials at 1,500 °C. In the furnace the diabase stones are mixed with coke and ed mineral fibre waste. The liquid stone 'lava' is then converted into fibres in a spinning chamber and at the same time a water-repellent impregnating oil and binder are added. The binder is then cured in an oven creating a dimensionally stable insulation matrix.

### Environmental Performance

Mineral fibre insulation is chemically inert and does not encourage the growth of fungi, moulds or bacteria. The resin which binds the mineral fibre, can be considered as an insoluble plastic which will remain unchanged for at least a century.

Life Cycle Phase	Range of Energy Consumed (MJ/kg)*
Mining and production of raw materials	0.62 to 1.25
Production of bonding agent	1.30 to 4.10
Manufacture	11.30 to 21.92
Transport	0.35 to 0.51
<b>Total</b>	<b>13.57 to 27.28</b>

\* Information submitted to the European Commission by the Danish Environmental Protection Agency. dk-TEKNIK, Thermal insulation products for walls and roofs, Impact assessment for eco labelling.

H.K. Stranddorf, A. Schmidt, L.E. Hansen, A.A. Jensen, M. Thorsen, April 1995.



## Polycarbonate (PC)

Polycarbonate profiles are extruded from polycarbonate resin and offer an extremely high impact resistance compared to traditional transparent glazing materials like glass and acrylic sheets. Furthermore this impact strength remains unchanged in a very wide temperature range. Indeed will keep high impact values from  $-40^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$ .

Compared to glass and PMMA sheet, polycarbonate is very ductile and does not break sharply, but deforms gradually instead under load and absorbs the impact energy.

A major requirement for rooflights is the hail resistance. Polycarbonate rooflights offers increased hail resistance properties compared to other rooflight materials.

### UV resistance

Polycarbonate is protected on both sides by a coextruded layer against the deteriorating effects of the UV fraction of the sunlight. Ultraviolet sunrays are responsible for early ageing effects on other building materials, what results in results yellowing, loss in light transmission and impact strength.

### Light Transmission

Polycarbonate has excellent light transmission, allowing to take advantage of natural light conditions in buildings. The opalescent colours are designed to control the natural light transmission in order to reduce the heating of the building interior in warm climates or sunny days. The opalescent sheet has a special light diffusion additive that spreads the light and guarantees optimal light conditions in any corner of the building without any shadows.

The control of the solar energy is an important requirement in modern buildings. Specific products and colours reduce considerably the solar heating and improve the interior comfort.

### Thermal and acoustic performance

Thermal insulation is a major requirement for energy saving in buildings. Polycarbonate sheet offers significant advantages compared to mono layer glazing materials.

The hollow structure reduces significantly the heat losses in roofing or glazing applications. The hollow structure of the sheet offers advantages compared to mono layer glazing materials in respect of sound reduction.

## GRP (Glass Reinforced Polyester)

GRP consists of thermosetting polyester resin, usually reinforced with 25 to 35 weight per cent glass fibres. It is a material with unique properties, offering a high degree of flexibility. GRP can easily be tooled, moulded and manufactured to meet almost any design specifications. Compared to other rooflight building materials, GRP indicates low expansion properties and excellent dimensional stability under mechanical and environmental stresses. Furthermore its offers excellent acoustic properties.

### Weather resistance

GRP is non-corrosive and has a much longer life expectancy when compared to a variety of construction materials. Fibreglass provides resistance to ultra violent light, extreme temperatures, salt air, and a variety of chemicals including most acids. GRP is chemically inert and corrosion-resistant.

The weather and water resistance of GRP is largely a function of the gel coat, which is exposed to attack. For optimum chemical resistance combined with high structural performance a resin rich surface is obtained on the face of the moulding, which is exposed to the hostile environment.

### Strength & Durability

GRP has high strength to weight ratio and high flexural strength.

### Light Transmission

Light transmission through a rooflight from GRP is typically lower than polycarbonate. GRP sheets will generally give diffused light, with little glare. Polycarbonate is clearer, and more likely to increase glare and higher solar gain. Light transmission decreased due to the presence of matrix microcracks and interface debonding.



## Fasteners

### Introduction

Primary fasteners hold the insulated panels to the building frame, and secondary fasteners join panels to each other, and to flashings etc. The fasteners are therefore an integral part of the building, and their strength, weather proofing, durability, and appearance must be carefully considered as part of the overall design.

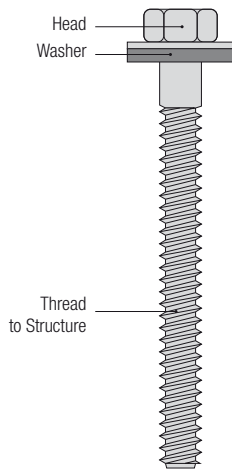
The following general notes explain the various fasteners which are used with Kingspan Insulated Panels.

Specific references from SFS Intec and EJOT fasteners are within the relevant roof or wall sections.

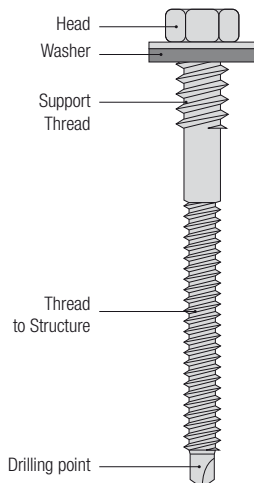
### Primary Fasteners

These fasteners are specially designed to drill through the panel, self tap into the framework, and finally seal the outer sheet

#### Self Tapping Fastener



#### Self Drilling Fastener



This is achieved in one fast operation using a screwgun with a depth sensing nose piece. Various accessories for these tools are available from the fastener manufacturers.

Fasteners are manufactured to suit the many materials and constructions in common use.

The variations include:

- They may be made from high quality carbon steel or austenitic stainless steel.
- The drill point alters for drilling into different materials and thicknesses.
- The self tapping thread can vary with the type and thickness of material.

- The overall fastener length will vary depending on the thickness of the panel being fixed.
- For through fixed panels the fasteners have a secondary support thread directly under the head to withstand superimposed loads caused by foot traffic and snow. This also draws the outer skin tightly up to the washer, thus ensuring a weatherproof seal.
- The sealing washer may vary in size and material, for fixing roof, wall, or rooflights. Carbon steel, stainless steel, and aluminium washers are used in conjunction with EPDM seals.
- The fastener head may be coated metal, coated metal covered with a push-on plastic cap, or it may have an integral coloured head.

### Secondary Fasteners

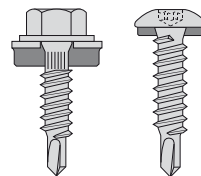
These are the fasteners which join sheet to sheet, flashing to sheet, or flashing to flashing. The main types used are stitching screws or rivets.

Stitching screws self drill and tap, draw the sheets together, and finally seal, in one operation, in the same way as the primary fasteners. They are available in high quality carbon steel and austenitic stainless steel, and in several head forms to suit the various materials being fastened.

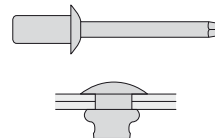
Rivets are made from aluminium alloy and are installed in a two stage operation which involves drilling a hole through the two components, pushing the rivet into the hole and setting it with a rivetting tool. This tool draws the mandrel through the rivet body and deforms it so that it grips the materials together, until it finally breaks.

Other blind fasteners are used for special applications, such as the side laps of rooflights, where normal pop rivets and stitchers are unsuitable. These larger fasteners come in several forms, some require a rivetting tool and others use a bolt to pull an EPDM grommet up to the underside of the sheet.

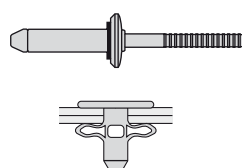
#### Stitching Screws



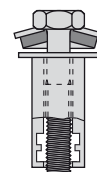
#### Blind Rivets



#### Blind Fasteners (Bulb-tite)



#### Roof/skylight Fasteners (Lap-lox)



## Fasteners

### Installation and Weathering

Self drilling/tapping fasteners can be supplied with a sealing washer which is designed to prevent water ingress into the building through the fixing point. To be sure of optimum performance it is important to install the fasteners correctly.

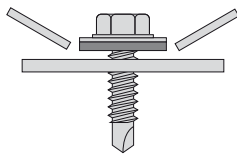
The fasteners and washers are designed to be driven so that the washer is compressed evenly, giving the appearance shown. The screwgun is fitted with an adjustable, depth sensitive nose piece which can be set to disengage the clutch when the fastener has been installed correctly.

### Strength

The Primary fasteners hold the panels in place on the building and must be strong enough to resist the applied loads. In practice the most important load for fasteners is often wind suction which is trying to pull the panels off the building frame. In these circumstances ultimate failure of the fixing can happen in three possible ways:

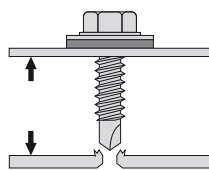
#### 1. Pull Over

The outer skin of the panel deforms around the head and washer of the fastener until the hole is large enough for the panel to pull over, leaving the entire fastener in place.



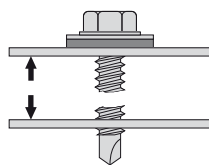
#### 2. Pull Out

The fastener pulls out of the purlin/rail due to wind suction.



#### 3. Fastener Tensile Failure

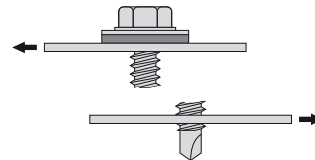
The fastener breaks in tension, part way down its length, leaving part of the thread in the frame. Permissible tensile load on a 5.5 mm diameter carbon or stainless steel fastener is 6.0 kN. \*



#### 4. Shear

Another mode of failure, not associated with wind loading, is shear. In this case the panel moves across the face of the purlin/rail and effectively cuts or shears the fastener.

It is possible that the fastener would severely damage panel facings before failure occurs.



Permissible shear load for 5.5 mm diameter carbon or stainless steel fasteners is 3.9 kN. \* In some cases it may be the fastener strength which limits the permissible span of the insulated panels, particularly near junctions on the building, where wind suction forces are high.

\* A load factor of 2 has been used generally to indicate permissible load.

*For detailed data of Pull Over and Pull Out permissible loads please contact Manufacturer Technical Department.*



## Fasteners

### Durability and Appearance

The ultimate life expectancy of the fasteners depends on their corrosion rate which can be affected by their material specification, the internal and external environments, and the construction of the building. However there may be appearance or performance problems long before ultimate failure occurs. These may be due to leakage at washers, rust staining, or faded/missing colour caps.

Corrosion can occur if there is moisture on the fastener. The rate of corrosion will depend on the fastener material, its coating, the materials being fixed, how long the moisture is present, corrosive elements and the ambient temperature of the environment.

From the above it is clearly difficult to make general predictions about the life expectancy of fasteners, however a number of statements can be made:

1. Coated carbon steel fasteners have performed satisfactorily on roofs and walls of insulated buildings in urban non-polluted atmospheres for a period of 10 years, and therefore, depending upon the conditions, may be used where warranties up to a maximum of 10 years are required.
2. The life expectancy of an austenitic stainless steel fastener on the same buildings would be at least 25 years and would be suitable for warranties exceeding 10 years.
3. Separate snap-on plastic colour caps may come off over time, but integral colour heads will not. The following table shows the minimum life expectancy, and maximum warranty period, in years for fasteners in a number of environments.

Fastener	Urban	Rural	Industrial	Marine
Carbon steel Separate cap	10	10	N/R	N/R
Carbon steel Integral head	15	15	15	N/R
Austenitic Stainless steel	25	25	25	25

N/R: Not Recommended

The fastener recommendations for SFS Intec and EJOT and Mage products have been tabulated and are in the relevant roof and wall sections. Where carbon steel fasteners are indicated, austenitic stainless steel could be used instead to provide long term durability.

\*) On projects which are supported by a Kingspan product warranty in excess of 10 years it is a strict requirement that austenitic stainless steel fasteners from the manufacturers listed below are specified and used throughout.

In situations where there is industrial or marine pollution, or internally there are chemical or wet processes (i.e. swimming pools), the fastener manufacturer should be consulted.

For further information about any of the fasteners please contact manufacturer's technical department.

**Note:** Other fastener manufacturers products can be used provided they are of equal specification and performance of those stated above and with the approval of Kingspan.

### Fastener Selector Guides

To assist designers, Fastener Selector Guides are available from each fastener manufacturer which clearly identify fastener references suggested for various building applications and panel types.

#### Building Classifications

The following Building Classifications are used in each Fastener Selector Guide:

1. Standard Environment  
For normal factory or general use buildings, where the occupants or processes do not add significant quantities of water vapour to the air.
2. High Humidity  
For buildings containing large areas of open water, or where water is used as part of a process, e.g. Swimming pools, laundries, paper processing etc.
3. Low temperature  
For buildings where the internal temperature is often below the external temperature (but not less than 4 °C), e.g. Chill stores, ice rinks etc.
4. Temperature Controlled  
For buildings where the internal temperature or environment has to be closely controlled, e.g. Laboratories, special manufacturing processes, etc.
5. Hygiene  
For buildings where food is processed or a high level of cleanliness is required, e.g. Food manufacturing/processing, bakeries, electronic component manufacture, pharmaceutical/medical etc.

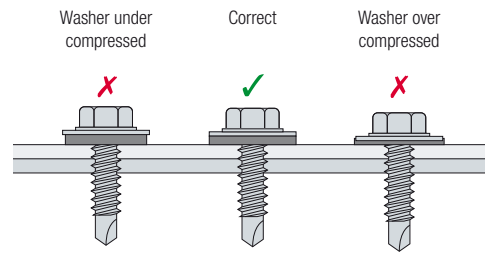
## Fasteners – Sitework Tools and Installation

### Sitework Tools and Installation

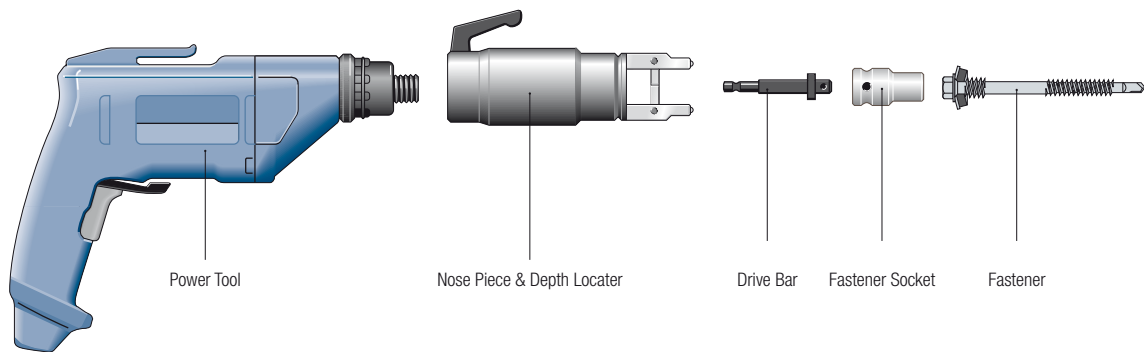
To be sure of optimum performance it is important that purpose designed tooling is used to install the fasteners correctly.

The fasteners and washers are designed to be driven so that the washer is compressed evenly, thus ensuring a weather tight seal. The screwgun must be fitted with an adjustable, depth sensitive nose piece which can be set to disengage the clutch when the fastener has been installed correctly.

### Fastener Installation Method

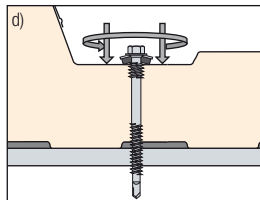
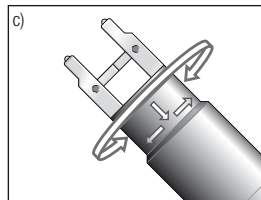
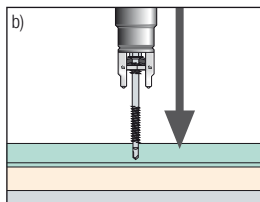
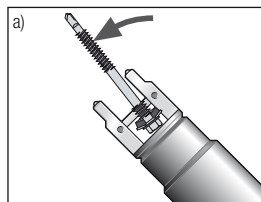
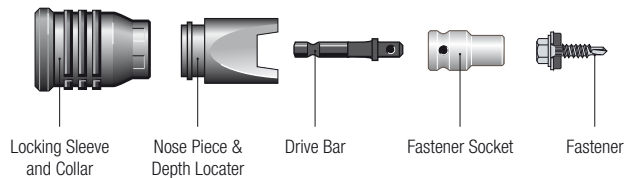


### Tools Required for Primary Fasteners



### Tools Required for Secondary Fasteners

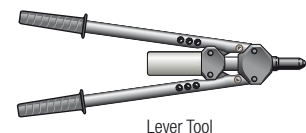
The following accessories can also be used with the standard power tool as above



- Insert fastener into socket
- Install fastener through panel
- Adjust depth stop to ensure the correct compression of the washer. (This only needs to be done on the first fastener to achieve the correct setting)
- Correct washer compression Correct Installation for Primary and Secondary Fasteners



Battery Operated Rivetting Tool



Lever Tool



Lazy Tong

## Fasteners – Sitework Tools and Installation

### Installation Instructions

It is essential that the self drilling fasteners are installed using the approved power screwdriver equipped with the correct accessories to suit the fastener and application.

### Driving Technique

The power screwdriver must be held perpendicular to the surface of the material being fixed. Apply end load to engage the clutch and maintain this load while the drilling and tapping operation takes place. The drive will disengage when the nosepiece makes contact with the surface of the material being fixed.



Bosch screwgun with depth locator. Code TE1

### Setting Instructions

The depth clutch is adjusted by pulling forward the locking collar and rotating the nosepiece. Screwing the nosepiece forward (counter clockwise) will decrease screwing depth, screwing the nosepiece back (clockwise) will increase screwing depth.

Test drive a fastener into a spare piece of material and make final adjustments to the setting as required.

Always use good site practice when installing self drilling fasteners – wear safety goggles.



## Sealants & Fillers

### Introduction

Sealants are fundamental part of roof and wall cladding specification and installation. They make an important contribution to satisfactory weathering, building physics and durability performance of the cladding envelope. It is therefore vital to specify the correct external and internal sealants and fillers at the desing stage.

### Sealants

Sealants used with Kingspan Insulated Panels can be supplied by different suppliers in following basic physical forms:

#### Preformed foam tapes

PE tapes:

- Main use
- dust seal, windbreak, noise, heat transfer, interruption of electrical cell;

Application

- the surface must be dry, without dust, grease and impurities;
- application temperature from +5 to +50 °C, the same is true for surface temperature of materials;
- temperature resistance from –30 to +85 °C.

Limitations

- limited resistance against UV radiation, not good recovery it is not recommended for contraction joints.

PVC tapes:

Main use

- dust seal, windbreak, damp, noise, vibrations, heat transfer; it has excellent recovery and resistance against UV radiation. It can be also used as water packing when compressed by 30%.

Application

- the surface must be dry, without dust, grease and impurities;
- application temperature from +10 to +45 °C, the same is true for surface temperature of materials;
- temperature resistance –30 to +70 °C.

Limitations

- it is not compatible with polycarbonate.

PU tape expanding, pre-compressed:

Main use

- dust seal, windbreak, damp, noise, vibrations, heat transfer; it has excellent recovery and resistance against UV radiation. It can be used for contraction joints.

Application

- the surface must be dry, without dust, grease and mechanical impurities. The tape is supplied in rolls in pre-compressed condition, after application (unrolling) it will fill the joint (in free condition it will expand up to five times the compressed volume)
- application temperature with no restriction, the same is true for surface temperature of materials;
- temperature resistance –30 to +90 °C.

Limitations

- at lower temperatures expansion is slower and the tape should be moistened with water, e.g. with a spray-gun

PU tape:

Main use

- dust seal, windbreak, damp, direct rain, noise, vibrations, heat transfer; flamability class B1 it has excellent recovery and compression 50%.

Application

- the surface must be dry, without dust, grease and mechanical impurities. The tape is supplied in rolls or spools in two variants self adhesive and non-adhesive.
- application temperature from –30 to +50 °C, the same is true for surface temperature of materials;
- temperature resistance –40 to +100 °C constant, to +120 °C short term

*To optimise sealing performance and minimise water vapour transmission rates all the tapes have to be compressed at least by 30%.*

#### Preformed mastic tapes

Butyl tape:

Main use

- sticking and steam tight packing of sheets, plates, and the like.

Application

- the surface must be dry, without dust, grease and impurities; Apply the tape and press it properly
- application temperature from +5 to +40 °C.
- temperature resistance –40 to +110 °C.

Limitations

- it is not resistant against UV radiation, not so good application at lower and extremely high temperatures, worse resistance to repeated mechanical stress. The tape is not allowed to be heated with flame or air warmer than 90 °C during application or it could be degraded irreversibly!

## Sealants & Fillers

### Gun Grade Sealants

#### Acetoxysilicon sealant

##### Main use

- superior quality in sealing window and door external seals, resistance to UV radiation.

##### Application

- the surface must be dry, free of dust and all dirt.
- application temperature from +5 to +40 °C, the same is true for surface temperature of materials;
- temperature resistance from -40 to +150 °C;

##### Limitations

- at temperature below +5 °C a reduced level of overall reaction should be expected.

#### Neutral Silicon sealant

##### Main use

- sealing of glass and metal windows and connecting joints, for the sealing of joints on parapets, panelling and glass building blocks, resistance to UV radiation. (foodsafes)

##### Application

- the surface must be dry, free of dust and all dirt.
- application temperature from +5 to +40 °C, the same is true for surface temperature of materials;
- temperature resistance from -40 to +150 °C;

##### Limitations

- at temperature below +5 °C a reduced level of overall reaction should be expected.
- Adhesive and Sealing Compound (WÜRTH K+D, Soudaflex 40FC)

##### Main use

- indoor and outdoors, wood and metal construction, the building industry

##### Application

- wide adhesive range especially on surfaces such as bare sheet metal, primer and painted, aluminium, special steel, ABS, glass-fibre, reinforced plastic, PUR-RIM, soft PUR, hard PUR, hard PVC, wood, glass.
- application temperature from +5 to +35 °C
- temperature resistance from -40 to +90 °C
- storage temperature from +10 to +25 °C

##### Limitations

- not suitable for polythene, polypropylene, silicone, PFTE, and softened plastic.

### Canister PU foams

##### Main use

- packing against water, noise, thermal insulation, entry packing, seating of door and window casings.

##### Application

- the surface must be without dust and mechanical impurities; the base should be moistened to improve adhesiveness.
- when joints greater than 5 cm are filled, PU foam should be applied in more layers.
- to secure maximum efficiency the foam must be moistened again after application;
- application temperature from +5 to +25 °C, Winter PU foam from -10 to +25 °C.
- recommended temperature of the dose is approximately 15 °C;
- temperature resistance from -40 to +90 °C
- storage temperature from +5 to +25 °C sealant curing 2 to 3 mm/24 h, not more than 15 mm deep from the side of air humidity impact.

##### Limitations

- it is not resistant against UV radiation and should not be used for steam tight applications.



## Sealants & Fillers

### Sealant Application

During application of any sealing material a detailed Manufacturer's installation instructions must be followed to provide maximum weathering performance of joint detail.

#### Tape Sealants:

On side and end laps the location of sealant tape is as indicated. On shallow roof pitches a double line of sealant should be used or alternatively a U section sealant can be supplied.

All tapes are applied from the roll leaving the backing paper in place to avoid stretching the tape. The paper is removed after the tape is in position. It is important that the tape is fitted properly down the valley sides and across the troughs without stretching.

If this procedure is not followed a good seal is unlikely to be made.

When placing the panels care should be taken to avoid displacing the tape. When fixing the sheets, fasteners must not be over tightened as this could force the sealant out of the joint. In buildings where the internal air has a high humidity or low temperature, e.g. swimming pools or chill stores, the liner side of the panel joint must also be sealed to form a vapour barrier.

When it is not possible to make a butt joint, a backing tape or gap filling foam should first be inserted into the joint, and the sealant is then applied so that it has an adequate bond area on both sides of the joint. Generally this should be at least 6 mm, but in some instances it may have to be varied to accommodate surface profiles etc.

All surfaces must be firm, clean, dry and free from dust, dirt, grease and water to enable the sealant to adhere to them.

The surfaces should preferably be reasonably warm and never below 4°C.

#### Gun-Grade Sealants:

These sealants are normally used to seal around windows and doors, gutters joints, etc.

When sealing window and door frames to the cladding it is best to arrange a butt joint, so that the sealant only bonds to the frame and the cladding. This allows the maximum amount of movement in the sealant.

*For sealant application see construction drawings in the Insulated Roof and Wall sections.*



## Sealants & Fillers

### Profile Fillers

Where any flashing, such as at a ridge or hip are fixed to profiled roofing or cladding panels a series of gaps are created. To prevent wind, rain and wildlife entering the construction these gaps need to be closed with profile fillers.

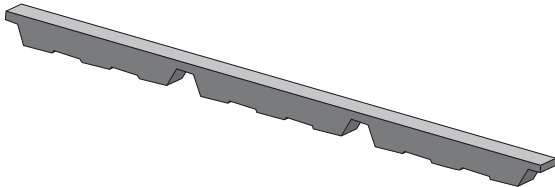
Fillers can be cut to fit any combinations of profiles including angled profiles at hips, valleys and gable ends.

Profile fillers are normally supplied slightly oversized and are held in place by light compression between the sheets. They can also be supplied with preformed mastic tape applied to either or both faces to seal and fix the filler in place.

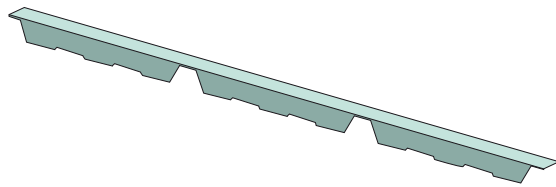
### Scalloped Metal Flashings

Scalloped metal flashings are available from Kingspan to protect weather exposed surfaces of profiled fillers from damage by birds and to enhance the appearance of the ridge construction detail.

Typical Ridge Filler



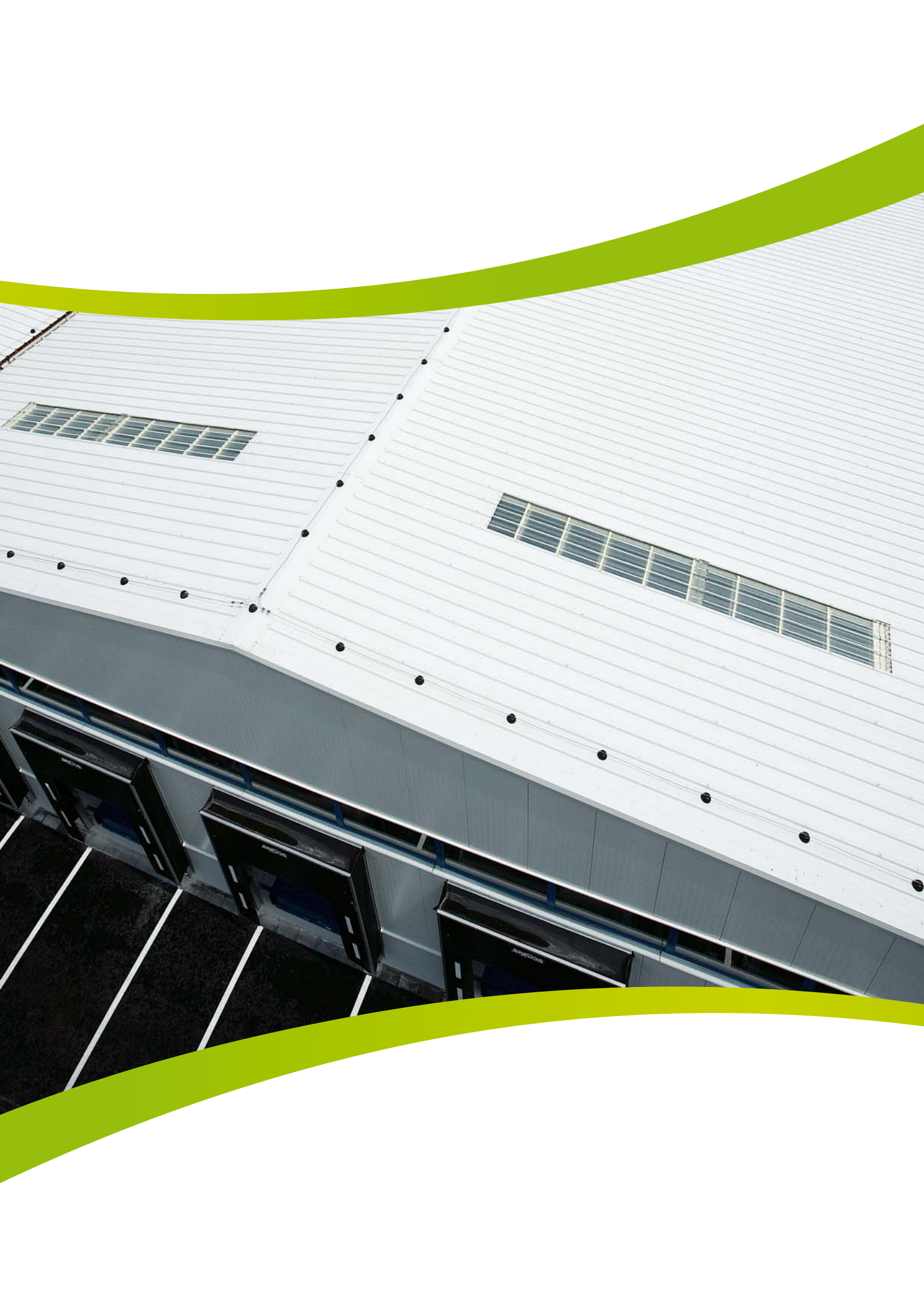
Ridge Scalloped Flashing



# Insulated Roof Systems

■	Roof System KS1000 RW	3.1.1
■	Roof System KS1000 TOP-DEK	3.2.5
■	Roof System KS1000 FF	3.3.9
■	Roof System KS1000 RT	3.4.13
■	Roof System KS1000 X-dek	3.5.17





## Product Data

### Application

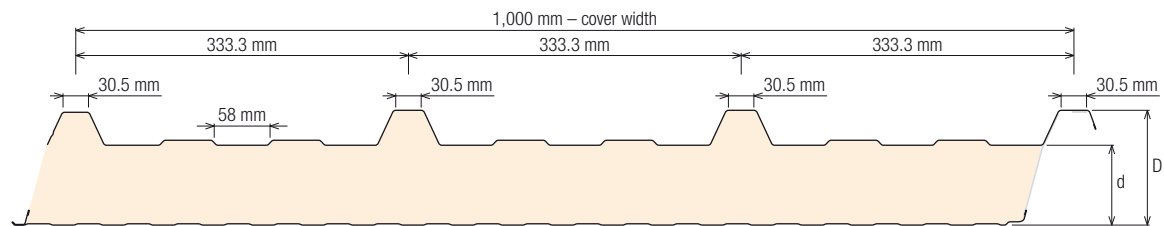
The KS1000 RW is a trapezoidal formed roof system with a standard fastening method (through fixed), which is suitable for all building applications, with a roof slope:

- More than 4° (7%) for roofs with one panel in the slope direction;
- More than 6° (10%) for roofs with two or more panels in slope direction.

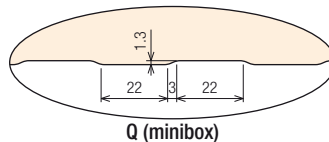
The KS1000 RW panel can also be used for wall cladding.



### Dimensions & Weight



#### Internal Facing Profiles



d – core thickness (mm)		25	40	50	60	70	80	100	120	160
D – overall dimension (mm)		60	75	85	95	105	115	135	155	195
Weight (kg/m <sup>2</sup> )	sheet 0.5/0.4 mm	9.03	9.63	10.03	10.43	10.83	11.23	12.03	12.83	14.43

### Product Tolerances

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

Panel width	±3 mm
-------------	-------

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm –2 mm
Panel thickness $d \geq 100$ mm	+3 mm –3 mm
Squarness of the cut end $\leq 0.5\%$ of the panel width.	
Panel bow $(\Delta 1 + \Delta 2)/2 \leq 10$ mm	

### Available Lengths

The standard panel length is between 2 and 14.5 meters. Panels shorter than 2 m and longer than 14.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

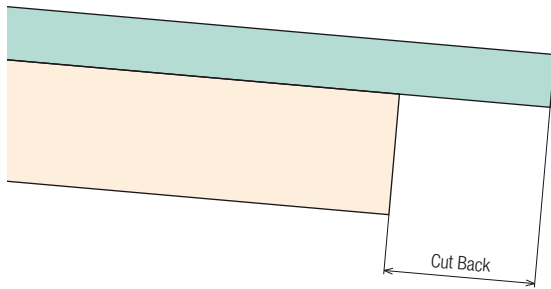
Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

### Panel End Lap Cut Back

If the project requires panels to be connected in the direction of the roof slope, the panels must have an overlap. Depending on the overlap length, the insulating core at the panel end under the overlap must be removed during mounting. For these situations, we can deliver panels with cut backs already made. These panels are normally delivered with a cut back up to 250 mm, but other cutback lengths are possible (see below). Cut backs for all types of panels (roof, wall, PUR, mineral wool) can be ordered. All RW panels have a cut back of 20 mm conditional of manufacturing.

Panel cut-backs for roofing and wall panels can be divided into three types:		
CUT BACK 1	unseparated cut backs	50–250 mm
CUT BACK 2	separated cut back with insulation not removed	50, 80, 150, 200 and 250 mm
CUT BACK 3	separated cut back with insulation removed	50, 80, 150, 200 and 250 mm

## Product Data



### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.50 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1000 RW panel side joints have factory applied anti-condensation seals fitted into the groove to seal automatically the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
25	0.745	1.20
40	0.505	1.84
50	0.411	2.29
60	0.348	2.73
70	0.300	3.19
80	0.266	3.62
100	0.213	4.52
120	0.180	5.42
160	0.143	6.85

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are non-deleterious.

### Fire

KS1000 RW insulated sandwich panels have been tested and approved and comply with National Building Regulations and Norms. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according to EN 13501-1. The panels do not propagate fire spread.

Panel Thickness (mm)	Fire resistance according EN 13501-2
	Roof application
25/60	N/A
40/75	
50/85	
60/95	R30, RE30, REI 20, REW20
70/105	
80/115	
100/135	
120/155	
160/195	

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction $R_w$ (dB)
25	25
40	
50	
60	
70	
80	
100	26
120	
160	

### Building Regulations

Kingspan KS1000 RW insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating and product guarantees on a project by project basis.

### Packing

#### Standard packing – road transportation

KS1000 RW panels are stacked weather side to weather side (to minimise palette height). The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,500 kg.

Panel core thickness (mm)	25	40	50	60	70	80	100	120	160
Number of panels in package	23	17	15	13	11	9	7	6	4

### Delivery

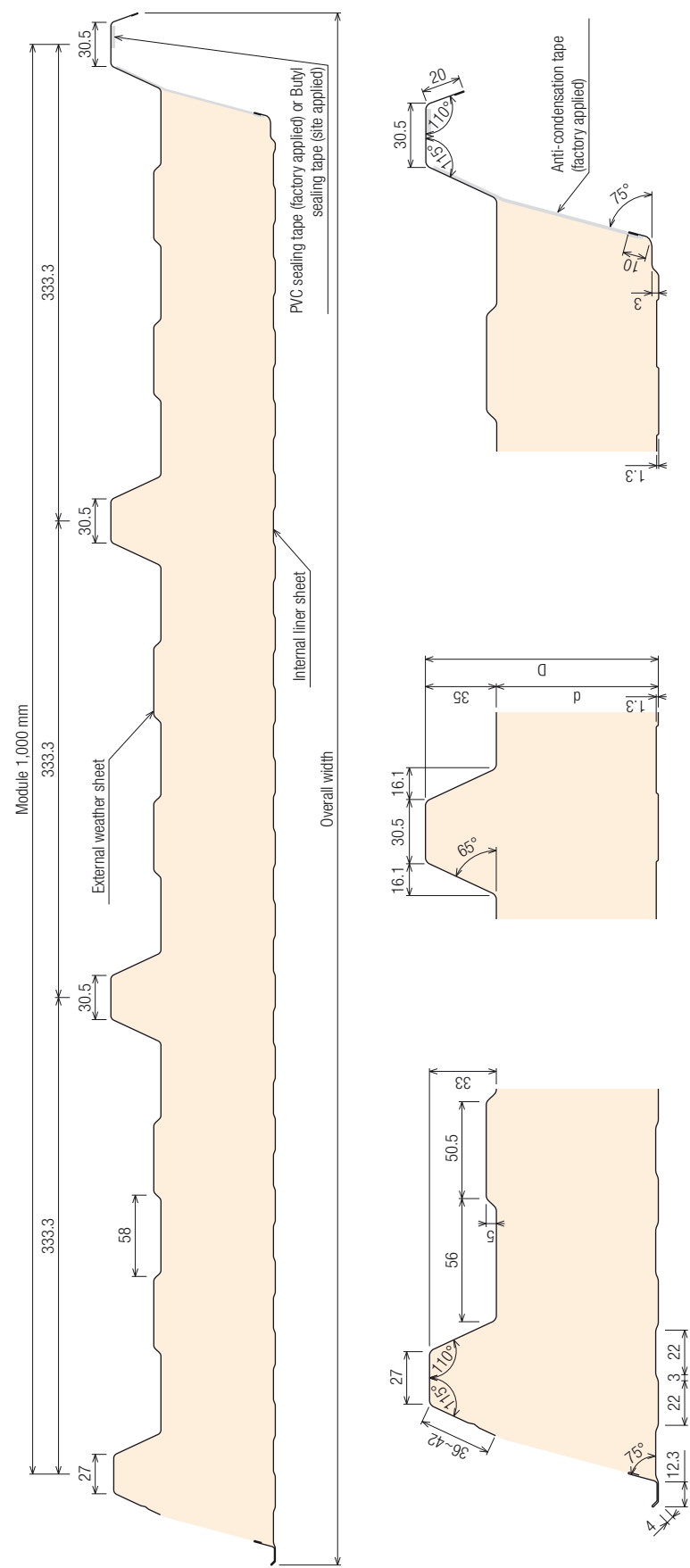
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



Available Panel Thicknesses

Insulation Core (d)	Overall Panel Thickness (D)	Overall Panel Width
25	60	1,067
40	75	1,069
50	85	1,074
60	95	1,079
70	105	1,083
80	115	1,088
100	135	1,097
120	155	1,107
160	195	1,125

Note:

External sheet thickness of 0.5 mm to 0.9 mm  
Internal sheet thickness of 0.4 mm to 0.9 mm  
All dimensions in millimetres

## Product Data

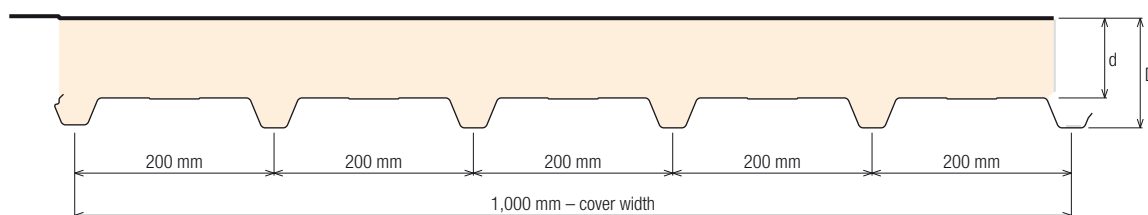
### Application

The KS1000 TOP-DEK is a roof system with a direct fastening of bottom deck to structure, which can be used for all building applications where the roof slope is 1% (0.5°) or more.

The panel can be used for curved roofs having a diameter of  $R_{min}$  in longitudinal direction= 50 m and in transversal direction=20 m.



### Dimensions & Weight



<b>d</b> – core thickness (mm)	20	50	60	70	80	100	
<b>D</b> – overall dimension (mm)	50	80	90	100	110	130	
Weight (kg/m <sup>2</sup> )	PVC membrane – ext. sheet 0.6 mm – int.	8.66	9.86	10.26	10.66	11.06	11.86

### Product Tolerances

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

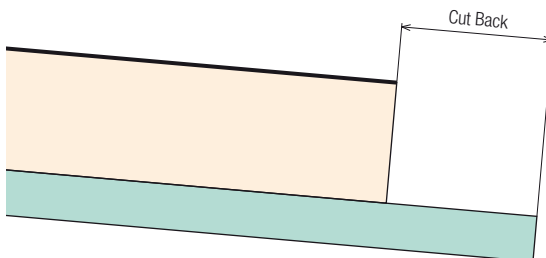
±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm –2 mm
Panel thickness $d \geq 100$ mm	+3 mm –3 mm
Squariness of the cut end $\leq 0.5\%$ of the panel width.	
Panel bow $(\Delta 1 + \Delta 2)/2 \leq 10$ mm	

### Panel End Lap Cut Back

If the project requires panels to be connected in the direction of the roof slope, the panels must have an overlap. Depending on the overlap length, the insulating core at the panel end under the overlap must be removed during mounting. For these situations, we can deliver panels with cut backs already made. These panels are normally delivered with a cut back up to 250 mm, but other cutback lengths are possible (see below). Cut backs for all types of panels (roof, wall, PUR, mineral wool) can be ordered.



### Available Lengths

The standard panel length is between 2 and 12 meters. Panels shorter than 2 m and longer than 12 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

Panel cut-backs for roofing and wall panels can be divided into three types:		
CUT BACK 1	unseparated cut backs	50–250 mm
CUT BACK 2	separated cut back with insulation not removed	50, 80, 150, 200 and 250 mm
CUT BACK 3	separated cut back with insulation removed	50, 80, 150, 200 and 250 mm

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Internal substrate thicknesses

- Standard internal sheet thickness 0.60 mm.
- Other thicknesses are available by arrangement with Kingspan.

#### External substrate specification

- The external cover layer – a single ply waterproof membrane made from softened PVC of 1.2 mm thickness with a non-woven pad.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1000 TOP-DEK panel side joints have factory applied anti-condensation seal fitted into the groove to seal automatically seal the joint between panels.

### Waterproof Foil Connections

- The longitudinal connections should be welded using a hot-air gun after mounting the panels. The transverse connections should be sealed with the waterproof PVC tape of 160 mm width using a hot-air gun.
- The installation instructions should detail how the waterproof foil is applied around ridges, gables, attics and other areas.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
20	0.92	0.92
50	0.41	2.27
60	0.35	2.69
70	0.3	3.16
80	0.27	3.53
100	0.22	4.38

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1000 TOP-DEK insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according EN 13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2
	Roof application
20/50	N/A
50/80	
60/90	
70/100	
80/110	REI 20
100/130	

### Acoustics

Panel KS1000 TOP-DEK (60 mm thick) have a single figure weighted sound reduction  $R_w = 26$  dB.

## Building Regulations

Kingspan KS1000 TOP-DEK insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

## Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

## Guarantees & Warranties

Kingspan will provide external coating and product guarantees on a project by project basis.

## Packing

### Standard packing – road transportation

KS1000 TOP-DEK panels are stacked weather side to weather side (to minimise palette height). The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,500 kg.

Panel core thickness (mm)	20	50	60	70	80	100
Number of panels in package	30	16	14	12	10	8

## Delivery

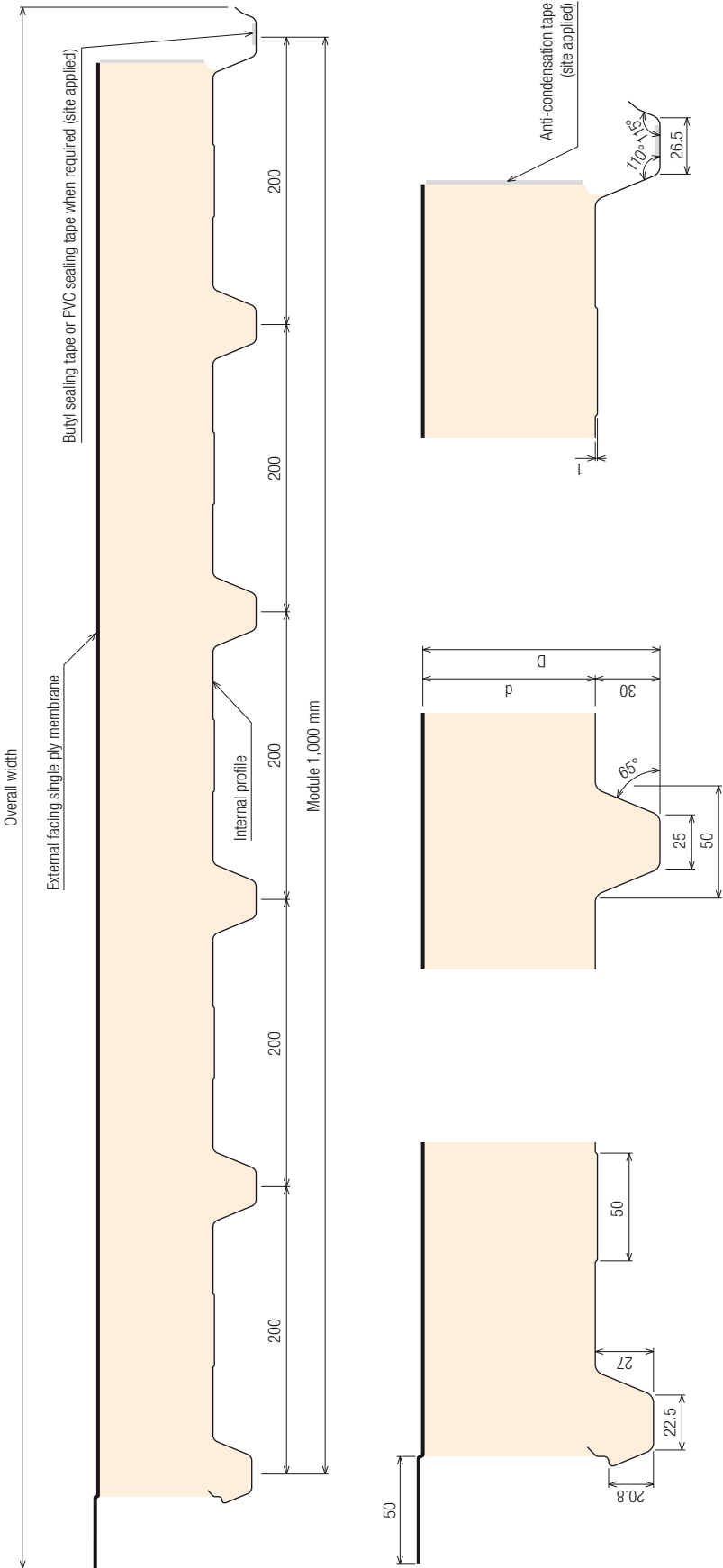
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

## Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



**Note:**  
External facing – single ply membrane  
Internal trapezoidal deck 0.55 mm–0.9 mm thick  
All dimensions in millimetres

Available Panel Thicknesses

Insulation Core (d)	Overall Panel Thickness (D)	Overall Panel Width
20	50	1,090
50	80	
60	90	
70	100	
80	110	
100	130	

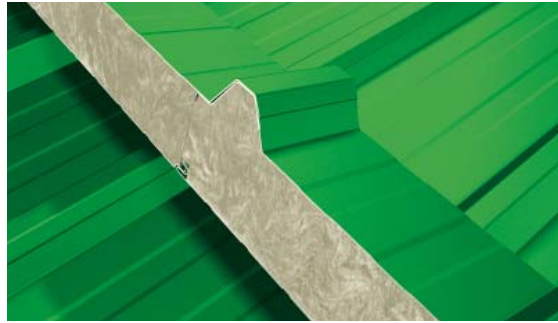
## Product Data

### Application

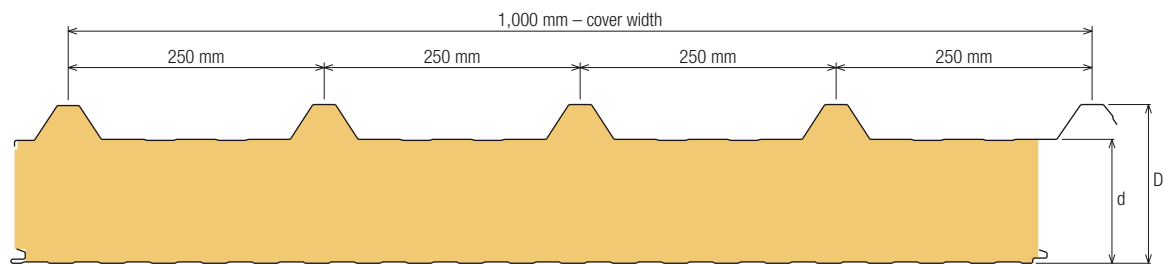
KS1000 FF is a trapezoidal formed roof system with a standard fastening method (through fixed) and a mineral fibre insulation core, which is applicable for all building applications, where the roof slope is:

- More than 5° (8.5%) for roofs with one panel in the slope direction;
- More than 8° (14%) for roofs with two or more panels in the slope direction.

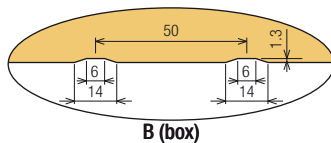
The KS1000 FF panel with high fire performance can also be used for wall claddings.



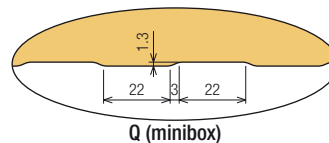
### Dimensions & Weight



#### Internal Facing Profiles



B (box)



Q (minibox)

<b>d</b> – core thickness (mm)	60	80	100	120	150	200	
<b>D</b> – overall dimension (mm)	94	114	134	154	184	234	
Weight (kg/m <sup>2</sup> )	sheet 0.6/0.5 mm	17.34	19.54	21.74	23.94	27.24	32.74

### Product Tolerances

#### Panel length

For panel length under 6 m ±4 mm  
 Panel length is equal or over 6 m and under 12 m ±6 mm  
 Panel length is equal or over 12 m ±8 mm

**Panel width** ±3 mm

#### Thickness

Panel thickness  $d \leq 50$  mm ±2 mm  
 Panel thickness  $50 \text{ mm} < d < 100$  mm +3 mm –2 mm  
 Panel thickness  $d \geq 100$  mm +3 mm –3 mm  
 Squariness of the cut end  $\leq 0.5\%$  of the panel width.  
 Panel bow  $(\Delta 1 + \Delta 2) / 2 \leq 10$  mm

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

### Panel End Lap Cut Back

If the project requires panels to be connected in the direction of the roof slope, the panels must have an overlap. Depending on the overlap length, the insulating core at the panel end under the overlap must be removed during mounting. For these situations, we can deliver panels with cut backs already made. These panels are normally delivered with a cut back up to 250 mm, but other cutback lengths are possible (see below). Cut backs for all types of panels (roof, wall, PUR, mineral wool) can be ordered.

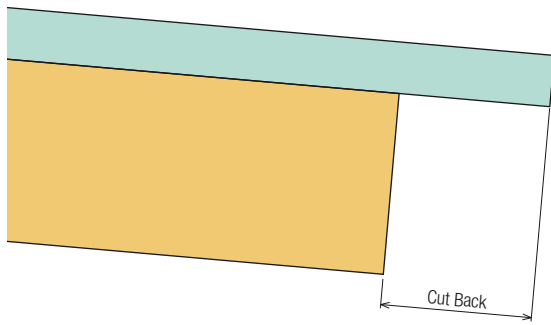
### Available Lengths

The standard panel length is between 2 and 13.5 (7) meters. Panels shorter than 2 m and longer than 13.5 m are available on request. Please contact your Kingspan sales partner.

#### Panel cut-backs for roofing and wall panels can be divided into three types:

CUT BACK 1	unseparated cut backs	
CUT BACK 2	separated cut back with insulation not removed	
CUT BACK 3	separated cut back with insulation removed	

## Product Data



The minimum length of a panel on which a cut back can normally be made is 2,700 mm. Cut backs on shorter length panels are possible by special arrangement.

## Steel

### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

### Substrate thicknesses

- Standard external sheet thickness 0.50 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

## External Coating Options

### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

## Internal Coating Options

### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

## Insulation Core

Mineral fiber of a high specific weight, suitable for applications that require fire resistance of more than 45 minutes.

## Seals

### Factory Applied Side Joint Tape

All KS1000 FF panel side joints have factory applied anti-condensation seal fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	HCFC Free $\lambda = 0.044$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
60	0.673	1.32
80	0.516	1.77
100	0.418	2.22
120	0.351	2.68
150	0.283	3.36
200	0.214	4.50

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1000 FF insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. The system is classified as A2-s<sub>1</sub>,d<sub>0</sub> according EN13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2
	Roof application
60/94	not tested
80/114	REI 90
100/134	
120/154	REI 120
150/184	
200/234	contact Technical department

### Acoustics

Panel KS1000 FF (60 mm thick) have a single figure weighted sound reduction  $R_w = 32$  dB.

## Building Regulations

Kingspan KS1000 FF insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

## Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating and product guarantees on a project by project basis.

### Packing

#### Standard packing – road transportation

KS1000 FF panels are stacked weather side to weather side (to minimise palette height). The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 2,500 kg.

Panel core thickness (mm)	60	80	100	120	150	200
Number of panels in package	14	10	8	7	6	4

### Delivery

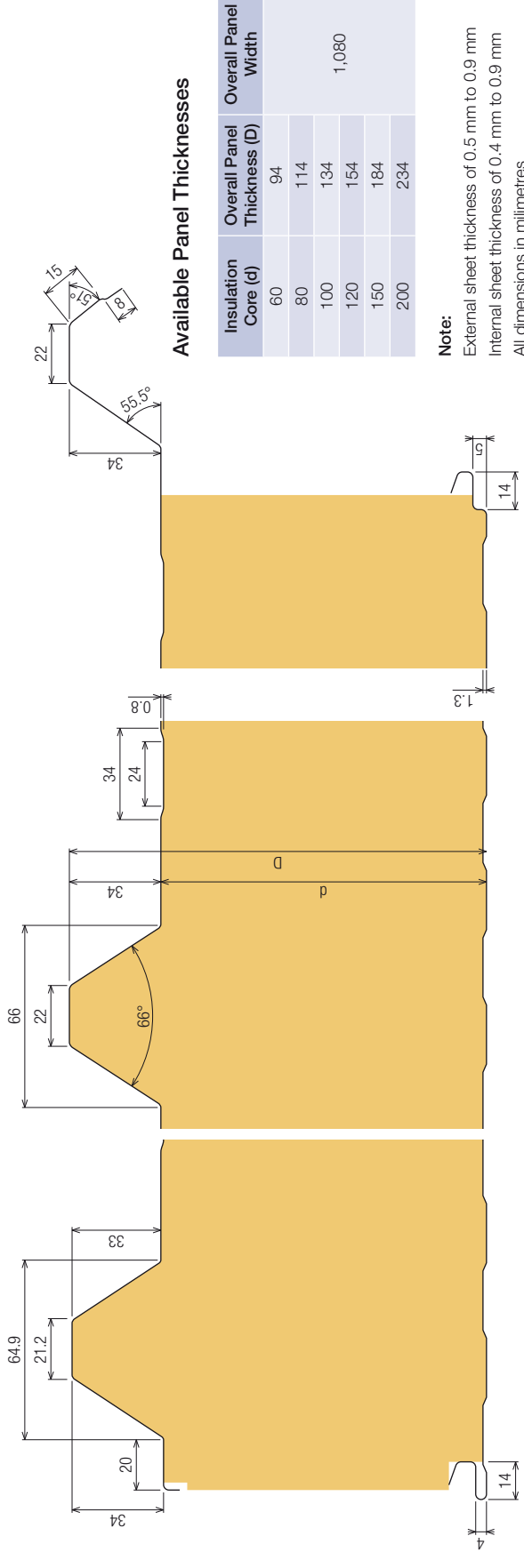
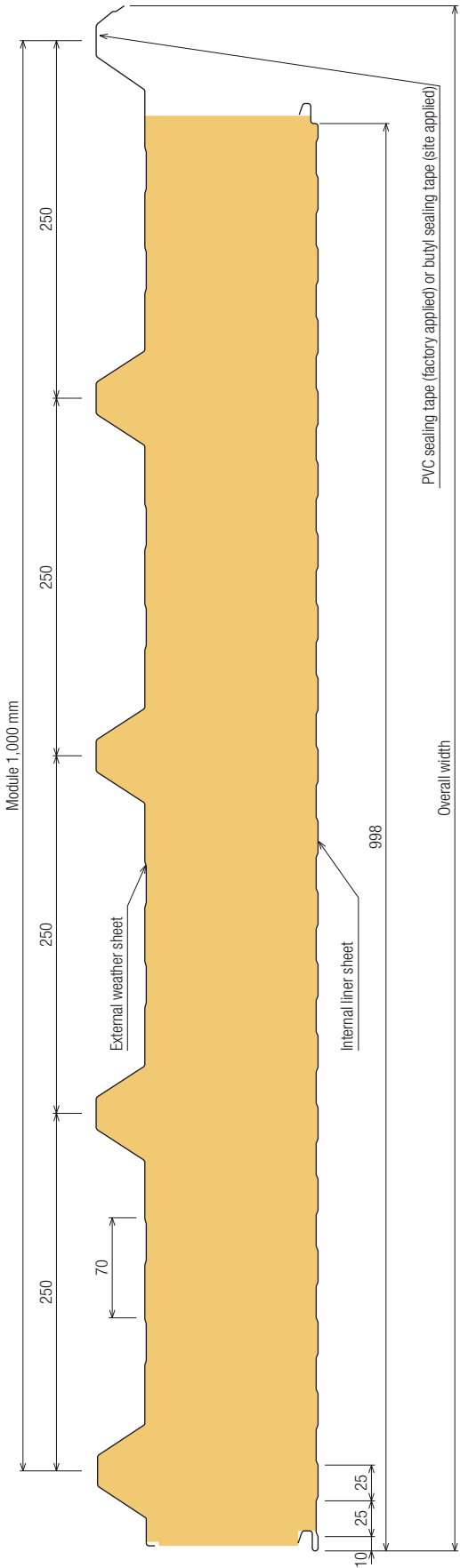
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

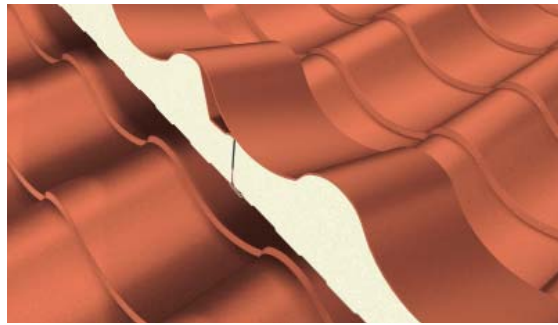
Panel Dimensions



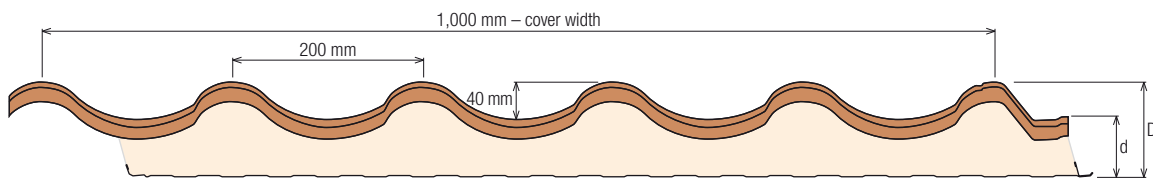
## Product Data

### Application

The KS1000 RT Roof Tile system is suitable for building applications with roof slopes of 21% (12°) and above.



### Dimensions & Weight



<b>d</b> – core thickness (mm)		45	60	80	100
<b>D</b> – overall dimension (mm)		85	100	120	140
Weight (kg/m <sup>2</sup> )	0.7/0.4 steel	12.58	13.23	14.10	14.96

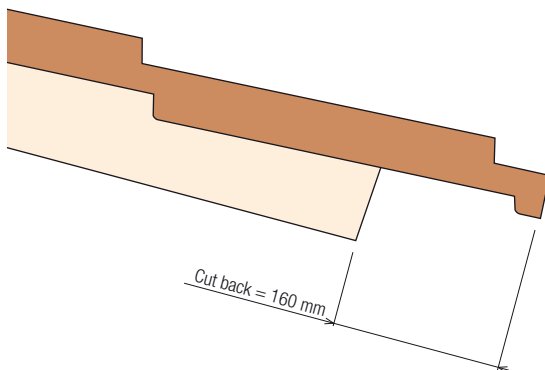
### Product Tolerances

Cut to Length	-0.05%	+0.1%
Liner Sheet Length	-0.1%	+0.1%
Cover Width	0 mm	+3 mm
Thickness	-2 mm	+2 mm
End Square	-3 mm	+3 mm

### Panel End Cut Back

Standard cut-back on RT panels is 160 mm.

110 mm cut-back is provided on special request and is related to relevant lengths of panels. See RT order form from UK.



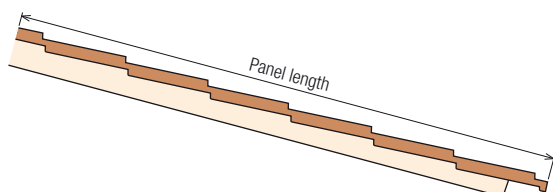
### Certification Reference

Please contact local Kingspan Technical department.

### Available Lengths

Kingspan Roof Tile is manufactured cut to length in a continuous manufacturing process. Standard lengths are available between 2.1 and 16.0 metres.

Consideration must be given to lifting and handling methods, especially where steeper roof pitches are contemplated. In practical terms advanced handling techniques should be considered if lengths over 6.0 metres are being considered. Panel length is defined as the overall length of the outer sheet including the end overlap.



## Product Data

### Tile Pitch

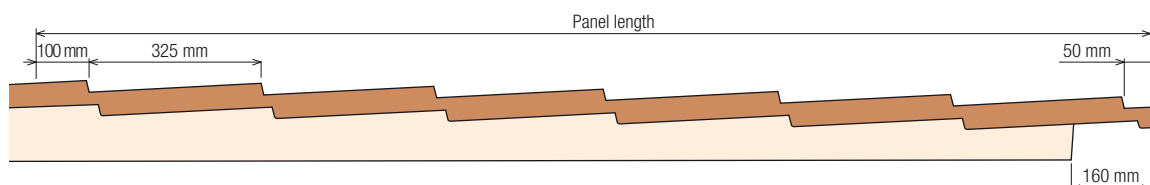
Kingspan Roof Tile is manufactured with standard end laps and pitch length. Manufactured panel length is therefore a multiple of the pitch. The pitch length of the Roof Tile is 325 mm with a standard eaves overhang of 160 mm.

In circumstances where the panel length is greater than the roof pitch the panels are site cut at the apex and the junction covered by the ridge flashing.

Panel size to suit the project's needs can be chosen from the length table as below.

When using Kingspan Roof Tile Panels consideration must be taken when ordering the required length of panel. Use the table to select the panel length nearest to that required. Variance in the panel length is taken up under the ridge flashing. When detailing the ridge junction the designer must ensure that the chosen panel length is long enough to provide a sound practical junction detail. In practical terms a shortfall of length no greater than 40 mm from the ridge line will ensure good insulation continuity of the infill insulation. Where this is not the case the next panel size up must be chosen and the surplus length cut to suit the site dimension.

Kingspan Technical Services can provide advice on this and all aspects of the design and installation of Kingspan Roof Tile.



### Panel Lengths (mm)

No. of Tiles	Tile Length 325 mm	No. of Tiles	Tile Length 325 mm	No. of Tiles	Tile Length 325 mm
6	2,100	21	6,975	36	11,850
7	2,425	22	7,300	37	12,175
8	2,750	23	7,625	38	12,500
9	3,075	24	7,950	39	12,825
10	3,400	25	8,275	40	13,150
11	3,725	26	8,600	41	13,475
12	4,050	27	8,925	42	13,800
13	4,375	28	9,250	43	14,125
14	4,700	29	9,575	44	14,450
15	5,025	30	9,900	45	14,775
16	5,350	31	10,225	46	15,100
17	5,675	32	10,550	47	15,425
18	6,000	33	10,875	48	15,750
19	6,325	34	11,200	–	–
20	6,650	35	11,525	–	–

## Product Data

### Materials – Steel

#### Substrate

- Fe 220 G hot-dip zinc coated steel according to EN10147:1992.
- Standard external sheet thickness 0.7 mm, standard internal sheet thickness 0.4 mm.

#### Coatings – External Weather Sheet

- High performance polymer, 50 micron thick. Colour – Terracotta or Anthracite.
- Reverse side of sheet coated with a light grey polyester coating.

#### Coatings – Internal Liner Sheet

- Lining Enamel: 15 micron thick coating developed for use for the internal lining of insulated panels. Standard colour is “bright white” with an easily cleaned surface.

#### Insulation Core

- Polyisocyanurate (PIR/IPN): with zero ozone depletion (Zero ODP). Available in LPCB certified product range, please contact Kingspan.

### Seals

#### Factory Applied Side Lap Tape

All side laps have a factory applied anti-condensation tape.

## Performance

### Thermal Insulation

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
45	0.45	2.05
60	0.32	2.96
80	0.25	3.83
100	0.20	4.83

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan panels are normally immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are not considered deleterious.

### Fire

Kingspan KS1000 RT panels comply with National Building Regulations and standards.

### Acoustics

All KS1000 RT panels have a single figure weighted sound reduction  $R_w = 25$  dB.

## Building Regulations & Standards

Kingspan insulated roof and wall systems conform to the following Building Regulations and standards.

## Quality & Durability

Kingspan Insulated Panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO 9001:2000 standard, ensuring long term reliability and service life.

## Guarantees & Warranties

Kingspan will provide external coating and product warranties and guarantees on an individual project basis.

## Packing

### Standard Packing

KS1000 RT panels are stacked weather sheet face down and require turning over during unpacking/erection.

The top, bottom, sides and ends are protected with foam and timber packing and the entire pack is wrapped in plastic.

The number of panels in each pack is a maximum of 10 for 45 mm thick, typical pack height is 1,100 mm. Number of panels per pack will vary according to panel thickness and panel length.

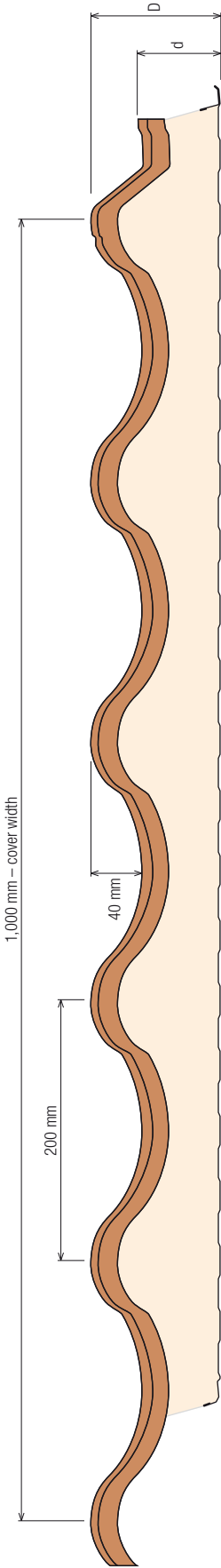
## Delivery

All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

## Site Installation Procedure

Site assembly instructions are available from the Kingspan.

Panel Dimensions



**Note:**  
Above dimensions are theoretical, actual dimensions will vary due to manufacturing tolerances.  
Exactly precise dimensions must always be measured from actual samples.  
All dimensions in millimetres.

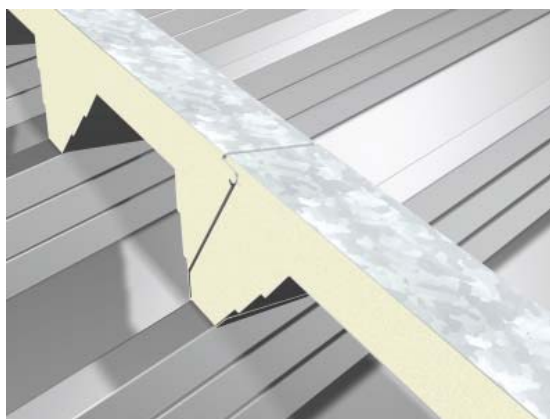
Available Panel Thicknesses		
Insulation Core (d)	Overall Panel Thickness (D)	
45	85	
60	100	
80	120	
100	140	

## Product Data

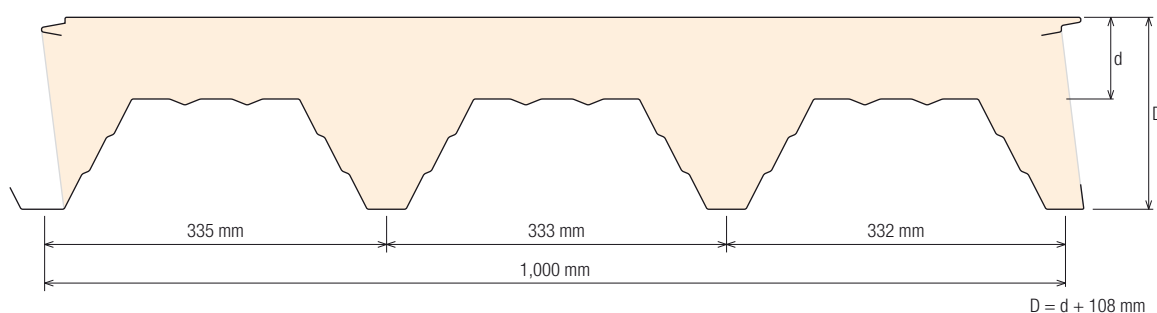
### Application

X-dek™ panels are insulated membrane covered roof panels suitable for flat roofs for all building applications except where there are low temperature internal conditions. The KS1000 X-dek panel secures the base for final waterproof covering of the roof installed by others.

- X-dek panels are insulated roof panels suitable for flat roofs roof slope > 1%
- X-dek is the “long-span” composite roofing panel, which provides the necessary structural strength and stiffness and the required level of thermal insulation. An outer membrane is applied on site as a waterproof barrier.
- The KS1000 XD panels are suitable for “Green Roof” solutions
- The XD panels can be used as “standard” panel and as a part of steel structure “structural” panel (restraining for the rafters)



### Dimensions & Weight



d [mm]	steel thickness [mm]	D [mm]	Weight [kg/m²]			
			XD	XB	XG	XM
80	0.9	188	21.4	15.9	15.8	17.7
	1.1		23.7	18.2	18.1	20.0
100	0.9	208	22.2	16.8	16.7	18.6
	1.1		24.6	19.1	19.0	20.9

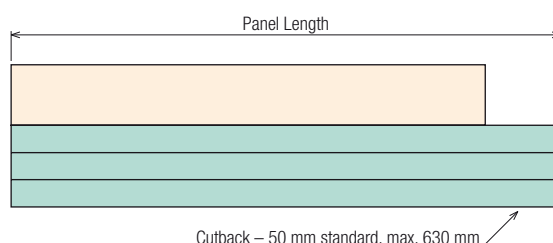
### Product Tolerances

Cut to Length	-5 mm	+5 mm
Width	-2 mm	+2 mm
Thickness	-2 mm	+2 mm
End Square	-3 mm	+3 mm
Flatness	-2 mm	+2 mm

### Available Lengths

Standard lengths 2.5 to 13.5 meters. 13.5–15 metres maximum can be supplied but are subject to a transport surcharge.

X-dek is manufactured with CUTBACK on bottom trapezoidal steel. The standard cutback is 50 mm, the maximum available cutback amounts to 630 mm.



## Product Data

X-dek™ panels are offered with different types of top finish. The different top (external) facings create a wide range of opportunities for application of different types of roofing waterproof membranes, and different load conditions. Depending on the certain type of top finish the panels are marked with different codes:

1. **KS1000 XD** – X-dek™ panels finished with steel skin to provide maximum load bearing capacity. The thickness of external steel facing is providing sufficient base for mechanically fixed waterproof membranes.
2. **KS1000 XD TR20 (XB)** – X-dek™ panels finished with bitumen impregnated glass fibre membrane which is dedicated especially for multi layer torch-on bitumen systems.
3. **KS1000 XD TR27 (XG)** – X-dek™ panels finished with glass tissue facing which allows to apply any waterproof roofing either by mechanical fastening or by bonding to.
4. **KS1000 XD PVC (XM)** – X-dek™ panels finished with PVC roofing membrane with side lap. This product DO NOT require further covering by roofing membrane. Factory applied PVC membrane is ready for hot-air welding at side laps after installation of panels and provides final protection against water.

## Steel

### Internal skin:

- Hot-dipped zinc coated steel according to EN 10326:2004. Grade S350GD + Z275 coated with Polyester 25 microns RAL 9002 – standard thickness 0.9 mm, on special request available 1.1 mm;

### External Skin

- **XD** Hot-dipped **zinc coated steel** according to EN 10326:2004. Grade S280GD + Z275 – thickness 0.7 mm – galvanised steel with a 5 microns clear film conversion layer for bonding to. Available profiles on top sheet: **MiniBox** or **Flat**
- **XB** Bitumen impregnated glass fibre membrane (**TR20**) suitable for multi layer torch on systems,
- **XG** Glass tissue facing (**TR27**) suitable for mechanically fixed or fully adhered single ply PVC or EPDM membrane
- **XM** Waterproof flexible **PVC** membrane with internal woven reinforcing and laminated with a non-woven polyester fleece on back side, ready for hot air welding  
Nominal thickness: 1.2 mm,  
Total width: 1,060 mm  
Polyester fleece width: 950 mm

## Insulation Core

The rigid closed cell insulation core is available in the following specification :

Isophenic rigid foam – IPN (HCFC Free), available in non certified product range, subject to special enquiry. Available nominal thickness of the core 80 mm and 100 mm.

## Seals

### Factory Applied Side Joint Seal

All side joints have a factory applied anti-condensation tape made of standard PE side foam.

## Performance

### Thermal Insulation

Panel Thickness (mm)	$\lambda = 0.022 \text{ W/m}^2\text{K}$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
80/Option I	0.23	4.21
80/Option II	0.24	4.03
100/Option I	0.19	5.12
100/Option II	0.20	4.86

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan panels are normally immune to attack from mould, fungi, mildew and vermin, no urea formaldehyde is used in the construction, and the panels are not considered deleterious.

### Fire

Kingspan X-dek™ roof panels has been tested according to EN1365 as load bearing roof element. The ratings achieved are presented in the table below:

Panel Type	Fire Rating	Max. bending moment* [kNm]
KS1000 XB 80	REI 15	6.621
KS1000 XG 100	REI 20	7.725
KS1000 XD 100	REI 30	7.725
KS1000 XM 80	REI 30**	6.581
KS1000 XM 100	REI 30	8.350

\* The value of maximum bending moment relates only to moment generated ONLY by snow load.

\*\*The rating covers additionally the suspended load of 14 kg/m<sup>2</sup> attached to the bottom trapezoidal deck

## Product Data

### Acoustics

Kingspan X-dek™ panels have acoustic parameters as below:

Type of panel	Parameters according to EN ISO 717-1:1999		
	$R_w$ [dB]	$R_{A1}$ [dB]	$R_{A2}$ [dB]
XD TR20 (XB), XD PVC (XM)	23	22	20
XD TR27 (XG)	24	23	21
XD (steel)	26	25	22

Sound absorption factor:  $\alpha_w = 0.1$

### Quality & Durability

Kingspan Insulated panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO 9001 standard, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating and product warranties and guarantees on an individual project basis.

### Packing

#### Standard Packing

Kingspan X-dek™ panels are stacked horizontally (with facing sheets alternately up and down). Removable hot melt adhesive is laid between each panel. The entire pack is wrapped in polythene.

The number of panels in each pack are as shown in the table. Typical pack height is 1,100 mm

Panel core thickness (mm)	80	100
Number of panels in package (max.)	8	6

### Delivery

All deliveries (unless indicated otherwise) are road transport to project site. Off loading is the responsibility of the client.

### Site Installation Procedure

Site assembly instructions are available from the Kingspan Technical Design Bureau.

### Construction Requirements

In general the supporting structure for X-dek panels must be made and assembled to an accuracy defined in **EN 1090-2:2008** (Execution of steel structures and aluminium structures. Technical requirements for the execution of steel structures). Despite of the fact that the above standard refers to steel structures, Kingspan demands to use the appropriate values of allowable tolerances, for the other types of supporting elements as well (ie. concrete and timber structures).

**For installation of KS1000 XD panel (option steelsteel) the supporting structure must be made and assembled to an accuracy of L/600 between bearing planes of adjacent supports, where L is the distance between neighbouring supports.**

For the KS1000 XD (steel-steel option) applications, where the expected accuracy of erection of the supporting structure may exceed the Kingspan requirements, it is recommended to specify either single-span elements or panels with MiniBox (I) external profilation.

### X-dek™ FM Approved

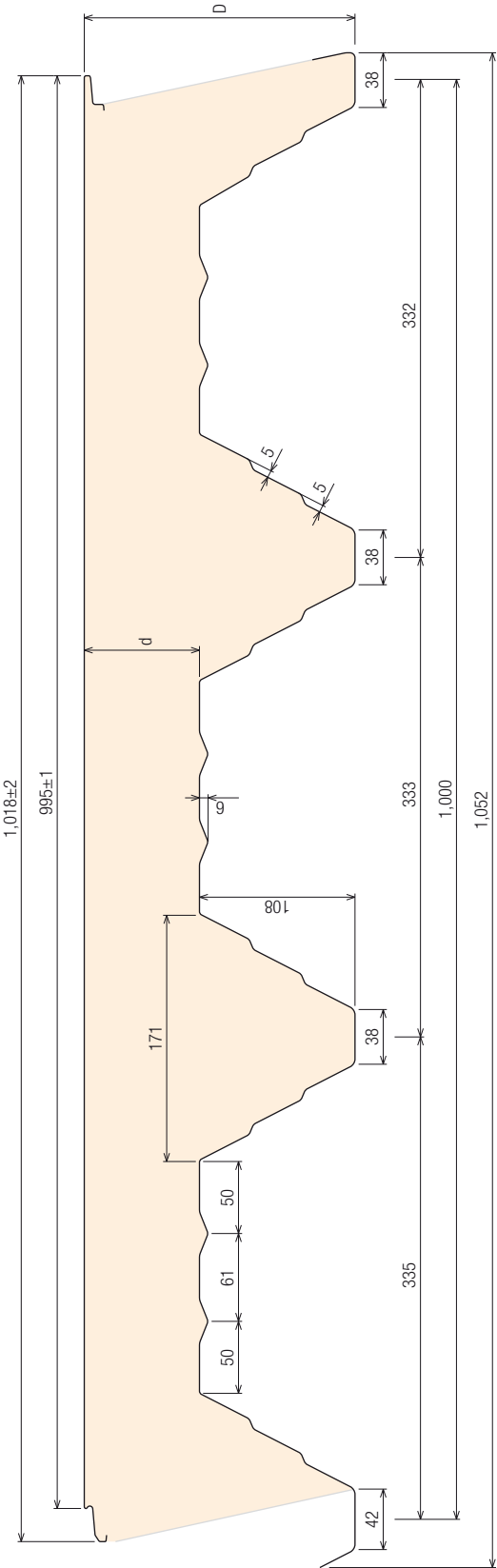
The KS1000 X-dek PVC (XM) option and KS1000 XD withy bonded PVC membrane are the **FM Approved** solutions for roofs.

The FM Approval is valid for both approved options of X-dek panel **only** with the **Sika SGK 1.5 mm PVC membrane**.

For the detailed specification of FM Approved products please contact Kingspan Technical Department.

Panel Dimensions

KS1000 XD 100 / KS1000 XD 80



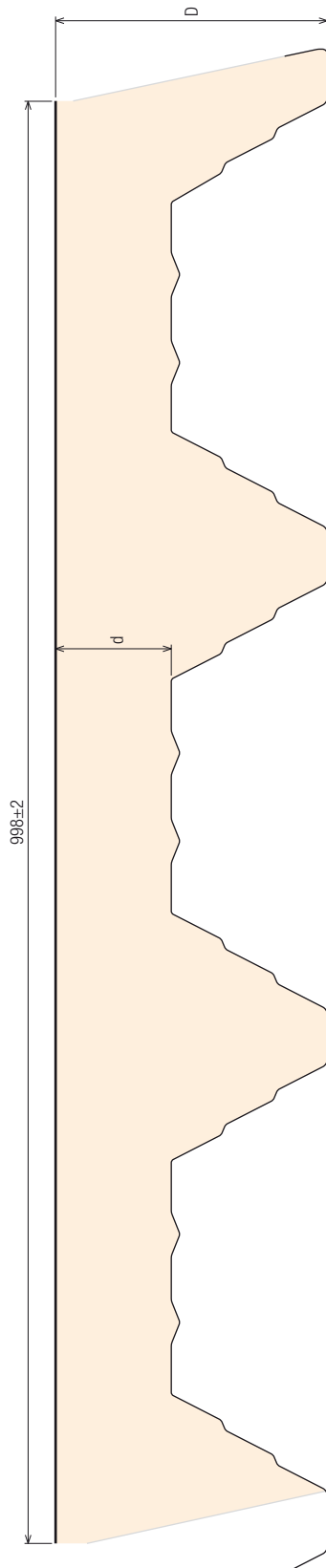
Available Panel Thicknesses

Insulation Core (d)	Overall Panel Thickness (D)
80	188
100	208

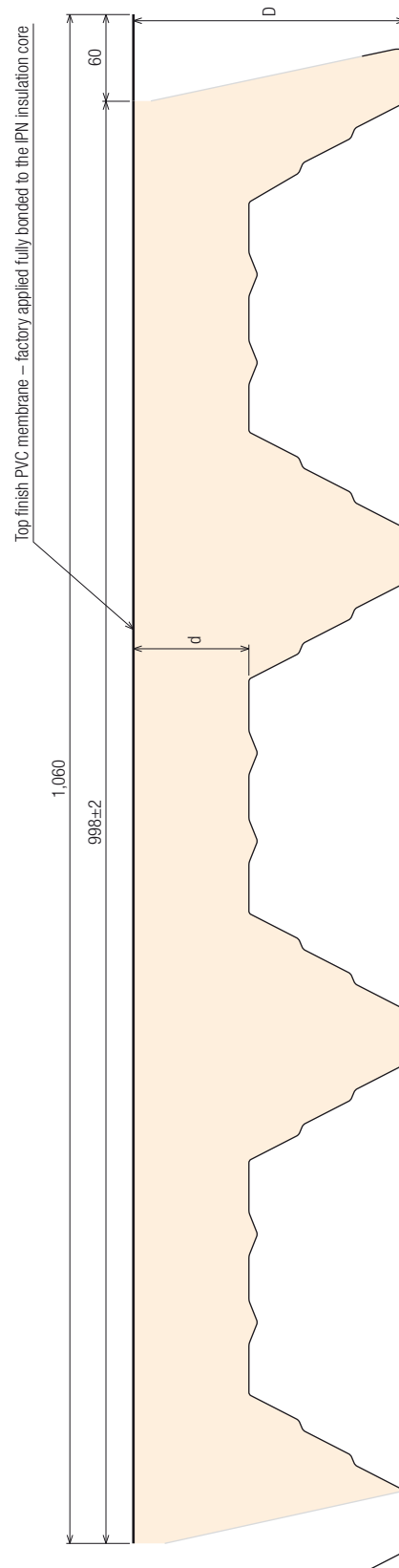
**Note:**  
All dimensions in millimetres

## Panel Dimensions

KS1000 XB 100 / KS1000 XB 80  
KS1000 XG 100 / KS1000 XG 80



KS1000 XM 100 / KS1000 XM 80



# Insulated Wall & Facade Systems

■	Wall System KS1000 AWP	4.1.1
■	Wall System KS1150 TF	4.2.5
■	Wall System KS1150 TC	4.3.9
■	Wall System KS1150 FR	4.4.13
■	Wall System KS1000 FH	4.5.17
■	Wall System KS1000 RW	4.6.21

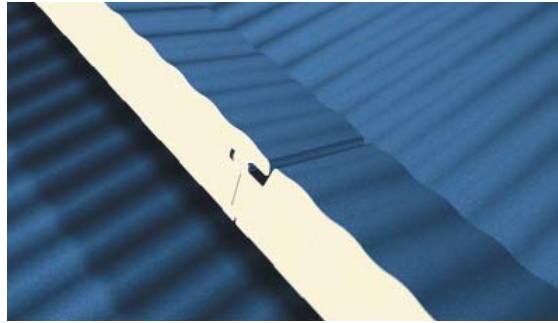




## Product Data

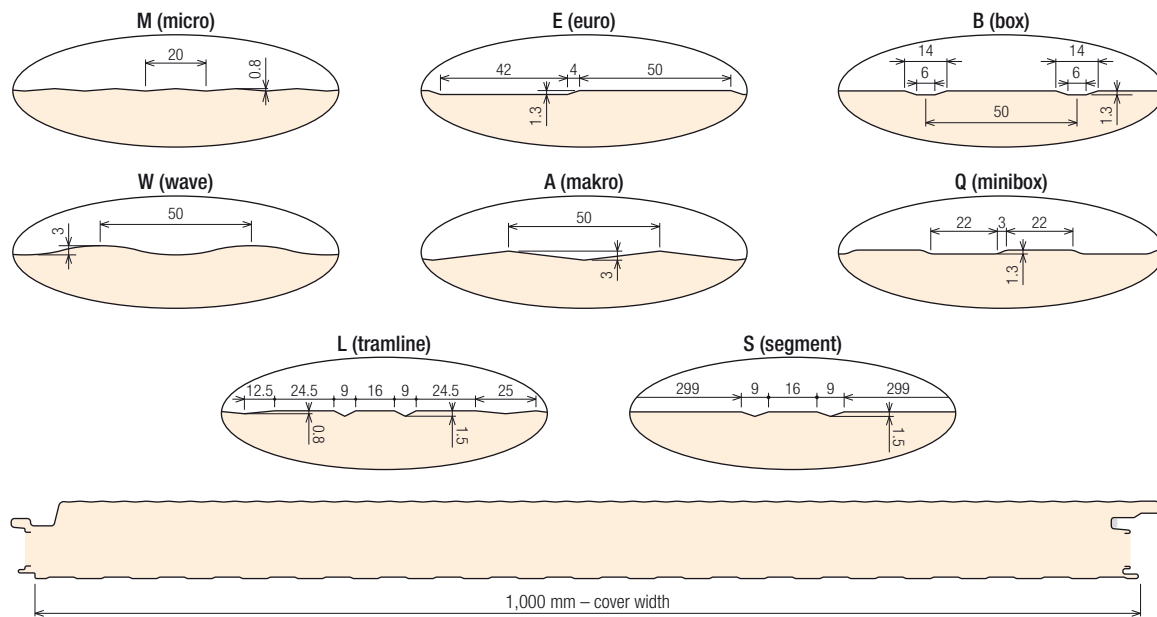
### Application

KS1000 AWP is a concealed fixed wall system which can be laid vertically or horizontally and is suitable for wall cladding on all buildings except where there are low internal temperature conditions (below 0 °C).

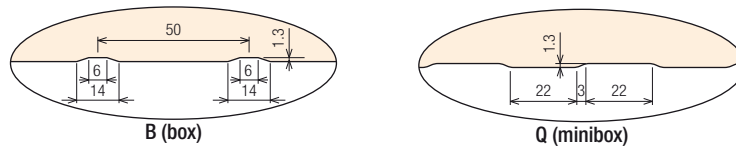


### Dimensions & Weight

#### External Facing Profiles



#### Internal Facing Profiles



Panel Thickness (mm)		50	60	70	80	100	120	150
Weight (kg/m <sup>2</sup> )	sheet 0.6/0.4 mm	10.77	11.17	11.57	11.97	12.77	13.57	14.77

### Product Tolerances

All materials intended for production of composite panels are in compliance with national regulations and standards. Dimensional tolerances of Kingspan insulated panels correspond to EN 14509 annex D.

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm -2 mm
Panel thickness $d \geq 100$ mm	+3 mm -3 mm
Squariness of the cut end $\leq 0.5\%$ of the panel width.	
Panel bow $(\Delta 1 + \Delta 2)/2 \leq 10$ mm	

### Available Lengths

The standard panel length is between 2 and 14.5 meters. Panels shorter than 2 m and longer than 14.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.60 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1000 AWP panel side joints have factory applied anti-condensation seals fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
50	0.446	2.07
60	0.376	2.49
70	0.325	2.91
80	0.285	3.34
100	0.226	4.26
120	0.187	5.18
150	0.150	6.50

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1000 AWP insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according to EN 13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
50	N/A	N/A
60	E10(o→i)	
70	EW15(i→o)	
80	EI15-ef(o→i) EW15(i→o)	
100		
120		
150		

### Acoustics

KS1000 AWP panels have a single figure weighted sound reduction  $R_w$  of 26 dB.

## Building Regulations

Kingspan KS1000 AWP insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

## Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

## Guarantees & Warranties

Kingspan will provide external coating and product guarantees on a project related basis.

## Packing

### Standard packing – road transportation

KS1000 AWP panels are stacked weather side to internal side. The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped with protection film.

The number of panels in each bundle depends on the panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,500 kg.

Panel core thickness (mm)	50	60	70	80	100	120	150
Number of panels in package	21	17	15	13	10	8	7

## Delivery

All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

## Site Installation

Site assembly instructions are available from Kingspan.

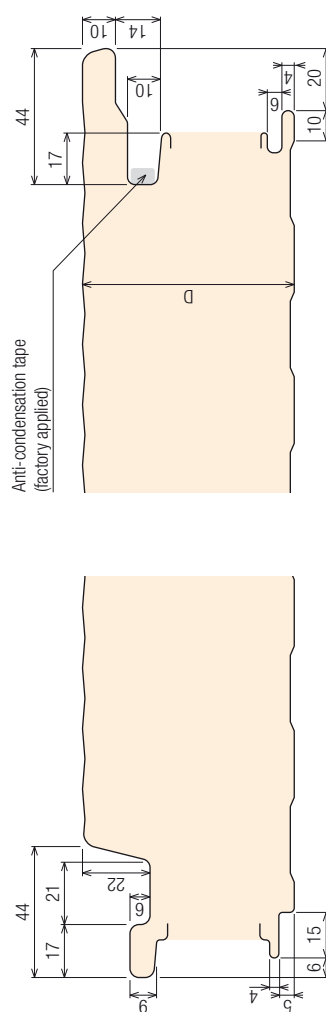
Kingspan will arrange training of the site fitters and supervisors if requested.

Overall width

External weather sheet

Internal liner sheet

Module 1,000 mm



### Available Panel Thicknesses

Panel Thickness (D)	Overall Panel Width
50	1,040
60	
70	
80	
100	
120	
150	

**Note:**

External sheet thickness of 0.4 mm to 0.9 mm  
Internal sheet thickness of 0.4 mm to 0.9 mm  
According to specification a combination of  
external and internal profiles are available as  
indicated on page 4.1.1.  
All dimensions in millimetres.

## Product Data

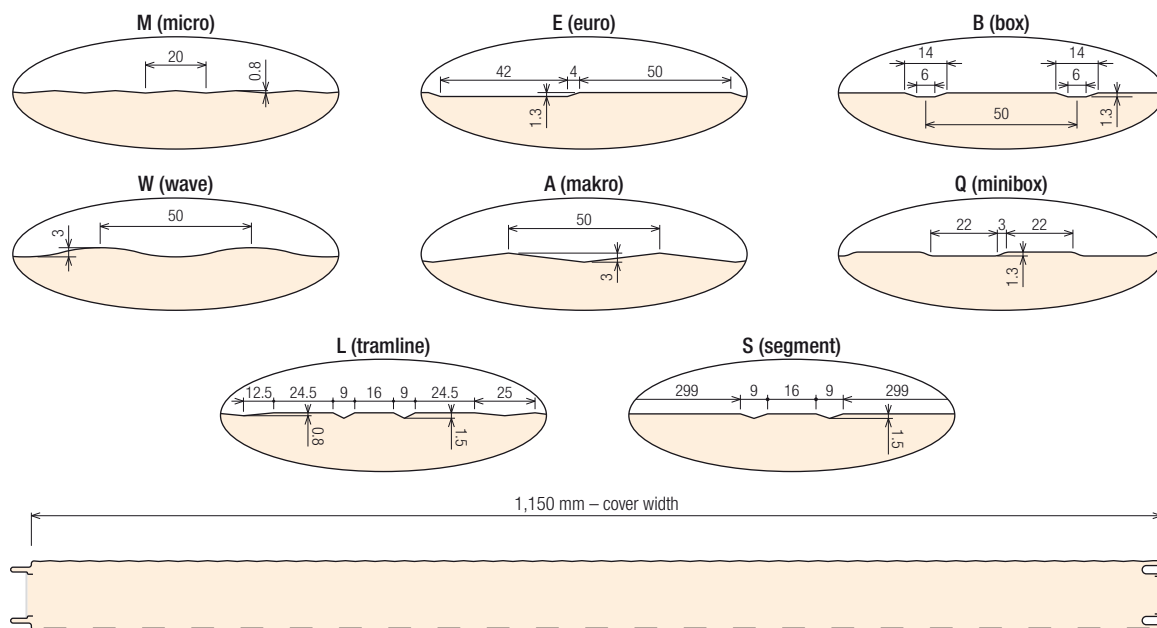
### Application

The KS1150 TF is a through fixed wall system which can be laid vertically or horizontally and is suitable for wall claddings on all types of buildings.

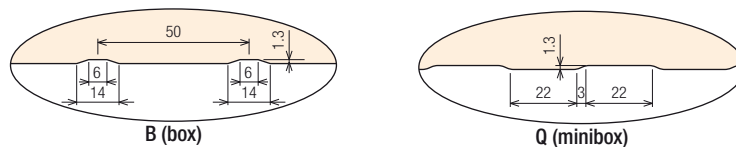


### Dimensions & Weight

#### External Facing Profiles



#### Internal Facing Profiles



Panel Thickness (mm)		40	50	60	70	80	100	120	150	170	200
Weight (kg/m <sup>2</sup> )	sheet 0.6/0.4 mm	11.72	12.18	12.64	13.10	13.56	14.48	15.40	16.78	17.70	19.08

### Product Tolerances

All materials intended for production of composite panels are in compliance with national regulations and standards. Dimensional tolerances of Kingspan insulated panels correspond to EN 14509 annex D.

#### Panel length

For panel length under 6 m  $\pm 4$  mm  
 Panel length is equal or over 6 m and under 12 m  $\pm 6$  mm  
 Panel length is equal or over 12 m  $\pm 8$  mm

#### Panel width

$\pm 3$  mm

#### Thickness

Panel thickness  $d \leq 50$  mm  $\pm 2$  mm  
 Panel thickness  $50 \text{ mm} < d < 100$  mm  $+3$  mm  $-2$  mm  
 Panel thickness  $d \geq 100$  mm  $+3$  mm  $-3$  mm  
 Squariness of the cut end  $\leq 0.5\%$  of the panel width.  
 Panel bow  $(\Delta 1 + \Delta 2)/2 \leq 10$  mm

## Product Data

### Available Lengths

The standard panel length is between 2 and 14.5 meters. Panels shorter than 2 m and longer than 14.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.60 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1150 TF panel side joints have factory applied anti-condensation seals fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
40	0.595	1.51
50	0.447	2.07
60	0.370	2.53
70	0.321	2.95
80	0.277	3.44
100	0.222	4.34
120	0.185	5.23
150	0.149	6.55
170	0.131	7.46
200	0.112	8.79

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1150 TF insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according EN 13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
40	N/A	N/A
50		
60	EI 15-ef(o→i) EW15(i→o)	EI 15
70		
80	EI 15-ef(o→i) EW30-ef(o→i) EW15(i→o)	
100		
120	EI 20-ef(o→i)/ EW15(i→o)	
150		
170		
200		

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction R <sub>w</sub> (dB)
40	27
50	
60	
70	
80	
100	28
120	
150	
170	29
200	

### Building Regulations

Kingspan KS1150 TF insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating, product guarantees on an individual project basis.

### Packing

#### Standard packing – road transportation

KS1150 TF panels are stacked weather side to internal side. The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 4,200 kg.

Panel core thickness (mm)	40	50	60	70	80	100	120	150	170	200
Number of panels in package	26	21	17	15	13	10	8	7	6	5

### Delivery

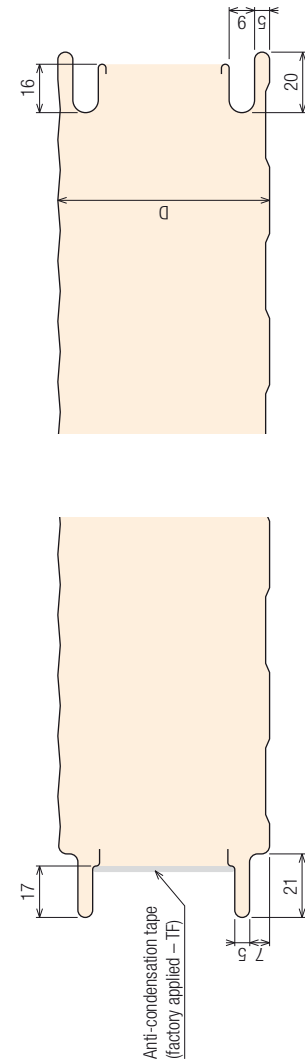
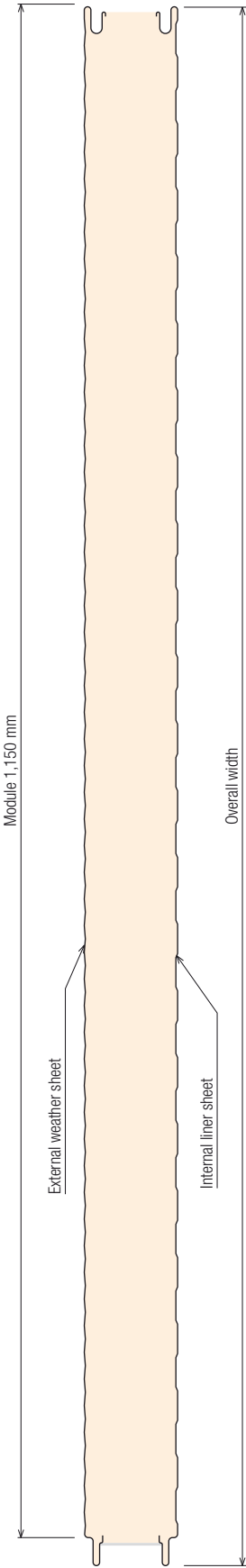
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



Available Panel Thicknesses

Panel Thickness (D)	Overall Panel Width
40	1,171
50	
60	
70	
80	
100	
120	
150	
170	
200	

## Product Data

### Application

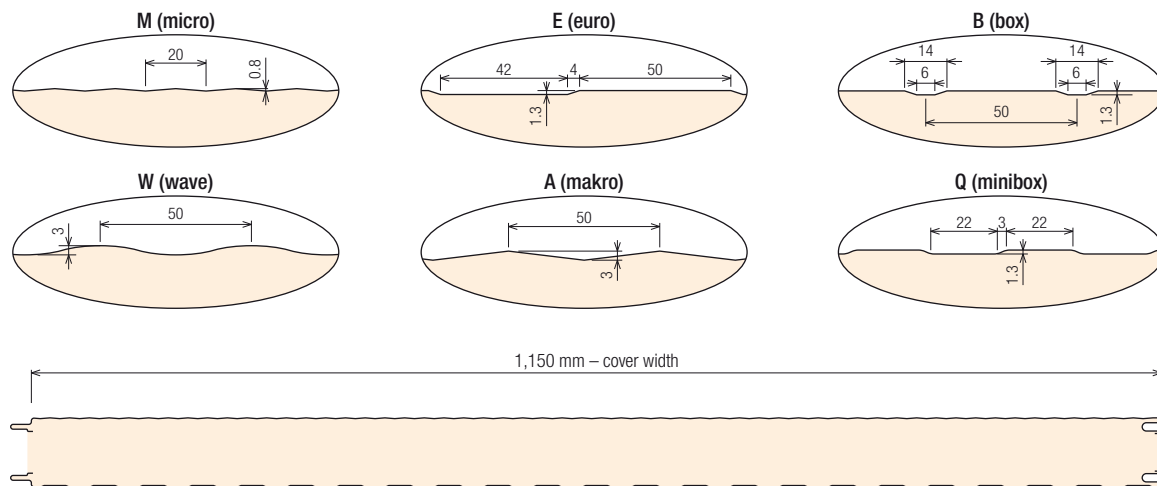
The KS1150 TC is a through fixed wall system which can be laid vertically or horizontally and is suitable for wall claddings on all types of buildings.

For the KS1150 TC follow the manufacturer's instructions given in the Controlled Environments section for special requirements relating to the cladding of cold stores.

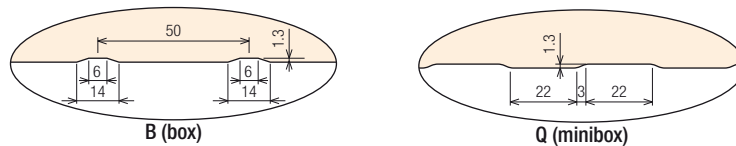


### Dimensions & Weight

#### External Facing Profiles



#### Internal Facing Profiles



Panel Thickness (mm)		40	50	60	70	80	100	120	150	170	200
Weight (kg/m <sup>2</sup> )	sheet 0.5/0.5 mm	10.24	10.64	11.04	11.44	11.84	12.64	13.44	13.74	14.44	15.49

### Product Tolerances

All materials intended for production of composite panels are in compliance with national regulations and standards. Dimensional tolerances of Kingspan insulated panels correspond to EN 14509 annex D.

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm -2 mm
Panel thickness $d \geq 100$ mm	+3 mm -3 mm
Squariness of the cut end $\leq 0.5\%$ of the panel width.	
Panel bow $(\Delta 1 + \Delta 2)/2 \leq 10$ mm	

### Available Lengths

The standard panel length is between 2 and 14.5 meters. Panels shorter than 2 m and longer than 14.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.60 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1150 TC panel side joints have factory applied anti-condensation seal fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
40	0.595	1.51
50	0.447	2.07
60	0.370	2.53
70	0.321	2.95
80	0.277	3.44
100	0.222	4.34
120	0.185	5.23
150	0.149	6.55
170	0.131	7.46
200	0.112	8.79

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1150 TC insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according to EN 13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
40	N/A	N/A
50		EI 15
60		
70		
80		
100		
120		
150		
170		
200		

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction $R_w$ (dB)
40	27
50	
60	
70	
80	
100	28
120	
150	
170	29
200	

### Building Regulations

Kingspan KS1150 TC insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating, product guarantees on an individual project basis.

### Packing

#### Standard packing – road transportation

KS1150 TC panels are stacked weather side to internal side. The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 4,200 kg.

Panel core thickness (mm)	40	50	60	70	80	100	120	150	170	200
Number of panels in package	26	21	17	15	13	10	8	7	6	5

### Delivery

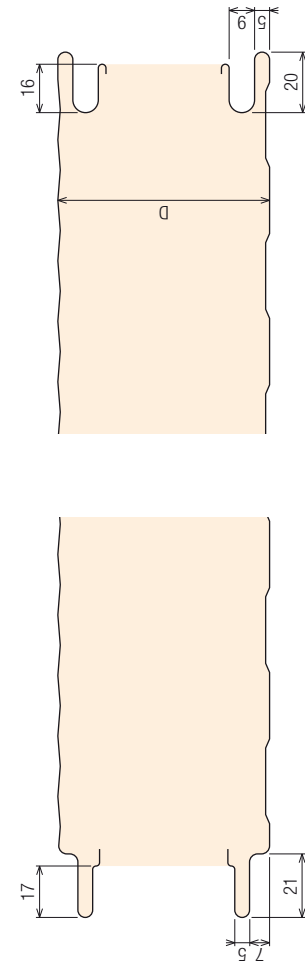
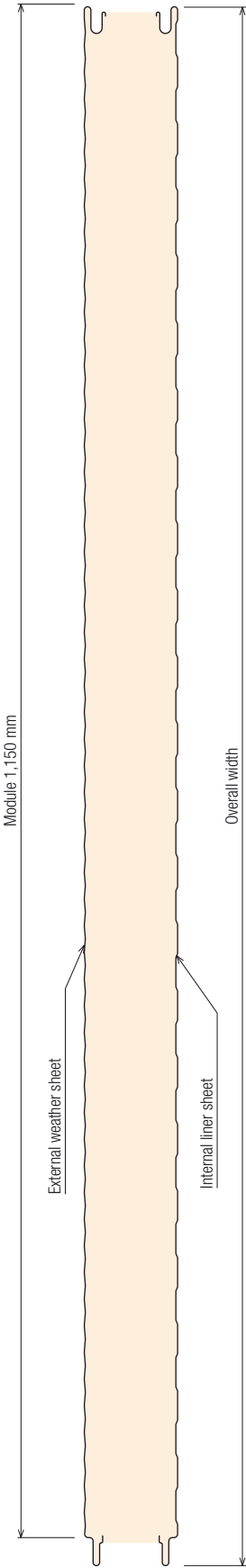
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



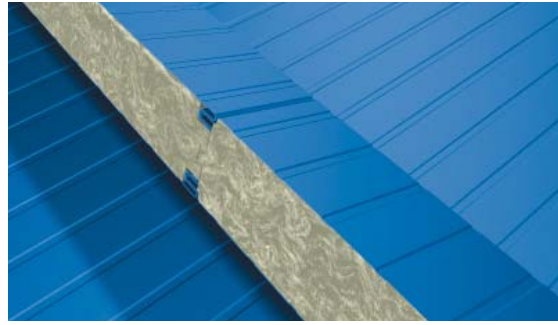
Available Panel Thicknesses

Panel Thickness (D)	Overall Panel Width
40	1,171
50	
60	
70	
80	
100	
120	
150	
170	
200	

## Product Data

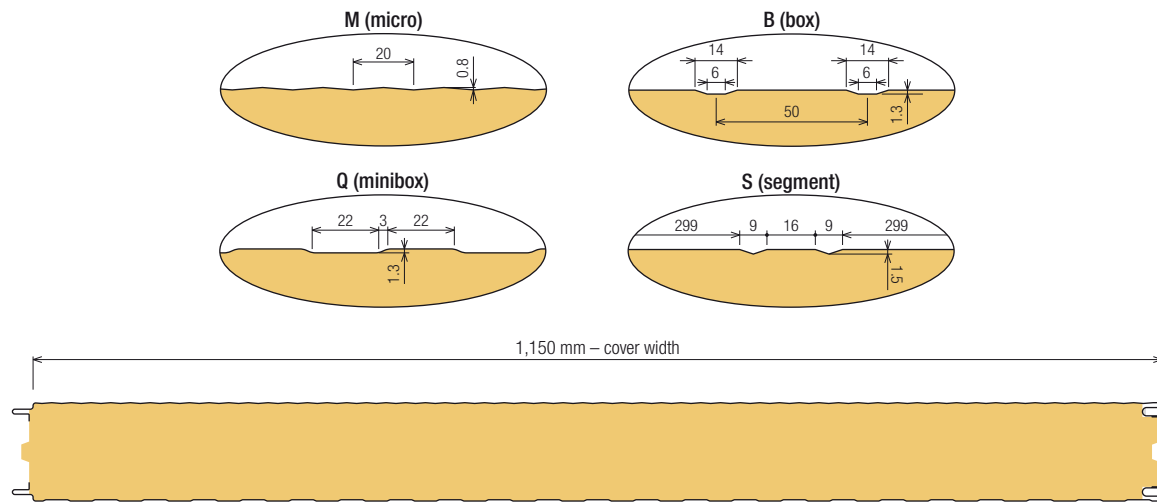
### Application

The KS1150 FR is a through-fixed wall system which can be laid vertically or horizontally and is suitable for wall cladding on all types of buildings except where there are internal low temperature conditions (below 0 °C).

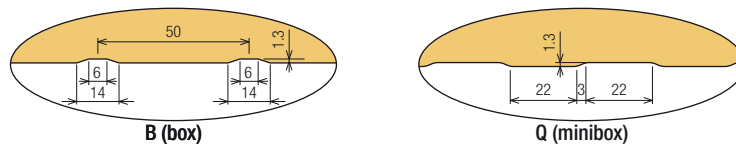


### Dimensions & Weight

#### External Facing Profiles



#### Internal Facing Profiles



Panel Thickness (mm)		60	80	100	120	150	200
Weight (kg/m <sup>2</sup> )	sheet 0.6/0.5 mm	18.37	20.90	23.43	25.96	29.76	36.08

### Product Tolerances

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm -2 mm
Panel thickness $d \geq 100$ mm	+3 mm -3 mm
Squarness of the cut end $\leq 0.5\%$ of the panel width.	

### Available Lengths

The standard panel length is between 2 and 13.5 meters. Panels shorter than 2 m and longer than 10 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.60 mm.
- Standard internal sheet thickness 0.50 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Mineral fiber of a high density ( $\geq 100 \text{ kg/m}^3$ ) suitable for use in application, where higher fire resistance is required.

### Seals

#### Factory Applied Side Joint Tape

All KS1150 FR panel side joints have factory applied anti-condensation seals fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	HCFC Free $\lambda = 0.044$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
60	0.675	1.31
80	0.520	1.75
100	0.422	2.20
120	0.354	2.65
150	0.287	3.31
200	0.218	4.42

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1150 FR insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. The system is classified as A2-s<sub>1</sub>,d<sub>0</sub> according EN13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
60	E30(↔), EW30(↔)	E30, EW30, EI30
80	EI30(↔)	
100	E60(↔), EW60(↔) EI60(↔)	E60, EW60, EI60
120	E120(↔),	E120, EW120, EI90
150	EW90(↔), EI90(↔)	
200	contact Kingspan for further info	

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction R <sub>w</sub> (dB)
60	31
80	
100	32
120	
150	
200	

## Building Regulations

Kingspan KS1150 FR insulated sandwich panels apply to the european standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating, product guarantees on an individual project basis.

### Packing

#### Standard packing – road transportation

KS1150 FR panels are stacked weather side to internal side. The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,500 kg.

Panel core thickness (mm)	60	80	100	120	150	200
Number of panels in package	17	13	10	8	7	5

### Delivery

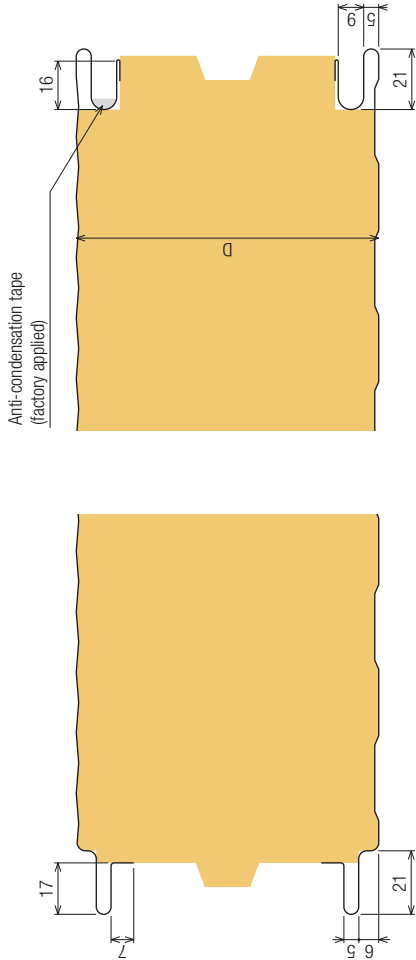
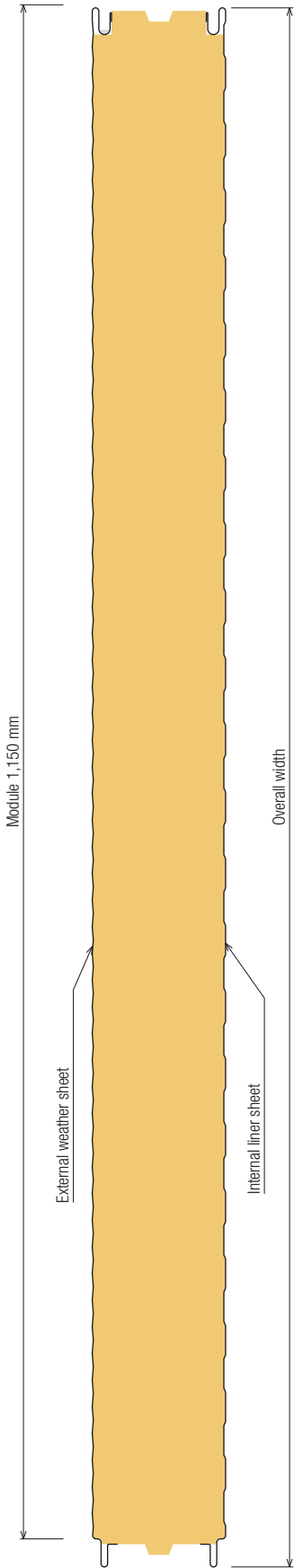
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



Available Panel Thicknesses

Panel Thickness (D)	Overall Panel Width
60	1,171
80	
100	
120	
150	
200	

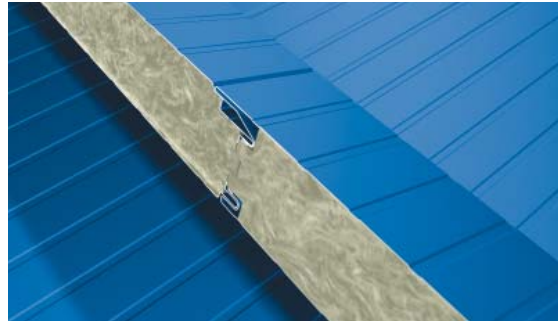
Note:

External sheet thickness of 0.4 mm to 0.9 mm  
Internal sheet thickness of 0.4 mm to 0.9 mm  
According to specification a combination of external and internal profiles are available as indicated on page 4.4.13.  
All dimensions in millimetres.

## Product Data

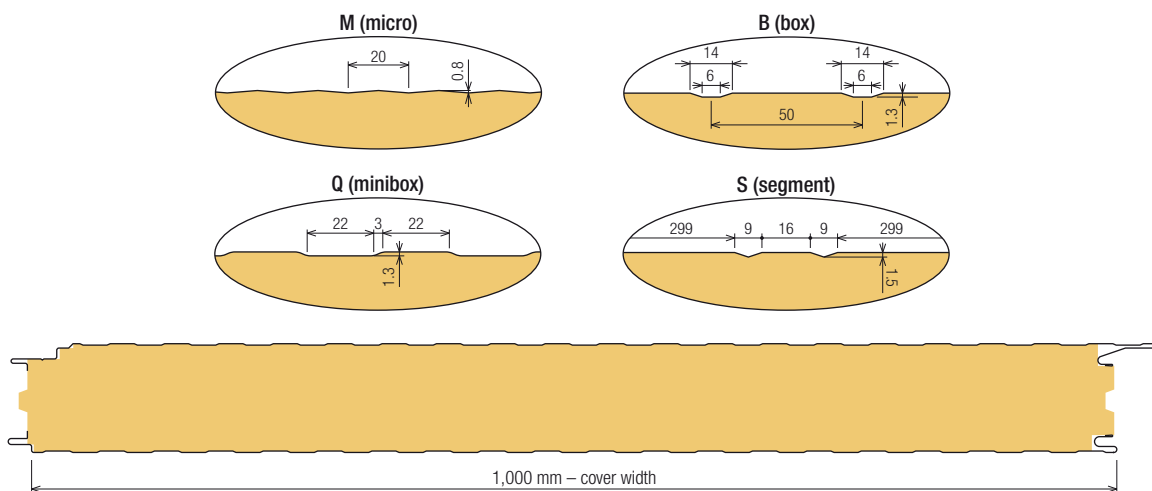
### Application

The KS1000 FH is a concealed fixed wall system which can be laid vertically or horizontally and is suitable for wall claddings on all types of buildings except where there are low internal temperature conditions (below 0 °C).

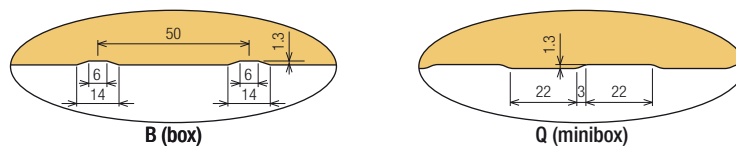


### Dimensions & Weight

#### External Facing Profiles



#### Internal Facing Profiles



Panel Thickness (mm)	60	80	100	120	150	200	
Weight (kg/m <sup>2</sup> )	sheet 0.6/0.5 mm	16.28	18.48	20.68	22.88	26.18	31.68

### Product Tolerances

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm -2 mm
Panel thickness $d \geq 100$ mm	+3 mm -3 mm
Squarness of the cut end $\leq 0.5\%$ of the panel width.	

### Available Lengths

The standard panel length is between 2 and 13.5 meters. Panels shorter than 2 m and longer than 13.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.60 mm.
- Standard internal sheet thickness 0.50 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Mineral fiber of a high density ( $\geq 100 \text{ kg/m}^3$ ) suitable for use in application, where higher fire resistance is required.

### Seals

#### Factory Applied Side Joint Tape

All KS1000 FH panel side joints have factory applied anti-condensation seals fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	HCFC Free $\lambda = 0.044$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
60	0.70	1.27
80	0.53	1.73
100	0.42	2.22
120	0.36	2.64
150	0.29	3.33
200	0.22	4.46

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are nondeleterious.

### Fire

KS1000 FH insulated sandwich panels have been tested and approved and comply with National Building Regulations and standards. The KS1000 FH wall system is classified as A2-s<sub>1</sub>,d<sub>0</sub> according to EN13501-1.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
60	N/A	N/A
80		
100	E60(i→o), EW60(i→o), EI 60(i→o), E120-ef(o→i), EW60-ef(o→i), EI 120-ef(o→i)	E60, EW60, EI 60
120		
150		
200	contact Technical department	

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction R <sub>w</sub> (dB)
60	31
80	
100	32
120	
150	
200	

## Building Regulations

Kingspan KS1000 FH insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating, product guarantees on an individual project basis.

### Packing

#### Standard packing – road transportation

KS1000 FH panels are stacked weather side to internal side. The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,600 kg.

Panel core thickness (mm)	60	80	100	120	150	200
Number of panels in package	17	13	10	8	7	5

### Delivery

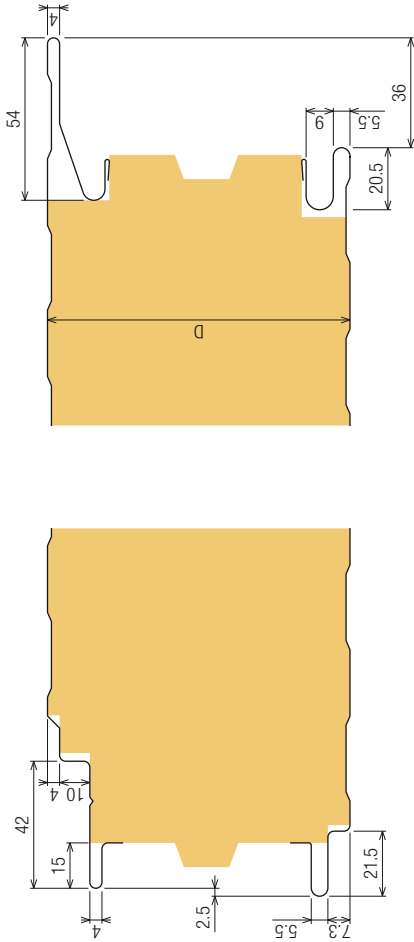
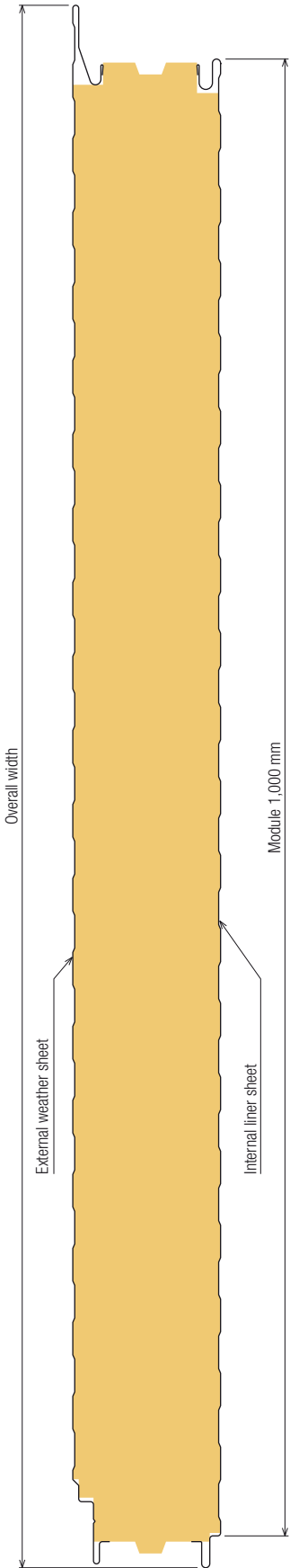
All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Panel Dimensions



Available Panel Thicknesses

Panel Thickness (D)	Overall Panel Width
60	1,058
80	
100	
120	
150	
200	

**Note:**  
External sheet thickness of 0.4 mm to 0.9 mm  
Internal sheet thickness of 0.4 mm to 0.9 mm  
According to specification a combination of external and internal profiles are available as indicated on page 4.5.17.  
All dimensions in millimetres.

## Product Data

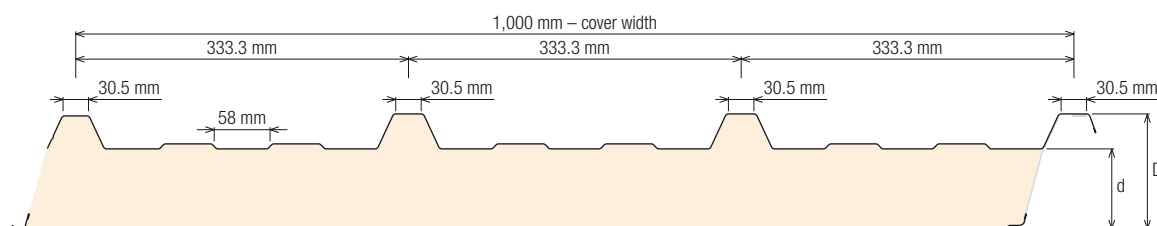
### Application

The KS1000 RW wall system uses a standard fastening method (through fixed). It is applicable for all building applications and especially in those projects, where there is a requirement for a more profiled surface appearance.

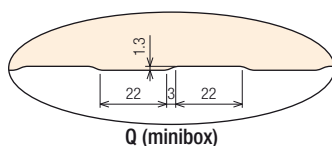
The KS1000 RW wall system can also be used for roof cladding.



### Dimensions & Weight



### Internal Facing Profiles



d – core thickness (mm)	25	40	50	60	70	80	100	120	160	
D – overall dimension (mm)	60	75	85	95	105	115	135	155	195	
Weight (kg/m <sup>2</sup> )	sheet 0.5/0.4 mm	9.03	9.63	10.03	10.43	10.83	11.23	12.03	12.83	14.43

### Product Tolerances

#### Panel length

For panel length under 6 m	±4 mm
Panel length is equal or over 6 m and under 12 m	±6 mm
Panel length is equal or over 12 m	±8 mm

#### Panel width

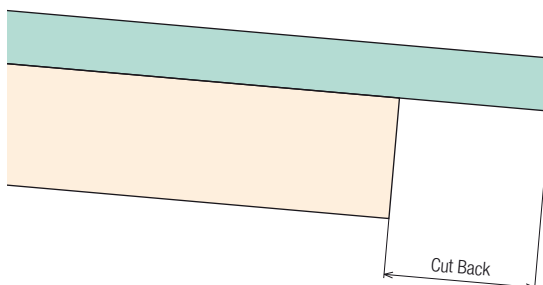
±3 mm

#### Thickness

Panel thickness $d \leq 50$ mm	±2 mm
Panel thickness $50 \text{ mm} < d < 100$ mm	+3 mm –2 mm
Panel thickness $d \geq 100$ mm	+3 mm –3 mm
Squariness of the cut end $\leq 0.5\%$ of the panel width.	
Panel bow $(\Delta 1 + \Delta 2)/2 \leq 10$ mm	

### Panel End Lap Cut Back

If the project requires panels to be connected in the direction of the roof slope, the panels must have an overlap. Depending on the overlap length, the insulating core at the panel end under the overlap must be removed during mounting. For these situations, we can deliver panels with cut backs already made. These panels are normally delivered with a cut back up to 250 mm, but other cutback lengths are possible (see section KS1000 RW roof system). All RW panels have a cut back of 20 mm conditional of manufacturing.



### Available Lengths

The standard panel length is between 2 and 14.5 meters. Panels shorter than 2 m and longer than 14.5 m are available on request. Please contact your Kingspan sales partner.

### Certification Reference

Kingspan possesses a wide range of insulated panel approvals (building, technical, thermal, static, fire, acoustic). In case you require further information, please contact Kingspan Technical department.

## Product Data

### Steel

#### Galvanic protection options

1. Hot-dip zinc coated steel with a total of 275 g/m<sup>2</sup> of zinc, according to EN 10147:2000. This can be finished with a number of coatings – Polyester, Spectrum™, PVDF, Plastisol and Foodsafe finishes.
2. Galvalloy (hot-dip coated with eutectic alloy of approx. 95% Zn, 5% Al and other elements) in accordance with EN 10214 for 200 µm Plastisol coated steel.

#### Substrate thicknesses

- Standard external sheet thickness 0.50 mm.
- Standard internal sheet thickness 0.40 mm.
- Other thicknesses are available by arrangement with Kingspan.

### External Coating Options

#### 1. Standard Polyester – PES

Polyester is a universal, economic coating system suitable for exterior and interior applications. The nominal coating thickness is 25 µm.

#### 2. PVDF

PVDF offers unequalled colour and gloss retention and good corrosion resistance. The nominal coating thickness is 25 µm. It can be used in climates with extremely high UV radiation combined with extreme temperatures and relative humidity. The standard colour range includes metallic silver.

#### 3. Spectrum™

Kingspan Spectrum™ is a 60µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability- and weather resistance performance, excellent corrosion and UV-resistance as well as high color & gloss retention characteristics.

Its superior flexibility enables high resistance against mechanical damages. Kingspan Spectrum is available in a wide range of solid and metallic colours.

Furthermore it is free of chlorine, phthalates and plasticizers and 100% recyclable.

#### 4. Plastisol 200 µm

Plastisol is a high performance coating system with a grain finish and a nominal thickness of 200 µm. Typical properties of Plastisol are excellent abrasion, high corrosion resistance, excellent flexibility and therefore very good scratch resistance.

### Internal Coating Options

#### 1. Polyester

Polyester coating with a nominal thickness of 15 µm. The standard colour is grey white, (similar RAL 9002).

#### 2. Foodsafe

The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. The standard colour is white. Consult Kingspan about the availability of other colours.

Other coating systems are available by discussion with Kingspan.

Plain and coloured aluminium is available on a project specific basis. Contact Kingspan Technical Services.

### Insulation Core

Rigid PUR or Firesafe IPN closed-cell foam is the standard insulating core used.

It is made to a non-deleterious specification with Zero Ozone Depletion Potential ODP and is CFC/HCFC free.

### Seals

#### Factory Applied Side Joint Tape

All KS1000 RW panel side joints have factory applied anti-condensation seal fitted into the groove to automatically seal the joint between panels.

## Product Data

### Performance

#### Thermal Insulation according to EN ISO 10211-2

Panel Thickness (mm)	IPN $\lambda = 0.0224$	
	U (W/m <sup>2</sup> K)	R (m <sup>2</sup> K/W)
25	0.745	1.17
40	0.505	1.81
50	0.411	2.26
60	0.348	2.70
70	0.300	3.16
80	0.266	3.59
100	0.213	4.52
120	0.180	5.39
160	0.143	6.82

U – Thermal transmittance W/m<sup>2</sup>K

R – Thermal resistance m<sup>2</sup>K/W

$\lambda$  – Long-term Thermal conductivity W/mK

### Biological

Kingspan insulated sandwich panels are immune to attack from mould, fungi, mildew and vermin. No urea formaldehyde is used in the construction, and the panels are non-deleterious.

### Fire

KS1000 RW insulated sandwich panels have been tested and approved and comply with National Building Regulations and Norms. Panels with FIREsafe IPN core are classified as B-s<sub>1</sub>,d<sub>0</sub> according to EN 13501-1. The panels do not propagate fire spread.

Panel Thickness (mm)	Fire resistance according EN 13501-2	
	External walls	Internal walls
25/60	N/A	N/A
40/75		
50/85		
60/95	E30(i→o), EI20(i→o), EW20(i→o)	
70/105		
80/115		
100/135		
120/155		
160/195		

### Acoustics

Panel Thickness (mm)	single figure weighted sound reduction R <sub>w</sub> (dB)
25	25
40	
50	
60	
70	
80	
100	
120	26
160	

### Building Regulations

Kingspan KS1000 RW insulated sandwich panels apply to the European standard EN 14509: Self-supporting double skin metal faced insulating panels and conform to additional National Building Regulations and standards.

### Quality

Kingspan insulated sandwich panels are manufactured from the highest quality materials, using state of the art production equipment to rigorous quality control standards, complying with ISO9001:2000 standards, ensuring long term reliability and service life.

### Guarantees & Warranties

Kingspan will provide external coating and product guarantees on a project by project basis.

### Packing

#### Standard packing – road transportation

KS1000 RW panels are stacked weather side to weather side (to minimise palette height). The top, bottom, sides and ends are protected with foam and timber packing and the entire palette is wrapped in plastic.

The number of panels in each pack depends on panel thickness and length. The table below is shown as a guide. Quantities are reduced for exceptionally long panels. Typical palette height is 1,100 mm.

Maximum palette weight is 3,500 kg.

Panel core thickness (mm)	25	40	50	60	70	80	100	120	160
Number of panels in package	23	17	15	13	11	9	7	6	4

### Delivery

All deliveries (unless indicated otherwise) are by road transport to project site. Off loading is the responsibility of the client.

### Site Installation

Site assembly instructions are available from Kingspan.

Kingspan will arrange training of the site fitters and supervisors if requested.

Module 1,000 mm

333.3

333.3

333.3

30.5

30.5

30.5

30.5

External weather sheet

Internal liner sheet

PVC sealing tape (factory applied) or Butyl sealing tape (site applied)

Overall width

27

58

16.1

30.5

16.1

35

65°

33

50.5

56

36-42

27

15°

110°

30.5

20

15°

110°

75°

10

3

1.3

Anti-condensation tape (factory applied)

**Note:**

External sheet thickness of 0.5 mm to 0.9 mm  
Internal sheet thickness of 0.4 mm to 0.9 mm  
All dimensions in millimetres

Insulation Core (d)	Overall Panel Thickness (D)	Overall Panel Width
25	60	1,067
40	75	1,069
50	85	1,074
60	95	1,079
70	105	1,083
80	115	1,088
100	135	1,097
120	155	1,107
160	195	1,125

# Load-Span Tables

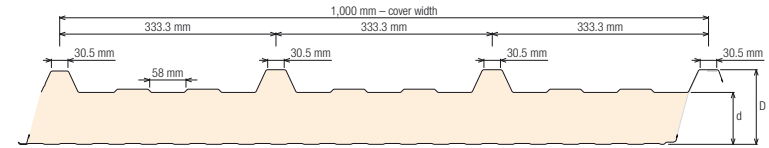
■	KS1000 RW	5.1
■	KS1000 FF	5.13
■	KS1150 TF	5.21
■	KS1150 FR, KS1000 FH	5.37
■	KS1000 AWP	5.45
■	KS1000 X-DEK	5.53





**KS1000 RW**

Roofpanel KS1000 RW 25 0.5 / 0.4 - S280/S280 – according to EN 14509

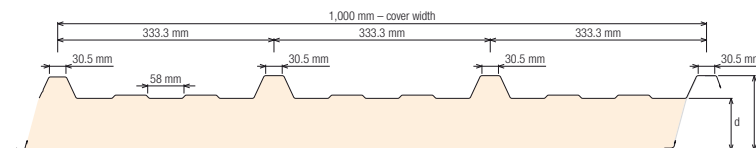


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 3.09	40 2.88	40 2.50	40 2.13	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 4.21	40 3.08	40 2.50	40 2.13	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 4.21	40 3.08	40 2.50	40 2.31	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 4.21	40 3.08	40 2.50	40 2.31	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 4.22	40 3.08	40 2.50	40 2.13	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 4.22	40 3.08	40 2.50	40 2.13	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 4.22	40 3.08	40 2.50	40 2.13	40 1.88	40 1.69	40 1.54	40 1.42	40 1.33	40 1.25	40 1.18	40 1.12	40 1.07	40 1.03	40 0.99	40 0.95	40 0.92	40 0.89	40 0.86	40 0.84
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

Roofpanel KS1000 RW 25 0.5 / 0.4 - S280/S280 – according to EN 14509

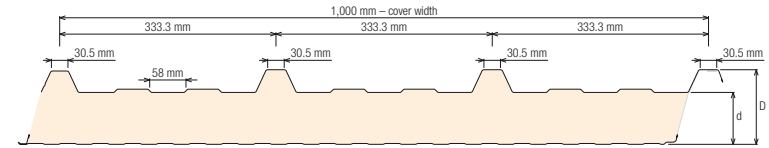


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 2.86	40 2.46	40 2.31	40 2.19	40 2.10	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 5.81	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.81	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.81	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 5.30	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.30	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.30	40 3.74	40 2.94	40 2.48	40 2.17	40 1.95	40 1.78	40 1.64	40 1.52	40 1.43	40 1.35	40 1.28	40 1.22	40 1.16	40 1.12	40 1.07	40 1.04	40 1.00	40 0.97	40 0.94
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1000 RW**

Roofpanel KS1000 RW 40 0.5 / 0.4 - S280/S280 – according to EN 14509

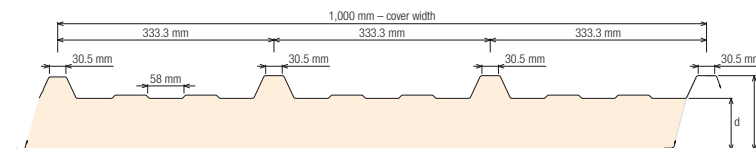


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 3.84	40 3.45	40 3.04	40 2.54	40 2.20	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	63	65	66	68	69	71
Double Span	I (f)	40 4.93	40 3.55	40 2.87	40 2.45	40 2.17	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	63	65	66	68	69	71
	II (f)	40 4.93	40 3.55	40 2.87	40 2.45	40 2.17	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	63	65	66	68	69	71
	III (f)	40 4.93	40 3.55	40 2.87	40 2.45	40 2.17	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	63	65	66	68	69	71
Multi Span	I (f)	40 5.30	40 3.82	40 3.04	40 2.54	40 2.20	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	62	63	65	66	68	69	71
	II (f)	40 5.30	40 3.82	40 3.04	40 2.54	40 2.20	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	62	63	65	66	68	69	71
	III (f)	40 5.30	40 3.82	40 3.04	40 2.54	40 2.20	40 1.94	40 1.75	40 1.59	40 1.47	40 1.37	40 1.28	40 1.21	40 1.15	40 1.10	40 1.05	40 1.01	40 0.97	40 0.94	40 0.91	40 0.88
		60	60	60	60	60	60	60	60	60	60	60	60	60	62	63	65	66	68	69	71

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

Roofpanel KS1000 RW 40 0.5 / 0.4 - S280/S280 – according to EN 14509

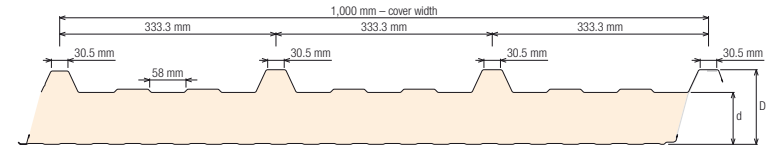


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 3.25	40 3.03	40 2.81	40 2.65	40 2.52	40 2.41	40 2.23	40 2.04	40 1.88	40 1.74	40 1.63	40 1.53	40 1.44	40 1.36	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 7.50	40 4.91	40 3.83	40 3.17	40 2.72	40 2.40	40 2.17	40 1.99	40 1.84	40 1.72	40 1.62	40 1.53	40 1.44	40 1.36	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 7.50	40 4.91	40 3.71	40 3.03	40 2.60	40 2.30	40 2.08	40 1.91	40 1.77	40 1.66	40 1.56	40 1.48	40 1.41	40 1.35	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 7.50	40 4.68	40 3.45	40 2.81	40 2.42	40 2.14	40 1.94	40 1.79	40 1.67	40 1.56	40 1.48	40 1.41	40 1.34	40 1.29	40 1.24	40 1.20	40 1.16	40 1.12	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 6.42	40 4.91	40 3.83	40 3.20	40 2.78	40 2.47	40 2.23	40 2.04	40 1.88	40 1.74	40 1.63	40 1.53	40 1.44	40 1.36	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 6.42	40 4.91	40 3.83	40 3.20	40 2.78	40 2.47	40 2.23	40 2.04	40 1.88	40 1.74	40 1.63	40 1.53	40 1.44	40 1.36	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 6.42	40 4.91	40 3.83	40 3.20	40 2.78	40 2.47	40 2.23	40 2.04	40 1.88	40 1.74	40 1.63	40 1.53	40 1.44	40 1.36	40 1.30	40 1.24	40 1.18	40 1.14	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1000 RW**

Roofpanel KS1000 RW 60 0.5 / 0.4 - S280/S280 – according to EN 14509

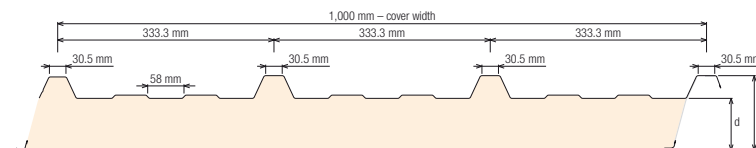


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		4.86	4.28	3.83	3.38	2.90	2.54	2.25	2.02	1.83	1.68	1.55	1.44	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98
Double Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		5.52	3.92	3.13	2.66	2.33	2.10	1.92	1.77	1.66	1.56	1.48	1.41	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98
	60	60	60	60	60	60	60	60	60	61	64	66	69	71	72	73	74	75	76	77	79
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	5.52	3.92	3.13	2.66	2.33	2.10	1.92	1.77	1.66	1.56	1.48	1.41	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98	
	60	60	60	60	60	60	60	60	60	61	64	66	69	71	72	73	74	75	76	77	79
III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	5.52	3.92	3.13	2.66	2.33	2.10	1.92	1.77	1.66	1.56	1.48	1.41	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98	
60	60	60	60	60	60	60	60	60	60	61	64	66	69	71	72	73	74	75	76	77	79
Multi Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		6.34	4.49	3.57	3.02	2.64	2.37	2.16	2.00	1.83	1.68	1.55	1.44	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98
	60	60	60	60	60	60	60	63	66	68	69	69	70	71	72	73	74	75	76	77	79
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	6.34	4.49	3.57	3.02	2.64	2.37	2.16	2.00	1.83	1.68	1.55	1.44	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98	
	60	60	60	60	60	60	60	63	66	68	69	69	70	71	72	73	74	75	76	77	79
III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	6.34	4.49	3.57	3.02	2.64	2.37	2.16	2.00	1.83	1.68	1.55	1.44	1.35	1.27	1.20	1.15	1.10	1.05	1.01	0.98	
60	60	60	60	60	60	60	63	66	68	69	69	70	71	72	73	74	75	76	77	79	

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

Roofpanel KS1000 RW 60 0.5 / 0.4 - S280/S280 – according to EN 14509

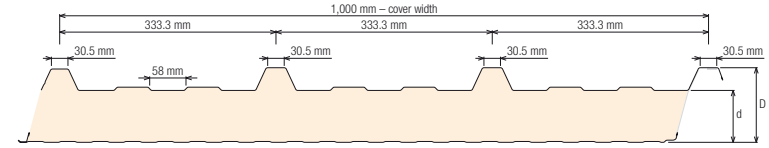


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 4.38	40 3.88	40 3.57	40 3.34	40 3.16	40 3.01	40 3.01	40 2.81	40 2.65	40 2.52	40 2.36	40 2.20	40 2.06	40 1.83	40 1.73	40 1.64	40 1.55	40 1.48	40 1.41	40 1.35
		60 9.25	60 6.05	60 4.57	60 3.67	60 3.11	60 2.73	60 2.44	60 2.23	60 2.05	60 1.91	60 1.79	60 1.69	60 1.60	60 1.53	60 1.46	60 1.40	60 1.35	60 1.30	60 1.26	60 1.22
Double Span	I (f)	40 9.25	40 6.05	40 4.57	40 3.67	40 3.11	40 2.73	40 2.44	40 2.23	40 2.05	40 1.91	40 1.79	40 1.69	40 1.60	40 1.53	40 1.46	40 1.40	40 1.35	40 1.30	40 1.26	40 1.22
	II (f)	40 9.25	40 6.04	40 4.36	40 3.50	40 2.96	40 2.60	40 2.33	40 2.13	40 1.96	40 1.83	40 1.72	40 1.62	40 1.54	40 1.47	40 1.414	40 1.35	40 1.30	40 1.26	40 1.22	40 1.18
	III (f)	40 9.25	40 5.60	40 4.02	40 3.23	40 2.74	40 2.41	40 2.17	40 1.98	40 1.84	40 1.72	40 1.62	40 1.53	40 1.46	40 1.40	40 1.34	40 1.29	40 1.24	40 1.20	40 1.16	40 1.13
Multi Span	I (f)	40 7.99	40 6.05	40 4.83	40 4.14	40 3.58	40 3.12	40 2.78	40 2.52	40 2.32	40 2.15	40 2.01	40 1.89	40 1.79	40 1.70	40 1.62	40 1.55	40 1.49	40 1.44	40 1.38	40 1.34
	II (f)	40 7.99	40 6.05	40 4.83	40 4.12	40 3.47	40 3.03	40 2.70	40 2.45	40 2.25	40 2.08	40 1.95	40 1.84	40 1.74	40 1.65	40 1.58	40 1.51	40 1.45	40 1.40	40 1.35	40 1.31
	III (f)	40 7.99	40 6.05	40 4.83	40 3.93	40 3.31	40 2.88	40 2.57	40 2.33	40 2.14	40 1.99	40 1.86	40 1.75	40 1.66	40 1.58	40 1.51	40 1.45	40 1.40	40 1.34	40 1.30	40 1.26

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

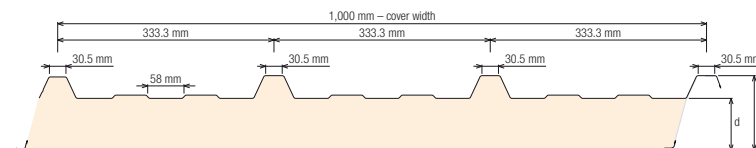
Roofpanel KS1000 RW 80 0.5 / 0.4 - S280/S280 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 5.88	40 5.08	40 4.55	40 4.18	40 3.67	41 3.23	42 2.87	43 2.56	43 2.31	43 2.10	43 1.92	43 1.76	43 1.63	43 1.52	43 1.42	43 1.34	43 1.26	43 1.20	43 1.14	43 1.10
		60	60	60	60	60	60	60	62	64	67	70	72	74	76	78	81	82	85	86	88
Double Span	I (f)	40 6.02	40 4.26	40 3.38	40 2.85	40 2.49	40 2.23	40 2.03	40 1.87	40 1.74	40 1.64	40 1.55	40 1.47	40 1.40	40 1.34	40 1.29	40 1.25	41 1.20	42 1.17	43 1.13	44 1.10
		60	60	60	60	60	60	60	62	64	67	70	72	74	76	78	81	82	85	86	88
	II (f)	40 6.02	40 4.26	40 3.38	40 2.85	40 2.49	40 2.23	40 2.03	40 1.87	40 1.74	40 1.64	40 1.55	40 1.47	40 1.40	40 1.34	40 1.29	40 1.25	41 1.20	42 1.17	43 1.13	44 1.10
		60	60	60	60	60	60	60	62	64	67	70	72	74	76	78	81	82	85	86	88
	III (f)	40 6.02	40 4.26	40 3.38	40 2.85	40 2.49	40 2.23	40 2.03	40 1.87	40 1.74	40 1.64	40 1.55	40 1.47	40 1.40	40 1.34	40 1.29	40 1.25	41 1.20	42 1.17	43 1.13	44 1.10
		60	60	60	60	60	60	60	62	64	67	70	72	74	76	78	81	82	85	86	88
Multi Span	I (f)	40 6.90	40 4.85	40 3.84	40 3.22	40 2.80	40 2.50	40 2.27	40 2.09	40 1.95	40 1.82	40 1.72	40 1.64	41 1.56	43 1.50	43 1.42	43 1.34	43 1.26	43 1.20	44 1.14	44 1.10
		60	60	60	60	60	60	66	69	72	75	77	80	82	85	86	86	86	87	87	88
	II (f)	40 6.90	40 4.85	40 3.84	40 3.22	40 2.80	40 2.50	40 2.27	40 2.09	40 1.95	40 1.82	40 1.72	40 1.64	41 1.56	43 1.50	43 1.42	43 1.34	43 1.26	43 1.20	44 1.14	44 1.10
		60	60	60	60	60	60	66	69	72	75	77	80	82	85	86	86	86	87	87	88
	III (f)	40 6.90	40 4.85	40 3.84	40 3.22	40 2.80	40 2.50	40 2.27	40 2.09	40 1.95	40 1.82	40 1.72	40 1.64	40 1.56	40 1.50	40 1.42	40 1.34	40 1.26	40 1.20	40 1.14	40 1.10
		60	60	60	60	60	60	66	69	72	75	77	80	82	85	86	86	86	87	87	88

## KS1000 RW

Roofpanel KS1000 RW 80 0.5 / 0.4 - S280/S280 – according to EN 14509

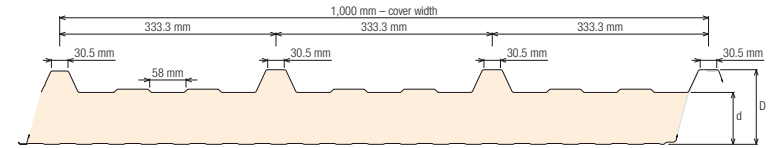


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 5.53	40 4.81	40 4.38	40 4.08	40 3.84	40 3.62	40 3.41	40 3.23	40 3.08	40 2.93	40 2.79	40 2.65	40 2.50	40 2.36	40 2.24	40 2.21	40 2.02	40 1.92	40 1.83	40 1.75
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 9.85	40 6.88	40 5.23	40 4.16	40 3.49	40 3.04	40 2.71	40 2.46	40 2.26	40 2.10	40 1.96	40 1.84	40 1.74	40 1.66	40 1.58	40 1.51	40 1.45	40 1.40	40 1.35	40 1.30
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 9.85	40 6.88	40 4.98	40 3.95	40 3.32	40 2.89	40 2.58	40 2.34	40 2.16	40 2.00	40 1.88	40 1.77	40 1.67	40 1.59	40 1.52	40 1.46	40 1.40	40 1.35	40 1.30	40 1.26
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 9.85	40 6.51	40 4.58	40 3.63	40 3.05	40 2.67	40 2.39	40 2.17	40 2.01	40 1.87	40 1.76	40 1.66	40 1.58	40 1.50	40 1.44	40 1.38	40 1.33	40 1.28	40 1.24	40 1.20
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 9.45	40 6.88	40 5.47	40 4.68	40 4.02	40 3.48	40 3.08	40 2.78	40 2.54	40 2.34	40 2.18	40 2.05	40 1.93	40 1.83	40 1.74	40 1.66	40 1.59	40 1.53	40 1.48	40 1.42
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 9.45	40 6.88	40 5.47	40 4.66	40 3.89	40 3.37	40 2.98	40 2.69	40 2.46	40 2.27	40 2.12	40 1.98	40 1.87	40 1.78	40 1.69	40 1.62	40 1.55	40 1.49	40 1.44	40 1.39
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 9.45	40 6.88	40 5.47	40 4.43	40 3.70	40 3.20	40 2.83	40 2.55	40 2.34	40 2.16	40 2.01	40 1.89	40 1.78	40 1.69	40 1.62	40 1.54	40 1.48	40 1.43	40 1.38	40 1.33
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

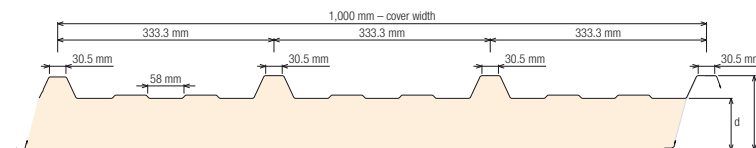
Roofpanel KS1000 RW 100 0.5 / 0.4 - S280/S280 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	42	50	56	58	60	61	61	61	61	61	60	59	59	59	59	59	59	59
		6.78	5.81	5.20	4.76	4.33	3.82	3.40	3.05	2.75	2.49	2.26	2.06	1.89	1.74	1.62	1.51	1.42	1.33	1.26	1.20
Double Span	I (f)	40	40	40	40	40	40	40	40	40	42	43	44	46	47	47	50	51	52	53	54
		6.33	4.47	3.54	2.97	2.59	2.31	2.10	1.94	1.80	1.69	1.60	1.51	1.44	1.38	1.33	1.28	1.23	1.19	1.16	1.12
	II (f)	60	60	60	62	67	70	74	77	80	83	86	89	91	94	97	99	101	104	107	108
		40	40	40	40	40	40	40	40	40	42	43	44	46	47	47	50	51	52	53	54
	III (f)	6.33	4.47	3.54	2.97	2.59	2.31	2.10	1.94	1.80	1.69	1.60	1.51	1.44	1.38	1.33	1.28	1.23	1.19	1.16	1.12
		60	60	60	62	67	70	74	77	80	83	86	89	91	94	97	99	101	104	107	108
Multi Span	I (f)	40	40	40	40	40	40	41	43	45	46	48	49	50	52	53	55	56	57	58	58
		7.22	5.07	3.99	3.34	2.90	2.58	2.34	2.15	2.00	1.87	1.76	1.67	1.59	1.52	1.46	1.41	1.36	1.32	1.26	1.20
	II (f)	60	60	65	70	74	78	82	86	89	92	95	98	101	104	106	109	112	115	116	116
		40	40	40	40	40	40	41	43	45	46	48	49	50	52	53	55	56	57	58	58
	III (f)	7.22	5.07	3.99	3.34	2.90	2.58	2.34	2.15	2.00	1.87	1.76	1.67	1.59	1.52	1.46	1.41	1.36	1.32	1.26	1.20
		60	60	65	70	74	78	82	86	89	92	95	98	101	104	106	109	112	115	116	116

## KS1000 RW

Roofpanel KS1000 RW 100 0.5 / 0.4 - S280/S280 – according to EN 14509

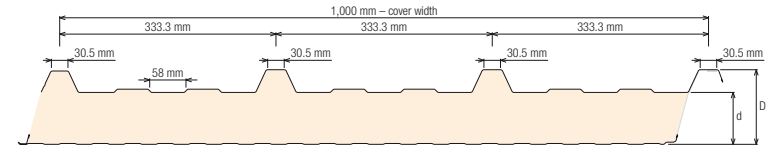


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 6.78	40 5.75	40 5.18	40 4.80	40 4.47	40 4.16	40 3.86	40 3.61	40 3.40	40 3.23	40 3.08	40 2.95	40 2.83	40 2.73	40 2.64	40 2.55	40 2.43	40 2.32	40 2.21	40 2.11
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 10.46	40 7.64	40 5.74	40 4.52	40 3.78	40 3.27	40 2.91	40 2.63	40 2.41	40 2.23	40 2.08	40 1.95	40 1.84	40 1.75	40 1.67	40 1.59	40 1.53	40 1.47	40 1.41	40 1.36
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 10.46	40 7.64	40 5.45	40 4.28	40 3.58	40 3.11	40 2.76	40 2.50	40 2.30	40 2.13	40 1.99	40 1.87	40 1.77	40 1.68	40 1.61	40 1.54	40 1.48	40 1.42	40 1.37	40 1.32
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 10.46	40 7.22	40 5.01	40 3.93	40 3.29	40 2.86	40 2.56	40 2.32	40 2.14	40 1.99	40 1.86	40 1.76	40 1.67	40 1.59	40 1.52	40 1.46	40 1.40	40 1.35	40 1.30	40 1.26
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 10.78	40 7.64	40 6.06	40 5.18	40 4.33	40 3.73	40 3.29	40 2.96	40 2.69	40 2.48	40 2.30	40 2.15	40 2.03	40 1.92	40 1.82	40 1.74	40 1.66	40 1.60	40 1.54	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 10.78	40 7.64	40 6.06	40 5.05	40 4.19	40 3.60	40 3.18	40 2.86	40 2.60	40 2.40	40 2.23	40 2.08	40 1.96	40 1.86	40 1.77	40 1.69	40 1.62	40 1.55	40 1.49	40 1.44
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 10.78	40 7.64	40 6.06	40 4.79	40 3.97	40 3.41	40 3.01	40 2.70	40 2.46	40 2.27	40 2.12	40 1.98	40 1.87	40 1.77	40 1.69	40 1.61	40 1.54	40 1.49	40 1.43	40 1.38
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1000 RW**

Roofpanel KS1000 RW 120 0.5 / 0.4 - S280/S280 – according to EN 14509

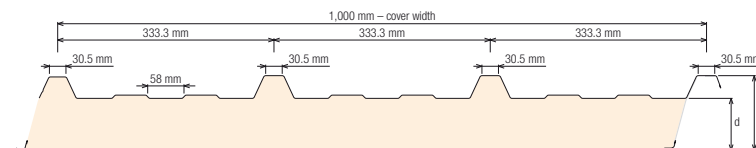


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 7.56	47 6.48	59 5.79	70 5.30	79 4.92	83 4.35	86 3.89	87 3.49	88 3.15	88 2.85	88 2.59	86 2.35	85 2.15	84 1.97	83 1.81	82 1.68	80 1.56	80 1.46	79 1.37	78 1.29
		67	67	75	81	86	91	95	99	103	107	110	114	117	120	123	126	130	133	136	138
Double Span	I (f)	40 6.52	40 4.61	40 3.65	40 3.06	43 2.67	45 2.38	48 2.16	50 1.99	52 1.85	53 1.73	55 1.63	57 1.55	58 1.47	60 1.41	62 1.35	63 1.30	65 1.26	67 1.22	68 1.18	69 1.14
		67	67	75	81	86	91	95	99	103	107	110	114	117	120	123	126	130	133	136	138
	II (f)	40 6.52	40 4.61	40 3.65	40 3.06	43 2.67	45 2.38	48 2.16	50 1.99	52 1.85	53 1.73	55 1.63	57 1.55	58 1.47	60 1.41	62 1.35	63 1.30	65 1.26	67 1.22	68 1.18	69 1.14
		67	67	75	81	86	91	95	99	103	107	110	114	117	120	123	126	130	133	136	138
	III (f)	40 6.52	40 4.61	40 3.65	40 3.06	43 2.67	45 2.38	48 2.16	50 1.99	52 1.85	53 1.73	55 1.63	57 1.55	58 1.47	60 1.41	62 1.35	63 1.30	65 1.26	67 1.22	68 1.18	69 1.14
		67	67	75	81	86	91	95	99	103	107	110	114	117	120	123	126	130	133	136	138
Multi Span	I (f)	40 7.41	40 5.20	42 4.09	45 3.42	48 2.96	50 2.63	52 2.38	55 2.19	57 2.03	59 1.90	61 1.79	63 1.70	64 1.62	66 1.55	68 1.48	70 1.43	71 1.38	73 1.33	74 1.29	76 1.26
		64	76	84	90	95	100	105	109	113	117	121	125	129	132	135	139	142	145	148	152
	II (f)	40 7.41	40 5.20	42 4.09	45 3.42	48 2.96	50 2.63	52 2.38	55 2.19	57 2.03	59 1.90	61 1.79	63 1.70	64 1.62	66 1.55	68 1.48	70 1.43	71 1.38	73 1.33	74 1.29	76 1.26
		64	76	84	90	95	100	105	109	113	117	121	125	129	132	135	139	142	145	148	152
	III (f)	40 7.41	40 5.20	42 4.09	45 3.42	48 2.96	50 2.63	52 2.38	55 2.19	57 2.03	59 1.90	61 1.79	63 1.70	64 1.62	66 1.55	68 1.48	70 1.43	71 1.38	73 1.33	74 1.29	76 1.26
		64	76	84	90	95	100	105	109	113	117	121	125	129	132	135	139	142	145	148	152

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 RW

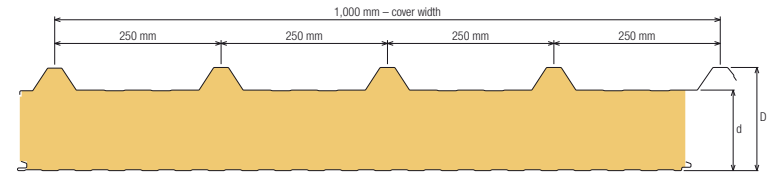
Roofpanel KS1000 RW 120 0.5 / 0.4 - S280/S280 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		7.75	6.70	5.98	5.49	5.01	4.55	4.20	3.93	3.70	3.50	3.34	3.20	3.07	2.96	2.86	2.77	2.69	2.61	2.55	2.45
Double Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.79	8.36	6.17	4.82	4.01	3.46	3.07	2.77	2.54	2.34	2.18	2.05	1.93	1.83	1.74	1.66	1.59	1.53	1.47	1.32
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.79	8.37	5.86	4.57	3.80	3.29	2.92	2.64	2.42	2.24	2.09	1.96	1.86	1.76	1.68	1.60	1.54	1.48	1.42	1.32
	III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.79	7.86	5.37	4.18	3.48	3.03	2.70	2.45	2.25	2.09	1.96	1.85	1.75	1.66	1.59	1.52	1.46	1.41	1.36	1.32
Multi Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		11.98	8.36	6.62	5.55	4.58	3.93	3.45	3.09	2.81	2.58	2.40	2.24	2.10	1.99	1.88	1.80	1.72	1.65	1.58	1.52
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		11.98	8.36	6.62	5.37	4.43	3.79	3.33	2.98	2.71	2.50	2.32	2.16	2.04	1.89	1.83	1.74	1.67	1.60	1.54	1.48
	III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		11.89	8.36	6.59	5.09	4.19	3.58	3.15	2.82	2.57	2.36	2.20	2.06	1.94	1.84	1.74	1.67	1.60	1.54	1.48	1.43

**KS1000 FF**

Roofpanel KS1000 FF 80 0.6 / 0.5 - S280/S280 – according to EN 14509

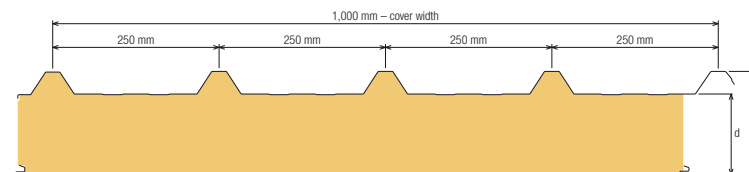


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	42 5.40	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	90 1.95	90 1.80	91 1.67	91 1.66	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	43 1.08	92 1.04
Double Span	I (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182
	II (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182
	III (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182
Multi Span	I (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182
	II (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182
	III (f)	49 6.28	60 4.93	67 4.13	74 3.58	78 3.16	82 2.83	85 2.55	87 2.32	88 2.12	90 1.95	90 1.80	91 1.67	91 1.55	91 1.45	91 1.36	91 1.28	91 1.20	91 1.14	91 1.08	91 1.04
		99	120	135	147	157	164	170	174	177	179	181	182	182	182	182	182	182	182	182	182

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 FF

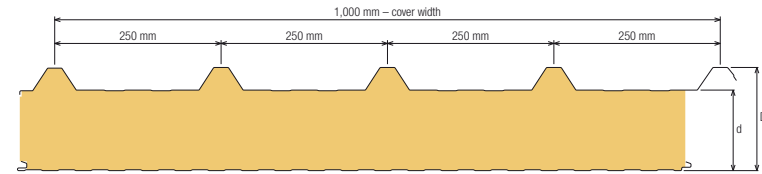
Roofpanel KS1000 FF 80 0.6 / 0.5 - S280/S280 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 5.40	40 5.40	40 5.01	40 4.61	40 3.94	40 3.27	40 2.82	40 2.48	40 2.23	40 2.03	40 1.87	40 1.74	40 1.63	40 1.54	40 1.46	40 1.39	40 1.32	40 1.27	40 1.22	40 1.18
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 6.31	40 6.31	40 4.48	40 3.40	40 2.80	40 2.42	40 2.14	40 1.94	40 1.79	40 1.66	40 1.55	40 1.46	40 1.39	40 1.32	40 1.26	40 1.21	40 1.17	40 1.13	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 6.31	40 6.31	40 4.01	40 3.05	40 2.52	40 2.19	40 1.96	40 1.78	40 1.65	40 1.54	40 1.45	40 1.37	40 1.30	40 1.25	40 1.20	40 1.15	40 1.11	40 1.07	40 1.04	40 1.01
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 6.31	40 4.20	40 2.25	40 1.92	40 1.74	40 1.62	40 1.52	40 1.44	40 1.38	40 1.32	40 1.28	40 1.24	40 1.19	40 1.14	40 1.10	40 1.06	40 1.03	40 1.00	40 0.97	40 0.95
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 8.27	40 8.27	40 5.45	40 4.11	40 3.35	40 2.85	40 2.50	40 2.24	40 2.04	40 1.88	40 1.75	40 1.64	40 1.55	40 1.47	40 1.40	40 1.34	40 1.29	40 1.24	40 1.20	40 1.16
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 8.27	40 8.17	40 5.13	40 3.85	40 3.13	40 2.67	40 2.34	40 2.10	40 1.92	40 1.77	40 1.65	40 1.55	40 1.47	40 1.40	40 1.33	40 1.28	40 1.23	40 1.18	40 1.14	40 1.11
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 8.24	40 7.44	40 4.61	40 3.44	40 2.80	40 2.39	40 2.10	40 1.90	40 1.74	40 1.61	40 1.51	40 1.42	40 1.35	40 1.29	40 1.24	40 1.19	40 1.14	40 1.10	40 1.07	40 1.04
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1000 FF**

Roofpanel KS1000 FF 100 0.6 / 0.5 - S280/S280 – according to EN 14509

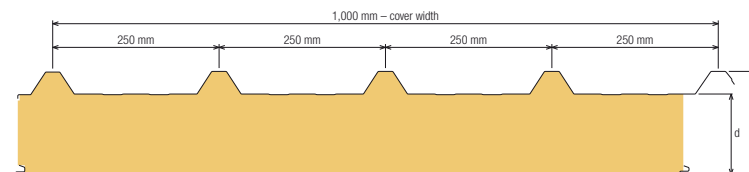


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	42	60	67	74	78	82	85	87	88	90	90	91	91	91	91	91	91	91	91	91
		5.40	4.93	4.13	3.58	3.16	2.83	2.55	2.32	2.12	1.95	1.80	1.67	1.55	1.45	1.36	1.28	1.20	1.14	1.08	1.04
Double Span	I (f)	49	60	67	74	78	82	85	87	88	90	90	91	91	91	91	91	51	91	91	91
		6.28	4.93	4.13	3.58	3.16	2.83	2.55	2.32	2.12	1.95	1.80	1.67	1.55	1.45	1.36	1.28	1.20	1.14	1.08	1.04
	II (f)	99	120	135	147	157	164	170	174	177	179	179	182	182	182	182	182	101	182	182	182
		49	60	67	74	78	82	85	87	88	90	90	91	91	91	91	91	51	91	91	91
	III (f)	6.28	4.93	4.13	3.58	3.16	2.83	2.55	2.32	2.12	1.95	1.80	1.67	1.55	1.45	1.36	1.28	1.20	1.14	1.08	1.04
		99	120	135	147	157	164	170	174	177	179	179	182	182	182	182	182	101	182	182	182
Multi Span	I (f)	49	60	67	74	78	82	85	87	88	90	90	91	91	91	91	91	51	91	91	91
		6.28	4.93	4.13	3.58	3.16	2.83	2.55	2.32	2.12	1.95	1.80	1.67	1.55	1.45	1.36	1.28	1.20	1.14	1.08	1.04
	II (f)	99	120	135	147	157	164	170	174	177	179	179	182	182	182	182	182	101	182	182	182
		49	60	67	74	78	82	85	87	88	90	90	91	91	91	91	91	51	91	91	91
	III (f)	6.28	4.93	4.13	3.58	3.16	2.83	2.55	2.32	2.12	1.95	1.80	1.67	1.55	1.45	1.36	1.28	1.20	1.14	1.08	1.04
		99	120	135	147	157	164	170	174	177	179	179	182	182	182	182	182	101	182	182	182

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1000 FF**

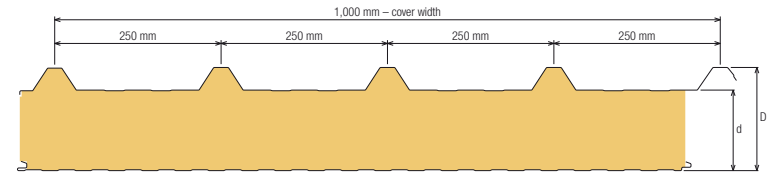
Roofpanel KS1000 FF 100 0.6 / 0.5 - S280/S280 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 6.15	40 6.15	40 5.85	40 4.19	40 3.30	40 2.75	40 2.37	40 2.10	40 1.89	40 1.73	40 1.60	40 1.49	40 1.40	40 1.32	40 1.26	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 4.28	40 4.28	40 4.28	40 3.64	40 2.98	40 2.56	40 2.26	40 2.04	40 1.88	40 1.73	40 1.60	40 1.49	40 1.40	40 1.32	40 1.26	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 4.28	40 4.28	40 4.28	40 3.26	40 2.69	40 2.33	40 2.08	40 1.89	40 1.74	40 1.62	40 1.52	40 1.44	40 1.37	40 1.30	40 1.25	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 4.28	40 4.28	40 2.59	40 2.20	40 1.98	40 1.82	40 1.71	40 1.62	40 1.54	40 1.47	40 1.39	40 1.32	40 1.26	40 1.21	40 1.16	40 1.12	40 1.08	40 1.05	40 1.02	40 0.99
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 5.44	40 5.44	40 5.44	40 4.19	40 3.30	40 2.75	40 2.37	40 2.10	40 1.89	40 1.73	40 1.60	40 1.49	40 1.40	40 1.32	40 1.26	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.44	40 5.44	40 5.44	40 4.09	40 3.28	40 2.75	40 2.37	40 2.10	40 1.89	40 1.73	40 1.60	40 1.49	40 1.40	40 1.32	40 1.26	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.44	40 5.44	40 4.99	40 3.64	40 2.92	40 2.48	40 2.18	40 1.96	40 1.80	40 1.67	40 1.56	40 1.47	40 1.40	40 1.32	40 1.26	40 1.20	40 1.15	40 1.11	40 1.07	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1000 FF**

Roofpanel KS1000 FF 120 0.6 / 0.5 - S280/S280 – according to EN 14509

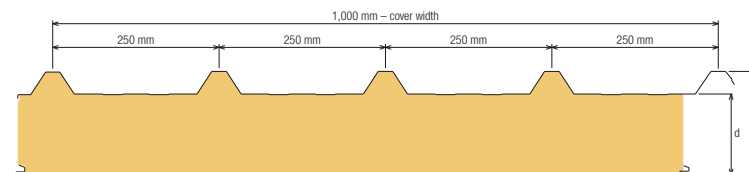


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	59 6.84	71 5.53	73 4.26	75 3.49	76 2.98	78 2.61	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.50	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
Double Span	I (f)	41 4.70	61 4.70	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		81 122	122 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200
	II (f)	41 4.70	61 4.70	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		81 122	122 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200
	III (f)	41 4.70	61 4.70	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		81 122	122 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200
Multi Span	I (f)	50 5.74	71 5.52	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		100 142	142 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200
	II (f)	50 5.74	71 5.52	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		100 142	142 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200
	III (f)	50 5.74	71 5.52	73 4.25	74 3.48	76 2.97	78 2.60	79 2.33	81 2.11	82 1.94	84 1.80	86 1.68	87 1.58	89 1.49	90 1.42	92 1.36	94 1.30	95 1.25	97 1.20	98 1.16	100 1.12
		100 142	142 146	146 149	149 152	152 155	155 159	159 162	162 165	165 168	168 171	171 174	174 177	177 181	181 185	185 188	188 191	191 193	193 197	197 200	200

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 FF

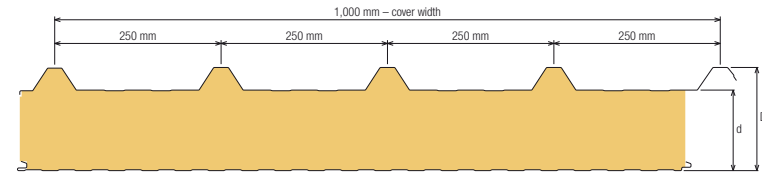
Roofpanel KS1000 FF 120 0.6 / 0.5 - S280/S280 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 6.84	40 6.84	40 6.53	40 4.62	40 3.62	40 3.00	40 2.58	40 2.27	40 2.04	40 1.86	40 1.72	40 1.60	40 1.50	40 1.41	40 1.34	40 1.28	40 1.22	40 1.17	40 1.13	40 1.09
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 4.69	40 4.69	40 4.69	40 3.93	40 3.18	40 2.72	40 2.40	40 2.16	40 1.98	40 1.83	40 1.70	40 1.60	40 1.50	40 1.41	40 1.34	40 1.28	40 1.22	40 1.17	40 1.13	40 1.09
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 4.69	40 4.69	40 4.69	40 3.52	40 2.88	40 2.48	40 2.20	40 2.00	40 1.84	40 1.71	40 1.60	40 1.51	40 1.43	40 1.36	40 1.30	40 1.25	40 1.20	40 1.16	40 1.12	40 1.08
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 4.69	40 4.69	40 2.95	40 2.45	40 2.19	40 2.00	40 1.87	40 1.76	40 1.66	40 1.56	40 1.47	40 1.39	40 1.33	40 1.27	40 1.22	40 1.17	40 1.13	40 1.09	40 1.06	40 1.03
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 5.73	40 5.73	40 5.73	40 4.63	40 3.62	40 3.00	40 2.58	40 2.27	40 2.04	40 1.86	40 1.72	40 1.60	40 1.50	40 1.41	40 1.34	40 1.28	40 1.22	40 1.17	40 1.13	40 1.09
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.73	40 5.73	40 5.73	40 4.38	40 3.48	40 2.92	40 2.54	40 2.27	40 2.04	40 1.86	40 1.72	40 1.60	40 1.50	40 1.41	40 1.34	40 1.28	40 1.22	40 1.17	40 1.13	40 1.09
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.73	40 5.73	40 5.73	40 3.88	40 3.08	40 2.60	40 2.28	40 2.05	40 1.88	40 1.74	40 1.62	40 1.53	40 1.45	40 1.38	40 1.32	40 1.27	40 1.22	40 1.17	40 1.13	40 1.09
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1000 FF**

Roofpanel KS1000 FF 150 0.6 / 0.5 - S280/S280 – according to EN 14509

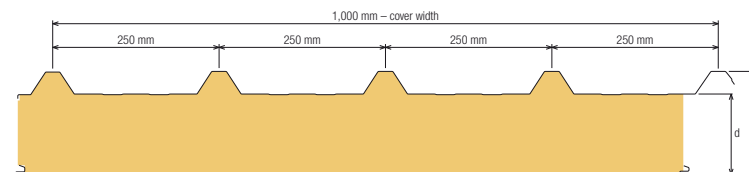


System	Colour group	characteristic downwards load, e.g. snow load [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	63 8.83	72 6.38	74 4.75	76 3.82	77 3.21	79 2.79	81 2.48	82 2.23	84 2.04	85 1.89	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.16
Double Span	I (f)	42 5.97	68 5.97	74 4.74	75 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		85	135	148	151	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204
	II (f)	42 5.97	68 5.97	74 4.74	75 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		85	135	148	150	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204
	III (f)	42 5.97	68 5.97	74 4.74	75 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		85	135	148	150	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204
Multi Span	I (f)	53 7.52	72 6.36	74 4.74	76 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		107	144	148	152	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204
	II (f)	53 7.52	72 6.36	74 4.74	76 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		107	144	148	152	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204
	III (f)	53 7.52	72 3.63	74 4.74	76 3.81	77 3.21	79 2.78	80 2.47	82 2.23	84 2.04	85 1.88	87 1.76	89 1.65	90 1.56	92 1.48	94 1.41	95 1.34	97 1.29	99 1.24	100 1.20	102 1.14
		107	144	148	152	154	157	161	164	168	170	174	177	180	184	188	190	194	198	200	204

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 FF

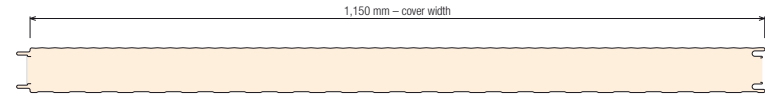
Roofpanel KS1000 FF 150 0.6 / 0.5 - S280/S280 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 8.82	40 8.82	40 6.19	40 4.53	40 3.61	40 3.02	40 2.61	40 2.32	40 2.09	40 1.91	40 1.76	40 1.64	40 1.54	40 1.46	40 1.38	40 1.32	40 1.26	40 1.21	40 1.16	40 1.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 5.97	40 5.97	40 4.86	40 3.74	40 3.11	40 2.70	40 2.40	40 2.17	40 1.99	40 1.85	40 1.72	40 1.62	40 1.53	40 1.45	40 1.38	40 1.32	40 1.26	40 1.21	40 1.16	40 1.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.97	40 5.97	40 4.34	40 3.38	40 2.84	40 2.49	40 2.23	40 2.03	40 1.88	40 1.74	40 1.64	40 1.54	40 1.46	40 1.39	40 1.33	40 1.28	40 1.22	40 1.18	40 1.14	40 1.10
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.97	40 3.72	40 2.93	40 2.56	40 2.32	40 2.14	40 2.01	40 1.85	40 1.72	40 1.61	40 1.52	40 1.44	40 1.37	40 1.31	40 1.26	40 1.21	40 1.16	40 1.12	40 1.09	40 1.05
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 7.51	40 7.51	40 5.83	40 4.36	40 3.54	40 3.01	40 2.61	40 2.32	40 2.09	40 1.91	40 1.76	40 1.64	40 1.54	40 1.46	40 1.38	40 1.32	40 1.26	40 1.21	40 1.16	40 1.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 7.51	40 7.51	40 5.42	40 4.06	40 3.30	40 2.82	40 2.48	40 2.23	40 2.04	40 1.89	40 1.76	40 1.64	40 1.54	40 1.46	40 1.38	40 1.32	40 1.26	40 1.21	40 1.16	40 1.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 7.51	40 7.51	40 4.78	40 3.58	40 2.94	40 2.53	40 2.25	40 2.04	40 1.88	40 1.75	40 1.64	40 1.55	40 1.47	40 1.40	40 1.34	40 1.29	40 1.24	40 1.20	40 1.16	40 1.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1150 TF**

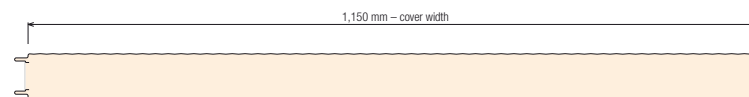
Wallpanel KS1150 TF 40 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 4.66	40 4.04	40 3.56	40 3.22	40 2.98	40 2.78	40 2.62	40 2.43	40 2.16	40 1.95	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
Double Span	I (f)	40 5.10	40 3.82	40 3.27	40 2.94	40 2.71	40 2.54	40 2.40	40 2.28	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.99
		60	60	60	60	60	60	66	72	77	76	77	77	77	77	77	77	77	77	77	77
	II (f)	40 5.10	40 3.82	40 3.27	40 2.94	40 2.71	40 2.54	40 2.40	40 2.28	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.99
		60	60	60	60	60	60	66	72	77	76	77	77	77	77	77	77	77	77	77	77
	III (f)	40 5.10	40 3.82	40 3.27	40 2.94	40 2.71	40 2.54	40 2.40	40 2.28	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.99
		60	60	60	60	60	60	66	72	77	76	77	77	77	77	77	77	77	77	77	77
Multi Span	I (f)	40 6.51	40 4.65	40 3.82	40 3.34	40 3.01	40 2.77	40 2.58	40 2.43	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	65	71	77	77	76	77	77	77	77	77	77	77	77	77	77
	II (f)	40 6.51	40 4.65	40 3.82	40 3.34	40 3.01	40 2.77	40 2.58	40 2.43	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	65	71	77	77	76	77	77	77	77	77	77	77	77	77	77
	III (f)	40 6.51	40 4.65	40 3.82	40 3.34	40 3.01	40 2.77	40 2.58	40 2.43	40 2.16	40 1.94	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	65	71	77	77	76	77	77	77	77	77	77	77	77	77	77

## KS1150 TF

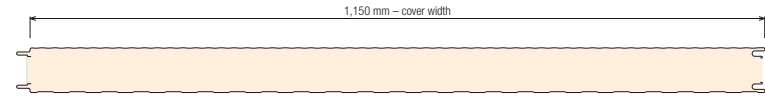
Wallpanel KS1150 TF 40 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 3.88	40 3.48	40 3.21	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 5.92	40 4.19	40 3.42	40 2.96	40 2.65	40 2.42	40 2.24	40 2.09	40 1.97	40 1.87	40 1.77	40 1.62	40 1.50	40 1.39	40 1.30	40 1.22	40 1.14	40 1.08	40 1.02	40 0.98
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1150 TF**

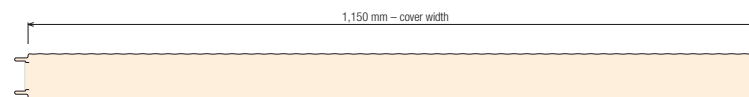
Wallpanel KS1150 TF 60 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 6.61	40 5.53	40 4.85	40 4.40	40 4.07	45 3.77	49 3.53	53 3.34	56 3.17	58 2.96	58 2.69	58 2.46	58 2.28	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
Double Span	I (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	60	66	74	81	88	95	102	108	114	116	116	116	116	116	116	116	116
	II (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	60	66	74	81	88	95	102	108	114	116	116	116	116	116	116	116	116
	III (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	60	66	74	81	88	95	102	108	114	116	116	116	116	116	116	116	116
Multi Span	I (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	65	73	81	88	94	101	107	113	116	116	116	116	116	116	116	116	116
	II (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	65	73	81	88	94	101	107	113	116	116	116	116	116	116	116	116	116
	III (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60	60	60	65	73	81	88	94	101	107	113	116	116	116	116	116	116	116	116	116

**KS1150 TF**

Wallpanel KS1150 TF 60 E/I 0.6 / 0.4 – according to EN 14509

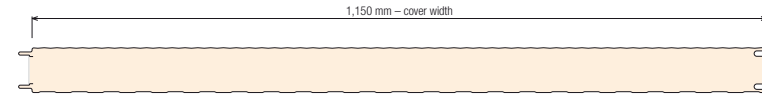


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 5.62	40 4.97	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 7.30	40 5.16	40 4.21	40 3.65	40 3.26	40 2.98	40 2.76	40 2.58	40 2.43	40 2.31	40 2.20	40 2.11	40 2.02	40 1.95	40 1.88	40 1.82	40 1.74	40 1.64	40 1.56	40 1.48
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1150 TF**

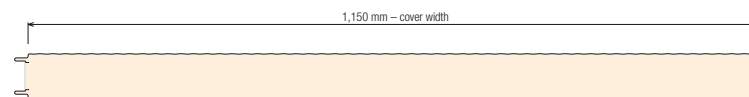
Wallpanel KS1150 TF 80 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 8.39	40 6.86	40 6.01	43 5.46	49 5.00	54 4.61	59 4.27	63 3.99	67 3.76	70 3.57	74 3.40	77 3.26	78 3.05	78 2.84	78 2.64	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
Double Span	I (f)	40 7.27	40 5.46	40 4.66	40 4.19	40 3.87	43 3.63	47 3.42	51 3.25	55 3.10	59 2.98	62 2.88	66 2.79	69 2.71	73 2.64	76 2.58	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	60	66	76	86	94	102	110	117	125	132	139	146	152	156	156	156	156	156
	II (f)	40 7.27	40 5.46	40 4.66	40 4.19	40 3.87	43 3.63	47 3.42	51 3.25	55 3.10	59 2.98	62 2.88	66 2.79	69 2.71	73 2.64	76 2.58	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	60	66	76	86	94	102	110	117	125	132	139	146	152	156	156	156	156	156
	III (f)	40 7.27	40 5.46	40 4.66	40 4.19	40 3.87	43 3.63	47 3.42	51 3.25	55 3.10	59 2.98	62 2.88	66 2.79	69 2.71	73 2.64	76 2.58	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	60	66	76	86	94	102	110	117	125	132	139	146	152	156	156	156	156	156
Multi Span	I (f)	40 9.29	40 6.63	40 5.46	40 4.77	42 4.30	47 3.95	51 3.68	55 3.47	58 3.29	62 3.14	65 3.01	69 2.90	72 2.80	75 2.72	78 2.64	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	64	75	85	93	102	110	117	124	130	137	144	150	156	156	156	156	156	156
	II (f)	40 9.29	40 6.63	40 5.46	40 4.77	42 4.30	47 3.95	51 3.68	55 3.47	58 3.29	62 3.14	65 3.01	69 2.90	72 2.80	75 2.72	78 2.64	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	64	75	85	93	102	110	117	124	130	137	144	150	156	156	156	156	156	156
	III (f)	40 9.29	40 6.63	40 5.46	40 4.77	42 4.30	47 3.95	51 3.68	55 3.47	58 3.29	62 3.14	65 3.01	69 2.90	72 2.80	75 2.72	78 2.64	78 2.48	78 2.33	78 2.20	78 2.09	78 1.98
		60	60	64	75	85	93	102	110	117	124	130	137	144	150	156	156	156	156	156	156

**KS1150 TF**

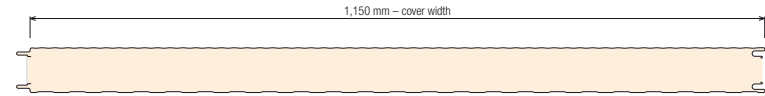
Wallpanel KS1150 TF 80 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 7.24	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 8.45	40 5.98	40 4.88	40 4.23	40 3.78	40 3.45	40 3.20	40 2.99	40 2.82	40 2.67	40 2.55	40 2.44	40 2.34	40 2.26	40 2.18	40 2.11	40 2.05	40 1.99	40 1.94	40 1.89
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1150 TF**

Wallpanel KS1150 TF 100 E/I 0.6 / 0.4 – according to EN 14509

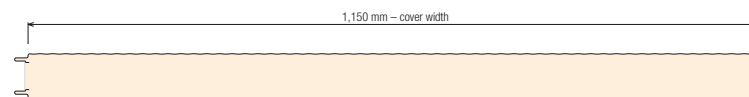


System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	50	60	67	73	79	84	90	94	99	103	108	108	108	108	108	108	109	109
		9.99	8.05	7.05	6.32	5.65	5.16	4.78	4.47	4.21	4.00	3.81	3.65	3.51	3.28	3.06	2.87	2.70	2.55	2.42	2.30
Double Span	I (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109
		8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30
	60	60	75	90	104	117	128	139	150	160	170	180	190	198	208	216	217	217	217	217	
	II (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109
	8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30	
	60	60	75	90	104	117	128	139	150	160	170	180	190	198	208	216	217	217	217	217	217
III (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109	
	8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30	
Multi Span	I (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109
		10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30
	60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	
	II (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109
	10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30	
	60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	
III (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109	
	10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30	
60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	217	

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 TF

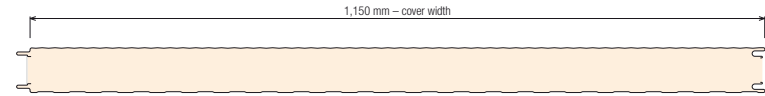
Wallpanel KS1150 TF 100 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 8.76	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 9.47	40 6.70	40 5.47	40 4.73	40 4.23	40 3.86	40 3.58	40 3.35	40 3.16	40 2.99	40 2.86	40 2.73	40 2.63	40 2.53	40 2.44	40 2.37	40 2.30	40 2.23	40 2.17	40 2.12
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

## KS1150 TF

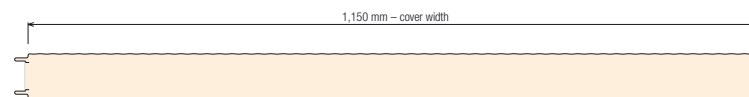
Wallpanel KS1150 TF 120 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	54	71	82	92	100	108	116	123	129	136	142	148	150	150	150	150	150	150	150
		11.38	9.17	7.99	6.93	6.20	5.66	5.24	4.90	4.62	4.38	4.18	4.00	3.85	3.62	3.38	3.17	2.98	2.82	2.67	2.53
Double Span	I (f)	40	40	52	62	71	81	89	96	104	111	118	125	131	138	144	150	150	150	150	150
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
	II (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
	III (f)	40	40	52	62	71	81	89	96	104	111	118	125	131	138	144	150	150	150	150	150
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
Multi Span	I (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53
	II (f)	40	48	60	70	79	87	94	102	109	115	122	128	134	140	146	150	150	150	150	150
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53
	III (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53

## KS1150 TF

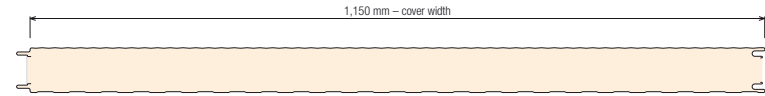
Wallpanel KS1150 TF 120 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.20	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
Double Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
	III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
Multi Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32
	III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		10.38	7.34	6.00	5.19	4.64	4.24	3.92	3.67	3.46	3.28	3.13	3.00	2.88	2.78	2.68	2.60	2.52	2.45	2.38	2.32

**KS1150 TF**

Wallpanel KS1150 TF 150 E/I 0.6 / 0.4 – according to EN 14509

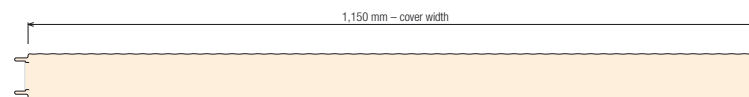


System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 13.40	56 10.74	68 8.77	79 7.60	88 6.79	97 6.20	104 5.74	112 5.37	118 5.06	125 4.80	131 4.58	137 4.39	142 4.21	148 4.06	153 3.92	158 3.80	162 3.68	165 3.53	165 3.34	165 3.18
Double Span	I (f)	40 10.16	40 7.68	51 6.59	62 5.94	71 5.49	80 5.11	88 4.82	95 4.58	103 4.39	110 4.22	117 4.08	123 3.96	130 3.85	136 3.75	143 3.66	149 3.58	155 3.51	161 3.44	165 3.34	165 3.18
		60	80	103	123	143	159	175	190	205	219	233	247	260	273	285	297	310	322	330	330
	II (f)	40 10.16	40 7.68	51 6.59	62 5.94	71 5.49	80 5.11	88 4.82	95 4.58	103 4.39	110 4.22	117 4.08	123 3.96	130 3.85	136 3.75	143 3.66	149 3.58	155 3.51	161 3.44	165 3.34	165 3.18
		60	80	103	123	143	159	175	190	205	219	233	247	260	273	285	297	310	322	330	330
	III (f)	40 10.16	40 7.68	51 6.59	62 5.94	71 5.49	80 5.11	88 4.82	95 4.58	103 4.39	110 4.22	117 4.08	123 3.96	130 3.85	136 3.75	143 3.66	149 3.58	155 3.51	161 3.44	165 3.34	165 3.18
		60	80	103	123	143	159	175	190	205	219	233	247	260	273	285	297	310	322	330	330
Multi Span	I (f)	40 12.81	48 9.15	59 7.55	69 6.60	77 5.96	86 5.49	93 5.12	100 4.83	107 4.59	114 4.38	120 4.21	126 4.06	132 3.92	138 3.80	144 3.70	150 3.60	155 3.51	160 3.43	165 3.34	165 3.18
		67	95	118	137	155	171	186	201	214	227	240	253	265	276	288	300	310	321	330	330
	II (f)	40 12.81	48 9.15	59 7.55	69 6.60	77 5.96	86 5.49	93 5.12	100 4.83	107 4.59	114 4.38	120 4.21	126 4.06	132 3.92	138 3.80	144 3.70	150 3.60	155 3.51	160 3.43	165 3.34	165 3.18
		67	95	118	137	155	171	186	201	214	227	240	253	265	276	288	300	310	321	330	330
	III (f)	40 12.81	48 9.15	59 7.55	69 6.60	77 5.96	86 5.49	93 5.12	100 4.83	107 4.59	114 4.38	120 4.21	126 4.06	132 3.92	138 3.80	144 3.70	150 3.60	155 3.51	160 3.43	165 3.34	165 3.18
		67	95	118	137	155	171	186	201	214	227	240	253	265	276	288	300	310	321	330	330

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 TF

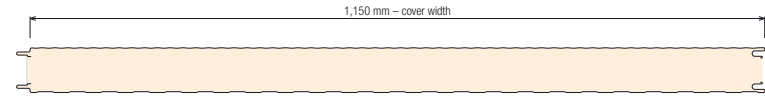
Wallpanel KS1150 TF 150 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 11.83	40 8.36	40 6.83	40 5.91	40 5.29	40 4.83	40 4.47	40 4.18	40 3.94	40 3.74	40 3.57	40 3.41	40 3.28	40 3.16	40 3.05	40 2.96	40 2.87	40 2.79	40 2.71	40 2.64
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1150 TF**

Wallpanel KS1150 TF 170 E/I 0.6 / 0.4 – according to EN 14509

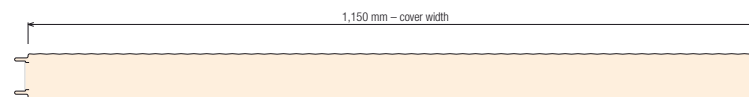


System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 14.68	54 11.27	66 9.21	76 7.97	85 7.13	93 6.51	101 6.03	108 5.64	114 5.32	120 5.04	126 4.81	132 4.60	137 4.42	142 4.26	147 4.12	152 3.99	157 3.87	162 3.76	166 3.66	170 3.56
Double Span	I (f)	40 10.83	40 8.19	50 7.03	61 6.34	70 5.86	78 5.45	86 5.14	93 4.89	101 4.68	108 4.51	114 4.36	121 4.22	128 4.11	134 4.00	140 3.91	146 3.82	152 3.75	158 3.68	164 3.61	169 3.55
		60	78	101	121	140	156	172	187	202	215	229	242	256	268	280	292	304	316	327	339
	II (f)	40 10.83	40 8.19	50 7.03	61 6.34	70 5.86	78 5.45	86 5.14	93 4.89	101 4.68	108 4.51	114 4.36	121 4.22	128 4.11	134 4.00	140 3.91	146 3.82	152 3.75	158 3.68	164 3.61	169 3.55
		60	78	101	121	140	156	172	187	202	215	229	242	256	268	280	292	304	316	327	339
	III (f)	40 10.83	40 8.19	50 7.03	61 6.34	70 5.86	78 5.45	86 5.14	93 4.89	101 4.68	108 4.51	114 4.36	121 4.22	128 4.11	134 4.00	140 3.91	146 3.82	152 3.75	158 3.68	164 3.61	169 3.55
		60	78	101	121	140	156	172	187	202	215	229	242	256	268	280	292	304	316	327	339
Multi Span	I (f)	40 13.65	47 9.75	58 8.04	67 7.03	76 6.35	84 5.85	91 5.46	98 5.15	105 4.89	111 4.67	118 4.49	124 4.32	130 4.18	136 4.06	141 3.94	147 3.84	152 3.75	157 3.66	162 3.58	168 3.51
		65	93	115	134	152	168	182	197	210	223	236	247	259	272	282	293	304	314	325	335
	II (f)	40 13.65	47 9.75	58 8.04	67 7.03	76 6.35	84 5.85	91 5.46	98 5.15	105 4.89	111 4.67	118 4.49	124 4.32	130 4.18	136 4.06	141 3.94	147 3.84	152 3.75	157 3.66	162 3.58	168 3.51
		65	93	115	134	152	168	182	197	210	223	236	247	259	272	282	293	304	314	325	335
	III (f)	40 13.65	47 9.75	58 8.04	67 7.03	76 6.35	84 5.85	91 5.46	98 5.15	105 4.89	111 4.67	118 4.49	124 4.32	130 4.18	136 4.06	141 3.94	147 3.84	152 3.75	157 3.66	162 3.58	168 3.51
		65	93	115	134	152	168	182	197	210	223	236	247	259	272	282	293	304	314	325	335

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1150 TF**

Wallpanel KS1150 TF 170 E/I 0.6 / 0.4 – according to EN 14509

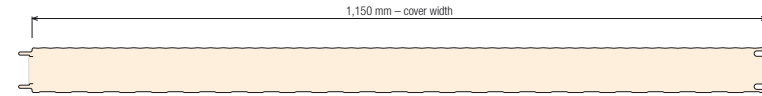


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
Double Span	I (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
	II (f)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
	III (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
Multi Span	I (f)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
	II (f)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85
	III (f)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
		12.74	9.01	7.36	6.37	5.70	5.20	4.82	4.50	4.25	4.03	3.84	3.68	3.53	3.40	3.29	3.18	3.09	3.00	2.92	2.85

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1150 TF**

Wallpanel KS1150 TF 200 E/I 0.6 / 0.4 – according to EN 14509

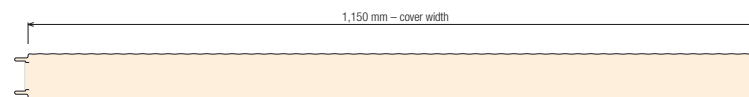


System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	51	63	73	81	89	96	103	109	115	120	126	131	136	141	145	150	154	158	162
		<b>16.51</b>	<b>11.96</b>	<b>9.76</b>	<b>8.45</b>	<b>7.56</b>	<b>6.90</b>	<b>6.39</b>	<b>5.98</b>	<b>5.64</b>	<b>5.35</b>	<b>5.10</b>	<b>4.88</b>	<b>4.69</b>	<b>4.52</b>	<b>4.37</b>	<b>4.23</b>	<b>4.10</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
Double Span	I (f)	40	40	49	59	68	77	84	92	99	105	112	119	125	131	137	143	149	154	158	162
		<b>11.77</b>	<b>8.91</b>	<b>7.65</b>	<b>6.90</b>	<b>6.37</b>	<b>5.94</b>	<b>5.60</b>	<b>5.33</b>	<b>5.10</b>	<b>4.91</b>	<b>4.75</b>	<b>4.60</b>	<b>4.48</b>	<b>4.36</b>	<b>4.26</b>	<b>4.17</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
	II (f)	60	77	99	119	137	153	168	183	198	211	224	238	250	262	274	287	298	308	317	325
		<b>11.77</b>	<b>8.91</b>	<b>7.65</b>	<b>6.90</b>	<b>6.37</b>	<b>5.94</b>	<b>5.60</b>	<b>5.33</b>	<b>5.10</b>	<b>4.91</b>	<b>4.75</b>	<b>4.60</b>	<b>4.48</b>	<b>4.36</b>	<b>4.26</b>	<b>4.17</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
	III (f)	40	40	49	59	68	77	84	92	99	105	112	119	125	131	137	143	149	154	158	162
		<b>11.77</b>	<b>8.91</b>	<b>7.65</b>	<b>6.90</b>	<b>6.37</b>	<b>5.94</b>	<b>5.60</b>	<b>5.33</b>	<b>5.10</b>	<b>4.91</b>	<b>4.75</b>	<b>4.60</b>	<b>4.48</b>	<b>4.36</b>	<b>4.26</b>	<b>4.17</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
Multi Span	I (f)	60	77	99	119	137	153	168	183	198	211	224	238	250	262	274	287	298	308	317	325
		<b>14.81</b>	<b>10.59</b>	<b>8.74</b>	<b>7.64</b>	<b>6.90</b>	<b>6.35</b>	<b>5.93</b>	<b>5.59</b>	<b>5.32</b>	<b>5.08</b>	<b>4.88</b>	<b>4.70</b>	<b>4.55</b>	<b>4.41</b>	<b>4.29</b>	<b>4.18</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
	II (f)	40	45	56	66	74	82	89	96	103	109	115	121	127	133	138	144	149	154	158	162
		<b>14.81</b>	<b>10.59</b>	<b>8.74</b>	<b>7.64</b>	<b>6.90</b>	<b>6.35</b>	<b>5.93</b>	<b>5.59</b>	<b>5.32</b>	<b>5.08</b>	<b>4.88</b>	<b>4.70</b>	<b>4.55</b>	<b>4.41</b>	<b>4.29</b>	<b>4.18</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>
	III (f)	60	77	99	119	137	153	168	183	198	211	224	238	250	262	274	287	298	308	317	325
		<b>14.81</b>	<b>10.59</b>	<b>8.74</b>	<b>7.64</b>	<b>6.90</b>	<b>6.35</b>	<b>5.93</b>	<b>5.59</b>	<b>5.32</b>	<b>5.08</b>	<b>4.88</b>	<b>4.70</b>	<b>4.55</b>	<b>4.41</b>	<b>4.29</b>	<b>4.18</b>	<b>4.08</b>	<b>3.98</b>	<b>3.88</b>	<b>3.78</b>

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 TF

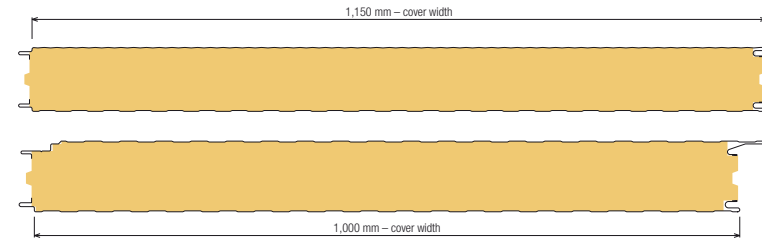
Wallpanel KS1150 TF 200 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 14.06	40 9.94	40 8.12	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 11.82	40 9.05	40 7.82	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 11.82	40 9.05	40 7.82	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 11.82	40 9.05	40 7.82	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Multi Span	I (f)	40 14.06	40 9.94	40 8.12	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	II (f)	40 14.06	40 9.94	40 8.12	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	III (f)	40 14.06	40 9.94	40 8.12	40 7.03	40 6.29	40 5.74	40 5.31	40 4.97	40 4.69	40 4.44	40 4.24	40 4.06	40 3.90	40 3.76	40 3.63	40 3.51	40 3.41	40 3.31	40 3.22	40 3.14
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60

**KS1150 FR, KS1000 FH**

Wallpanel KS1150 FR / FH 80 E/I 0.6 / 0.5 – according to EN 14509



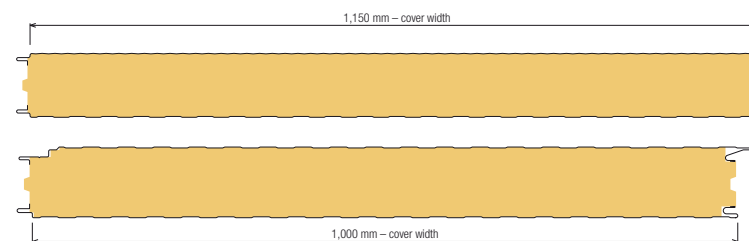
System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 8.71	55 6.64	56 4.44	56 3.33	56 2.66	56 2.22	56 1.90	56 1.66	56 1.48	56 1.33	56 1.21	56 1.11	57 1.02	57 0.96	57 0.89	57 0.84	57 0.79	57 0.74	57 0.71	57 0.67
Double Span	I (f)	40 4.36 60	40 3.63 61	42 3.27 83	51 3.04 103	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114
	II (f)	40 4.36 60	40 3.63 61	42 3.27 83	51 3.04 103	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114
	III (f)	40 4.36 60	40 3.63 60	42 3.27 83	51 3.04 103	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114
Multi Span	I (f)	40 6.68 60	41 4.88 83	52 4.10 104	56 3.33 113	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114
	II (f)	40 6.68 60	47 4.88 83	52 4.10 104	56 3.33 113	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114
	III (f)	40 6.68 60	47 4.88 83	52 4.10 104	56 3.33 113	56 2.66 113	56 2.22 113	56 1.90 113	56 1.66 113	56 1.48 113	56 1.33 113	56 1.21 113	56 1.11 113	56 1.02 113	56 0.96 113	57 0.89 114	57 0.84 114	57 0.79 114	57 0.74 114	57 0.71 114	57 0.67 114

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 80 E/I 0.6 / 0.5 – according to EN 14509

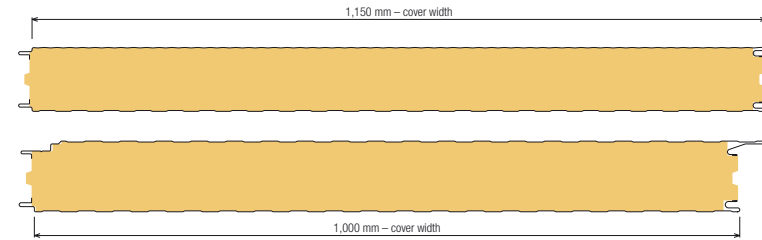


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 8.71	40 6.64	40 4.44	40 3.33	40 2.66	40 2.22	40 1.90	40 1.66	40 1.48	40 1.33	40 1.21	40 1.11	40 1.02	40 0.96	40 0.90	40 0.84	40 0.79	40 0.75	40 0.71	40 0.67
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 8.24 60	40 5.82 60	40 4.44 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	II (f)	40 5.23 60	40 5.82 60	40 4.43 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	III (f)	40 4.97 60	40 4.10 60	40 3.68 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
Multi Span	I (f)	40 8.24 60	40 5.82 60	40 4.43 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	II (f)	40 8.24 60	40 5.82 60	40 4.43 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	III (f)	40 7.95 60	40 5.77 60	40 4.43 60	40 3.33 60	40 2.66 60	40 2.22 60	40 1.90 60	40 1.66 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 100 E/I 0.6 / 0.5 – according to EN 14509



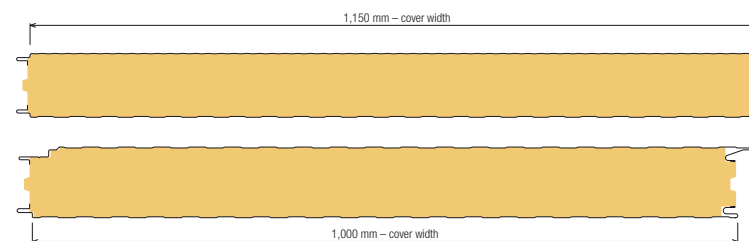
System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	44 10.30	57 6.68	56 4.45	57 3.34	57 2.67	57 2.22	56 1.90	57 1.67	57 1.48	56 1.33	56 1.21	56 1.11	56 1.02	56 0.96	57 0.90	57 0.84	57 0.79	57 0.75	57 0.71	57 0.67
Double Span	I (f)	40 5.16 60	40 4.30 73	49 3.87 98	56 3.33 113	56 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	II (f)	40 5.16 60	40 4.30 73	49 3.87 98	56 3.33 113	56 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	III (f)	40 3.89 60	40 3.89 66	49 3.87 98	56 3.33 113	56 2.67 112	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
Multi Span	I (f)	40 7.55 64	47 5.56 97	56 4.44 113	56 3.33 113	57 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	II (f)	40 7.55 64	47 5.56 94	56 4.44 113	56 3.33 113	57 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	III (f)	40 7.55 64	47 5.56 94	56 4.44 113	56 3.33 113	57 2.67 113	56 2.22 113	56 1.90 113	57 1.67 114	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1150 FR, KS1000 FH**

Wallpanel KS1150 FR / FH 100 E/I 0.6 / 0.5 – according to EN 14509

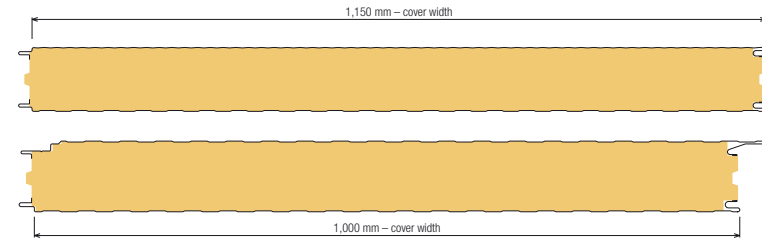


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 9.02	40 6.52	40 4.44	40 3.34	40 2.67	40 2.22	40 1.90	40 1.67	40 1.48	40 1.33	40 1.21	40 1.11	40 1.02	40 0.96	40 0.90	40 0.84	40 0.79	40 0.75	40 0.71	40 0.67
		56 60	56 60	56 60	56 60	56 113	56 113	56 113	57 113	57 113	57 113	57 113	57 113	56 113	56 113	56 113	56 113	56 113	56 113	56 113	56 113
Double Span	I (f)	40 8.93 60	40 6.52 60	40 4.44 60	40 3.34 60	56 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	II (f)	40 6.39 60	40 5.07 60	40 4.44 60	40 3.34 60	56 2.67 113	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
	III (f)	40 3.48 60	40 3.25 60	40 3.09 60	40 2.96 60	40 2.67 60	56 2.22 113	56 1.90 113	57 1.67 113	57 1.48 113	57 1.33 113	57 1.21 113	57 1.11 113	56 1.02 113	56 0.96 113	56 0.90 113	56 0.84 113	56 0.79 113	56 0.75 113	56 0.71 113	56 0.67 113
Multi Span	I (f)	40 9.22 60	40 6.52 60	40 4.44 60	40 3.34 60	40 2.67 60	40 2.22 60	40 1.90 60	40 1.67 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	II (f)	40 8.99 60	40 6.52 60	40 4.44 60	40 3.34 60	40 2.67 60	40 2.22 60	40 1.90 60	40 1.67 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60
	III (f)	40 4.64 60	40 3.84 60	40 3.44 60	40 3.19 60	40 2.67 60	40 2.22 60	40 1.90 60	40 1.67 60	40 1.48 60	40 1.33 60	40 1.21 60	40 1.11 60	40 1.02 60	40 0.96 60	40 0.90 60	40 0.84 60	40 0.79 60	40 0.75 60	40 0.71 60	40 0.67 60

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 120 E/I 0.6 / 0.5 – according to EN 14509



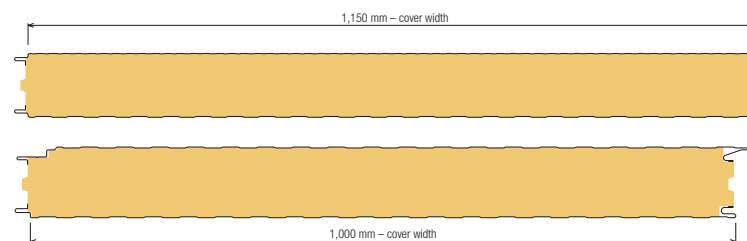
System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	48 11.31	61 7.21	61 4.81	61 3.60	61 2.88	61 2.40	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
Double Span	I (f)	40 5.01	40 4.35	51 3.98	61 3.60	61 2.88	61 2.40	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		62	74	101	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
	II (f)	40 5.01	40 4.35	51 3.98	61 3.60	61 2.88	61 2.40	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		62	74	101	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
	III (f)	40 4.56	40 4.35	51 3.98	51 3.60	61 2.88	61 2.40	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		60	74	101	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
Multi Span	I (f)	40 7.10	46 5.37	59 4.61	61 3.61	61 2.89	61 2.41	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		61	92	118	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
	II (f)	40 7.10	46 5.37	59 4.61	61 3.61	61 2.89	61 2.41	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		61	92	118	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
	III (f)	40 7.10	46 5.37	59 4.61	61 3.61	61 2.89	61 2.41	61 2.06	61 1.80	61 1.60	61 1.44	61 1.31	61 1.20	61 1.10	61 1.03	61 0.97	61 0.91	61 0.85	61 0.81	61 0.76	61 0.72
		68	92	118	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 120 E/I 0.6 / 0.5 – according to EN 14509

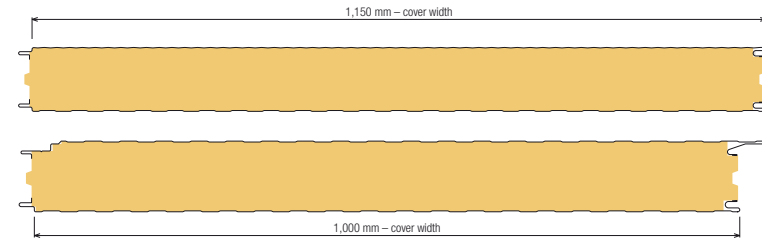


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 9.73	40 6.88	40 4.81	40 3.60	40 2.89	40 2.41	40 2.06	40 1.80	40 1.60	40 1.44	40 1.31	40 1.20	40 1.11	40 1.03	40 0.97	40 0.91	40 0.86	40 0.81	40 0.77	40 0.73
		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Double Span	I (f)	40 8.39 60	40 6.88 60	40 4.81 60	40 3.60 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60
	II (f)	40 7.15 60	40 5.69 60	40 4.81 60	40 3.60 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60
	III (f)	40 4.03 60	40 3.74 60	40 3.55 60	40 3.40 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60
Multi Span	I (f)	40 9.73 60	40 6.88 60	40 4.81 60	40 3.61 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60
	II (f)	40 9.73 60	40 6.88 60	40 4.81 60	40 3.61 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60
	III (f)	40 5.25 60	40 4.34 60	40 3.89 60	40 3.61 60	40 2.89 60	40 2.41 60	40 2.06 60	40 1.80 60	40 1.60 60	40 1.44 60	40 1.31 60	40 1.20 60	40 1.11 60	40 1.03 60	40 0.97 60	40 0.91 60	40 0.86 60	40 0.81 60	40 0.77 60	40 0.73 60

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 150 E/I 0.6 / 0.5 – according to EN 14509



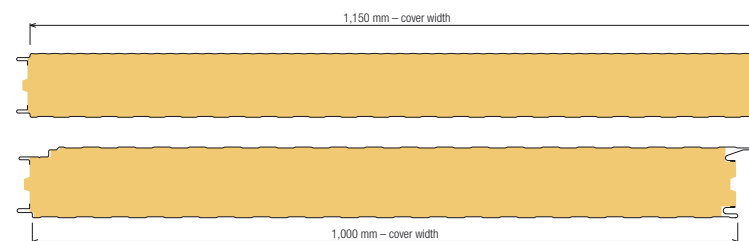
System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	54 12.66	64 7.52	64 5.02	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
Double Span	I (f)	40 4.85	40 4.40	52 4.12	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	74	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
	II (f)	40 4.85	40 4.40	52 4.12	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	74	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
	III (f)	40 4.85	40 4.40	52 4.12	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	74	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
Multi Span	I (f)	40 5.95	41 4.86	52 4.34	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	82	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
	II (f)	40 5.95	41 4.86	52 4.34	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	82	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127
	III (f)	40 5.95	41 4.86	52 4.34	64 3.76	64 3.01	64 2.51	64 2.15	64 1.88	63 1.67	63 1.50	63 1.36	63 1.25	63 1.16	63 1.07	64 1.00	64 0.95	64 0.89	64 0.84	64 0.79	64 0.76
		60	82	105	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127	127

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1150 FR, KS1000 FH

Wallpanel KS1150 FR / FH 150 E/I 0.6 / 0.5 – according to EN 14509



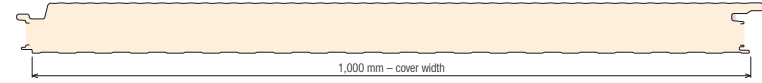
System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 10.20	40 7.21	40 5.02	40 3.76	40 3.01	40 2.51	40 2.15	40 1.88	40 1.67	40 1.50	40 1.36	40 1.25	40 1.16	40 1.07	40 1.00	40 0.95	40 0.89	40 0.84	40 0.80	40 0.76
Double Span	I (f)	40 5.90 60	40 5.90 60	40 5.02 60	40 3.76 60	40 3.01 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60
	II (f)	40 5.90 60	40 5.90 60	40 5.02 60	40 3.76 60	40 3.01 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60
	III (f)	40 4.95 60	40 4.56 60	40 4.31 60	40 3.76 60	40 3.01 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60
Multi Span	I (f)	40 10.20 60	40 7.21 60	40 5.02 60	40 3.76 60	40 3.01 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60
	II (f)	40 10.20 60	40 7.21 60	40 5.02 60	40 3.76 60	40 3.01 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60
	III (f)	40 6.17 60	40 5.12 60	40 4.60 60	40 3.76 60	40 5.29 60	40 2.51 60	40 2.15 60	40 1.88 60	40 1.67 60	40 1.50 60	40 1.36 60	40 1.25 60	40 1.16 60	40 1.07 60	40 1.00 60	40 0.95 60	40 0.89 60	40 0.84 60	40 0.80 60	40 0.76 60

The span tables are valid for the wall systems KS1000 FR and KS1000 FH. Maximum spans in combination with secret fixing are not part of these calculations. Regarding the secret fixing of KS1000 FH, please call your technical department.

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 AWP

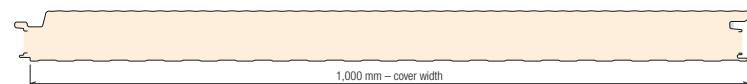
Wallpanel KS1000 AWP 60 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40 6.61	40 5.53	40 4.85	40 4.40	40 4.07	45 3.77	49 3.53	53 3.34	56 3.17	58 2.96	58 2.69	58 2.46	58 2.28	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
Double Span	I (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	60 60	66 66	74 74	81 81	88 88	95 95	102 102	108 108	114 114	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116
	II (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	60 60	66 66	74 74	81 81	88 88	95 95	102 102	108 108	114 114	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116
	III (f)	40 6.28	40 4.71	40 4.03	40 3.62	40 3.34	40 3.13	41 2.95	44 2.80	47 2.68	51 2.58	54 2.49	57 2.41	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	60 60	66 66	74 74	81 81	88 88	95 95	102 102	108 108	114 114	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116
Multi Span	I (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	65 65	73 73	81 81	88 88	94 94	101 101	107 107	113 113	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116
	II (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	65 65	73 73	81 81	88 88	94 94	101 101	107 107	113 113	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116
	III (f)	40 8.02	40 5.72	40 4.71	40 4.12	40 3.71	40 3.41	44 3.18	47 2.99	50 2.84	53 2.71	56 2.60	58 2.46	58 2.27	58 2.11	58 1.97	58 1.85	58 1.74	58 1.64	58 1.56	58 1.48
		60 60	60 60	60 60	65 65	73 73	81 81	88 88	94 94	101 101	107 107	113 113	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116	116 116

## KS1000 AWP

Wallpanel KS1000 AWP 60 E/I 0.6 / 0.4 – according to EN 14509

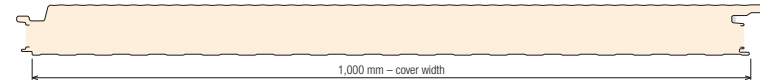


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	A 5.62	B 4.97	B 3.57	B 2.68	B 2.14	B 1.79	B 1.53	B 1.34	B 1.19	B 1.07	B 0.98	B 0.89	B 0.82	B 0.77	B 0.72	B 0.67	B 0.63	B 0.60	B 0.56	B 0.54
Double Span	I (f)	A 6.76	A 3.12	A 2.03	A 1.54	B 1.27	B 1.09	B 0.97	B 0.87	B 0.79	B 0.72	B 0.67	B 0.62	B 0.58	B 0.55	B 0.51	B 0.49	B 0.46	B 0.44	B 0.42	B 0.40
		B 6.45	B 2.82	B 1.81	B 1.39	B 1.15	B 1.00	B 0.89	B 0.80	B 0.73	B 0.68	B 0.63	B 0.59	B 0.55	B 0.52	B 0.49	B 0.46	B 0.44	B 0.42	B 0.40	B 0.39
	II (f)	A 6.45	A 2.82	A 1.81	A 1.39	B 1.15	B 1.00	B 0.89	B 0.80	B 0.73	B 0.68	B 0.63	B 0.59	B 0.55	B 0.52	B 0.49	B 0.46	B 0.44	B 0.42	B 0.40	B 0.39
		B 6.45	B 2.82	B 1.81	B 1.39	B 1.15	B 1.00	B 0.89	B 0.80	B 0.73	B 0.68	B 0.63	B 0.59	B 0.55	B 0.52	B 0.49	B 0.46	B 0.44	B 0.42	B 0.40	B 0.39
	III (f)	A 5.92	A 1.60	A 1.19	A 1.02	A 0.94	A 0.86	A 0.79	A 0.72	A 0.66	A 0.61	A 0.57	A 0.54	A 0.51	A 0.48	A 0.46	A 0.43	A 0.41	A 0.39	A 0.38	A 0.36
		B 5.92	B 1.60	B 1.19	B 1.02	B 0.94	B 0.86	B 0.79	B 0.72	B 0.66	B 0.61	B 0.57	B 0.54	B 0.51	B 0.48	B 0.46	B 0.43	B 0.41	B 0.39	B 0.38	B 0.36
Multi Span	I (f)	A 6.97	A 3.97	B 2.57	B 1.89	B 1.49	B 1.24	B 1.03	B 0.88	B 0.79	B 0.72	B 0.66	B 0.61	B 0.57	B 0.54	B 0.50	B 0.48	B 0.45	B 0.43	B 0.41	B 0.39
		B 6.97	B 3.97	B 2.57	B 1.89	B 1.49	B 1.24	B 1.03	B 0.88	B 0.79	B 0.72	B 0.66	B 0.61	B 0.57	B 0.54	B 0.50	B 0.48	B 0.45	B 0.43	B 0.41	B 0.39
	II (f)	A 6.97	A 3.86	A 2.46	B 1.78	B 1.40	B 1.16	B 1.00	B 0.89	B 0.79	B 0.72	B 0.66	B 0.61	B 0.57	B 0.54	B 0.50	B 0.48	B 0.45	B 0.43	B 0.41	B 0.39
		B 6.97	B 3.86	B 2.46	B 1.78	B 1.40	B 1.16	B 1.00	B 0.89	B 0.79	B 0.72	B 0.66	B 0.61	B 0.57	B 0.54	B 0.50	B 0.48	B 0.45	B 0.43	B 0.41	B 0.39
	III (f)	A 6.97	A 3.68	A 2.28	B 1.62	B 1.26	B 1.04	B 0.91	B 0.81	B 0.73	B 0.66	B 0.61	B 0.57	B 0.53	B 0.50	B 0.47	B 0.45	B 0.42	B 0.40	B 0.39	B 0.37
		B 6.97	B 3.68	B 2.28	B 1.62	B 1.26	B 1.04	B 0.91	B 0.81	B 0.73	B 0.66	B 0.61	B 0.57	B 0.53	B 0.50	B 0.47	B 0.45	B 0.42	B 0.40	B 0.39	B 0.37

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

**KS1000 AWP**

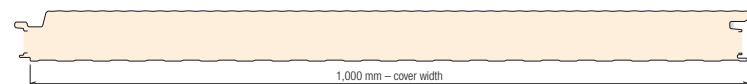
Wallpanel KS1000 AWP 80 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	40	43	49	54	59	63	57	70	74	77	78	78	78	78	78	78	78	78
		8.39	6.86	6.01	5.46	5.00	4.61	4.27	3.99	3.76	3.57	3.40	3.26	3.05	2.84	2.64	2.48	2.33	2.20	2.09	1.98
Double Span	I (f)	40	40	40	40	40	43	47	51	55	59	62	66	69	73	76	78	78	78	78	78
		7.27	5.46	4.66	4.19	3.87	3.63	3.42	3.25	3.10	2.98	2.88	2.79	2.71	2.64	2.58	2.48	2.33	2.20	2.09	1.98
	II (f)	60	60	60	66	76	86	94	102	110	117	125	132	139	146	152	156	156	156	156	156
		40	40	40	40	40	43	47	51	55	59	62	66	69	73	76	78	78	78	78	78
	III (f)	7.27	5.46	4.66	4.19	3.87	3.63	3.42	3.25	3.10	2.98	2.88	2.79	2.71	2.64	2.58	2.48	2.33	2.20	2.09	1.98
		60	60	60	66	76	86	94	102	110	117	125	132	139	146	152	156	156	156	156	156
Multi Span	I (f)	40	40	40	40	42	47	51	55	58	62	65	69	72	75	78	78	78	78	78	78
		9.29	6.63	5.46	4.77	4.30	3.95	3.68	3.47	3.29	3.14	3.01	2.90	2.80	2.72	2.64	2.48	2.33	2.20	2.09	1.98
	II (f)	60	60	64	75	85	93	102	110	117	124	130	137	144	150	156	156	156	156	156	156
		40	40	40	40	42	47	51	55	58	62	65	69	72	75	78	78	78	78	78	78
	III (f)	9.29	6.63	5.46	4.77	4.30	3.95	3.68	3.47	3.29	3.14	3.01	2.90	2.80	2.72	2.64	2.48	2.33	2.20	2.09	1.98
		60	60	64	75	85	93	102	110	117	124	130	137	144	150	156	156	156	156	156	156

## KS1000 AWP

Wallpanel KS1000 AWP 80 E/I 0.6 / 0.4 – according to EN 14509

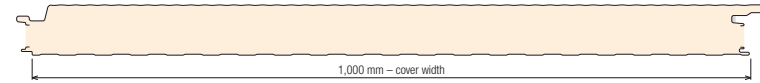


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	B 6.95	B 5.71	B 4.20	B 3.15	B 2.52	B 2.10	B 1.80	B 1.57	B 1.40	B 1.26	B 1.14	B 1.05	B 0.97	B 0.90	B 0.84	B 0.79	B 0.74	B 0.70	B 0.66	B 0.63
		A 7.95	A 3.68	A 2.40	B 1.82	B 1.49	B 1.28	B 1.12	B 1.01	B 0.92	B 0.85	B 0.78	B 0.73	B 0.68	B 0.64	B 0.60	B 0.57	B 0.54	B 0.52	B 0.49	B 0.47
Double Span	II (f)	B 7.60	B 3.34	B 2.14	B 1.64	B 1.36	B 1.17	B 1.04	B 0.95	B 0.86	B 0.79	B 0.74	B 0.69	B 0.65	B 0.61	B 0.58	B 0.55	B 0.52	B 0.50	B 0.47	B 0.45
		B 7.00	B 1.98	B 1.42	B 1.22	B 1.08	B 1.00	B 0.93	B 0.85	B 0.78	B 0.72	B 0.67	B 0.63	B 0.60	B 0.56	B 0.54	B 0.51	B 0.49	B 0.46	B 0.44	B 0.43
	III (f)	B 8.08	B 4.67	B 3.02	B 2.22	B 1.76	B 1.46	B 1.25	B 1.05	B 0.94	B 0.86	B 0.78	B 0.72	B 0.67	B 0.63	B 0.59	B 0.56	B 0.53	B 0.51	B 0.49	B 0.47
Multi Span	II (f)	B 8.08	B 4.54	B 2.90	B 2.10	B 1.65	B 1.37	B 1.18	B 1.03	B 0.94	B 0.85	B 0.78	B 0.72	B 0.67	B 0.63	B 0.59	B 0.56	B 0.53	B 0.51	B 0.48	B 0.46
		B 8.08	B 4.34	B 2.69	B 1.92	B 1.49	B 1.23	B 1.06	B 0.95	B 0.86	B 0.78	B 0.72	B 0.67	B 0.63	B 0.59	B 0.55	B 0.53	B 0.50	B 0.48	B 0.45	B 0.44
	III (f)	B 8.08	B 4.34	B 2.69	B 1.92	B 1.49	B 1.23	B 1.06	B 0.95	B 0.86	B 0.78	B 0.72	B 0.67	B 0.63	B 0.59	B 0.55	B 0.53	B 0.50	B 0.48	B 0.45	B 0.44

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 AWP

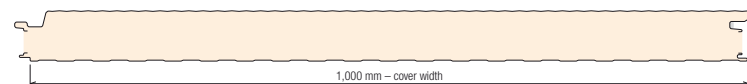
Wallpanel KS1000 AWP 100 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	40	50	60	67	73	79	84	90	94	99	103	108	108	108	108	108	108	109	109
		9.99	8.05	7.05	6.32	5.65	5.16	4.78	4.47	4.21	4.00	3.81	3.65	3.51	3.28	3.06	2.87	2.70	2.55	2.42	2.30
Double Span	I (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109
		8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30
	60	60	75	90	104	117	128	139	150	160	170	180	190	198	208	216	217	217	217	217	
	II (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109
	8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30	
	60	60	75	90	104	117	128	139	150	160	170	180	190	198	208	216	217	217	217	217	217
III (f)	40	40	40	45	52	58	64	70	75	80	85	90	95	99	104	108	108	108	109	109	
	8.20	6.17	5.28	4.76	4.39	4.11	3.87	3.68	3.52	3.38	3.27	3.17	3.08	3.00	2.93	2.86	2.70	2.55	2.42	2.30	
60	60	75	90	104	117	128	139	150	160	170	180	190	198	208	216	217	217	217	217	217	
Multi Span	I (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109
		10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30
	60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	
	II (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109
	10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30	
	60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	
III (f)	40	40	43	51	57	63	68	74	79	84	88	93	97	102	106	108	108	108	109	109	
	10.42	7.44	6.13	5.35	4.83	4.44	4.14	3.90	3.71	3.54	3.40	3.27	3.16	3.07	2.98	2.87	2.70	2.55	2.42	2.30	
60	70	87	101	114	126	137	147	158	167	177	185	194	203	212	217	217	217	217	217	217	

## KS1000 AWP

Wallpanel KS1000 AWP 100 E/I 0.6 / 0.4 – according to EN 14509

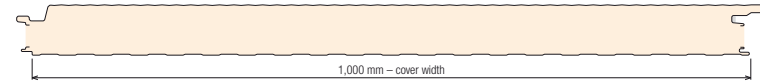


System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	A 8.38	B 6.40	B 4.84	B 3.63	B 2.90	B 2.42	B 2.07	B 1.81	B 1.61	B 1.45	B 1.32	B 1.21	B 1.12	B 1.04	B 0.97	B 0.91	B 0.85	B 0.81	B 0.76	B 0.72
Double Span	I (f)	A 9.05	A 4.29	B 2.80	B 2.13	B 1.75	B 1.50	B 1.32	B 1.18	B 1.07	B 0.99	B 0.91	B 0.85	B 0.80	B 0.75	B 0.70	B 0.67	B 0.63	B 0.60	B 0.57	B 0.55
		B 8.81	B 3.93	B 2.54	B 1.94	B 1.60	B 1.38	B 1.22	B 1.10	B 1.00	B 0.93	B 0.86	B 0.81	B 0.76	B 0.71	B 0.67	B 0.64	B 0.61	B 0.58	B 0.55	B 0.53
	II (f)	A 8.81	A 3.93	B 2.54	B 1.94	B 1.60	B 1.38	B 1.22	B 1.10	B 1.00	B 0.93	B 0.86	B 0.81	B 0.76	B 0.71	B 0.67	B 0.64	B 0.61	B 0.58	B 0.55	B 0.53
		B 8.81	B 3.93	B 2.54	B 1.94	B 1.60	B 1.38	B 1.22	B 1.10	B 1.00	B 0.93	B 0.86	B 0.81	B 0.76	B 0.71	B 0.67	B 0.64	B 0.61	B 0.58	B 0.55	B 0.53
	III (f)	A 8.17	A 3.18	A 1.85	A 1.54	A 1.35	B 1.22	B 1.10	B 1.00	B 0.92	B 0.85	B 0.80	B 0.75	B 0.70	B 0.66	B 0.63	B 0.60	B 0.57	B 0.54	B 0.52	B 0.50
		B 8.17	B 3.18	B 1.85	B 1.54	B 1.35	B 1.22	B 1.10	B 1.00	B 0.92	B 0.85	B 0.80	B 0.75	B 0.70	B 0.66	B 0.63	B 0.60	B 0.57	B 0.54	B 0.52	B 0.50
Multi Span	I (f)	A 9.05	B 5.38	B 3.50	B 2.58	B 2.04	B 1.69	B 1.45	B 1.28	B 1.14	B 1.02	B 0.94	B 0.86	B 0.60	B 0.75	B 0.71	B 0.67	B 0.63	B 0.60	B 0.58	B 0.55
		B 9.05	B 5.38	B 3.50	B 2.58	B 2.04	B 1.69	B 1.45	B 1.28	B 1.14	B 1.02	B 0.94	B 0.86	B 0.60	B 0.75	B 0.71	B 0.67	B 0.63	B 0.60	B 0.58	B 0.55
	II (f)	A 9.05	B 5.24	B 3.36	B 2.45	B 1.93	B 1.60	B 1.37	B 1.21	B 1.08	B 0.99	B 0.91	B 0.84	B 0.79	B 0.74	B 0.69	B 0.65	B 0.62	B 0.59	B 0.56	B 0.54
		B 9.05	B 5.24	B 3.36	B 2.45	B 1.93	B 1.60	B 1.37	B 1.21	B 1.08	B 0.99	B 0.91	B 0.84	B 0.79	B 0.74	B 0.69	B 0.65	B 0.62	B 0.59	B 0.56	B 0.54
	III (f)	A 9.05	B 5.02	B 3.14	B 2.25	B 1.76	B 1.45	B 1.25	B 1.10	B 1.00	B 0.92	B 0.85	B 0.78	B 0.73	B 0.69	B 0.65	B 0.62	B 0.58	B 0.56	B 0.53	B 0.51
		B 9.05	B 5.02	B 3.14	B 2.25	B 1.76	B 1.45	B 1.25	B 1.10	B 1.00	B 0.92	B 0.85	B 0.78	B 0.73	B 0.69	B 0.65	B 0.62	B 0.58	B 0.56	B 0.53	B 0.51

The span widths are calculated according to the proof procedures given in EN 14509. All loads are regarded as characteristic loads. Element dead loads have been considered in the span calculations. Possible errors and omissions excepted. Please consider, that this table does not replace a verifiable structural design.

## KS1000 AWP

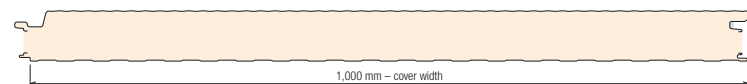
Wallpanel KS1000 AWP 120 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic downwards load, e.g. wind pressure [kN/m²]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	40	54	71	82	92	100	108	116	123	129	136	142	148	150	150	150	150	150	150	150
		11.38	9.17	7.99	6.93	6.20	5.66	5.24	4.90	4.92	4.38	4.18	4.00	3.85	3.62	3.38	3.17	2.98	2.82	2.67	2.53
Double Span	I (f)	40	40	52	62	71	81	89	96	104	111	118	125	131	138	144	150	150	150	150	150
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
	II (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
	III (f)	40	40	52	62	71	81	89	96	104	111	118	125	131	138	144	150	150	150	150	150
		9.06	6.85	5.87	5.29	4.89	4.56	4.29	4.08	3.91	3.76	3.64	3.52	3.42	3.34	3.26	3.17	2.98	2.82	2.67	2.53
Multi Span	I (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53
	II (f)	40	48	60	70	79	87	94	102	109	115	122	128	134	140	146	150	150	150	150	150
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53
	III (f)	60	81	104	125	144	162	177	193	208	222	236	249	263	276	289	300	300	300	300	300
		11.44	8.17	6.74	5.89	5.32	4.90	4.57	4.31	4.09	3.91	3.75	3.62	3.50	3.39	3.30	3.17	2.98	2.82	2.67	2.53

## KS1000 AWP

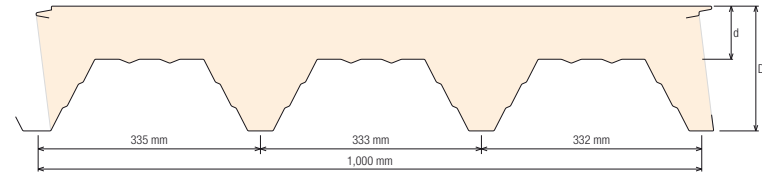
Wallpanel KS1000 AWP 120 E/I 0.6 / 0.4 – according to EN 14509



System	Colour group	characteristic uplifting load, e.g. Wind suction [kN/m <sup>2</sup> ]																			
		0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
Single Span	I, II, III (f)	A 9.74	B 7.02	B 5.46	B 4.09	B 3.28	B 2.73	B 2.34	B 2.05	B 1.82	B 1.64	B 1.49	B 1.36	B 1.26	B 1.17	B 1.09	B 1.02	B 0.98	B 0.91	B 0.86	B 0.82
Double Span	I (f)	A 9.92	B 4.92	B 3.24	B 2.46	B 2.02	B 1.72	B 1.52	B 1.36	B 1.23	B 1.12	B 1.04	B 0.98	B 0.91	B 0.86	B 0.81	B 0.76	B 0.72	B 0.69	B 0.66	B 0.63
		B 9.92	B 4.92	B 3.24	B 2.46	B 2.02	B 1.72	B 1.52	B 1.36	B 1.23	B 1.12	B 1.04	B 0.98	B 0.91	B 0.86	B 0.81	B 0.76	B 0.72	B 0.69	B 0.66	B 0.63
	II (f)	A 9.92	A 4.55	B 2.96	B 2.26	B 1.86	B 1.60	B 1.42	B 1.27	B 1.16	B 1.06	B 1.00	B 0.93	B 0.87	B 0.82	B 0.77	B 0.73	B 0.70	B 0.66	91 0.63	91 0.61
		B 9.92	B 4.55	B 2.96	B 2.26	B 1.86	B 1.60	B 1.42	B 1.27	B 1.16	B 1.06	B 1.00	B 0.93	B 0.87	B 0.82	B 0.77	B 0.73	B 0.70	B 0.66	181 0.63	181 0.61
	III (f)	A 9.39	A 3.92	A 2.40	B 1.92	B 1.65	B 1.44	B 1.28	B 1.16	B 1.06	B 0.99	B 0.92	B 0.86	B 0.81	B 0.77	B 0.73	B 0.69	B 0.66	B 0.63	B 0.60	B 0.58
		B 9.39	B 3.92	B 2.40	B 1.92	B 1.65	B 1.44	B 1.28	B 1.16	B 1.06	B 0.99	B 0.92	B 0.86	B 0.81	B 0.77	B 0.73	B 0.69	B 0.66	B 0.63	B 0.60	B 0.58
Multi Span	I (f)	A 9.92	B 6.10	B 3.98	B 2.93	B 2.33	B 1.94	B 1.66	B 1.46	B 1.31	B 1.18	B 1.08	B 1.00	B 0.94	B 0.88	B 0.82	B 0.78	B 0.74	B 0.70	B 0.66	B 0.63
		B 9.92	B 6.10	B 3.98	B 2.93	B 2.33	B 1.94	B 1.66	B 1.46	B 1.31	B 1.18	B 1.08	B 1.00	B 0.94	B 0.88	B 0.82	B 0.78	B 0.74	B 0.70	B 0.66	B 0.63
	II (f)	A 9.92	B 5.96	B 3.83	B 2.80	B 2.21	B 1.84	B 1.58	B 1.39	B 1.24	B 1.13	B 1.04	B 0.97	B 0.90	B 0.84	B 0.79	B 0.75	B 0.71	B 0.67	B 0.64	B 0.61
		B 9.92	B 5.96	B 3.83	B 2.80	B 2.21	B 1.84	B 1.58	B 1.39	B 1.24	B 1.13	B 1.04	B 0.97	B 0.90	B 0.84	B 0.79	B 0.75	B 0.71	B 0.67	B 0.64	B 0.61
	III (f)	A 9.92	B 5.73	B 3.60	B 2.60	B 2.04	B 1.68	B 1.45	B 1.28	B 1.15	B 1.05	B 0.98	B 0.91	B 0.85	B 0.79	B 0.75	B 0.71	B 0.67	B 0.64	B 0.61	B 0.59
		B 9.92	B 5.73	B 3.60	B 2.60	B 2.04	B 1.68	B 1.45	B 1.28	B 1.15	B 1.05	B 0.98	B 0.91	B 0.85	B 0.79	B 0.75	B 0.71	B 0.67	B 0.64	B 0.61	B 0.59

**KS1000 X-DEK**

Roofpanel KS1000 XD TR20/TR27



Bottom deck gauge [mm]	System	Core thickness	Load Case	Load Type	All loads in kN/m <sup>2</sup> for given span in meters								
					2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00
0.9	Single Span	XD 80	ULS	Downwards	10.38	8.26	6.85	5.36	4.70	3.56	2.76	2.28	1.92
				Upwards	15.78	10.16	7.10	5.25	3.33	2.42	1.79	1.53	1.33
			SLS	Downwards	6.92	5.51	4.57	3.40	2.62	1.76	1.22	0.93	0.73
				Upwards	10.52	6.77	4.73	3.50	2.50	1.73	1.24	0.95	0.74
		XD 100	ULS	Downwards	10.38	8.26	6.85	5.36	4.70	3.64	2.89	2.38	1.99
				Upwards	15.78	10.16	7.10	5.25	3.43	2.56	1.95	1.49	1.15
			SLS	Downwards	6.92	5.51	4.57	3.40	2.62	1.78	1.25	0.96	0.76
				Upwards	10.52	6.77	4.73	3.50	2.35	1.72	1.30	0.97	0.74
	Double Span	XD 80	ULS	Downwards	9.99	7.05	5.20	3.98	2.85	2.32	1.93	1.56	1.29
				Upwards	14.87	10.23	7.50	5.70	3.10	2.39	1.89	1.70	1.55
			SLS	Downwards	6.66	4.70	3.47	2.65	5.47	4.11	3.19	2.51	2.02
				Upwards	9.91	6.82	5.00	3.80	4.98	3.82	3.01	2.35	1.88
		XD 100	ULS	Downwards	9.99	7.05	5.20	3.98	3.19	2.45	1.93	1.55	1.27
				Upwards	14.87	10.23	7.50	5.70	3.11	2.75	2.46	2.16	1.92
			SLS	Downwards	6.66	4.70	3.47	2.65	5.47	3.91	2.90	2.40	2.02
				Upwards	9.91	6.82	5.00	3.80	4.66	3.70	3.01	2.38	1.92

Remarks: **ULS** – Ultimate Limit State – indicated loads should be compared with factored (design) loads, **SLS** – Serviceability Limit State – indicated loads should be compared with characteristic(un-factored) loads. Maximum permissible deflection limit (SLS):  $L/200$ .

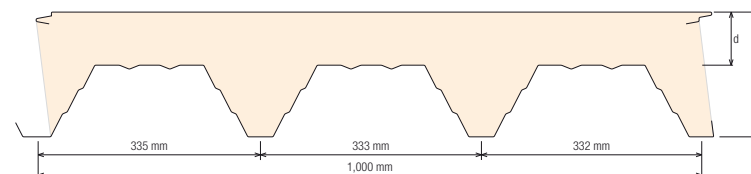
The minimum width of supports: For the span < 4.00 meters: For SINGLE SPAN at ends – 50 mm, For DOUBLE SPAN at ends – 90 mm, intermediate 160 mm

For the span ≥ 4.00 meters: For SINGLE SPAN at ends – 40 mm, For DOUBLE SPAN at ends – 40 mm, intermediate 120 mm

The dead load of panels is included in the above figures

**KS1000 X-DEK**

Roofpanel KS1000 XD TR20/TR27



Bottom deck gauge [mm]	System	Core thickness	Load Case	Load Type	All loads in kN/m <sup>2</sup> for given span in meters									
					2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50
1.1	Single Span	XD 80	ULS	Downwards	15.60	12.44	9.92	7.22	5.57	4.37	3.48	2.84	2.34	1.97
				Upwards	21.06	13.55	9.45	6.99	4.83	3.85	3.15	2.57	2.23	1.92
			SLS	Downwards	10.40	8.29	6.61	4.81	2.89	1.99	1.39	1.02	0.73	0.54
				Upwards	14.04	9.03	6.30	4.55	3.10	2.20	1.67	1.30	1.04	0.86
		XD 100	ULS	Downwards	15.60	12.44	9.92	7.22	5.67	4.45	3.54	2.90	2.38	2.01
				Upwards	21.06	13.55	9.45	6.99	4.83	3.85	3.15	2.57	2.23	1.92
			SLS	Downwards	10.40	8.29	6.61	4.81	2.94	2.03	1.42	1.04	0.74	0.55
				Upwards	14.04	9.03	6.30	4.55	3.10	2.20	1.67	1.30	1.04	0.86
	Double Span	XD 80	ULS	Downwards	14.09	9.86	7.25	5.52	4.32	3.45	2.81	2.31	1.92	1.62
				Upwards	21.80	14.76	10.32	7.62	5.29	4.19	3.42	2.86	2.42	2.09
			SLS	Downwards	9.39	6.57	4.83	3.68	5.47	4.11	3.19	2.51	2.02	1.19
				Upwards	14.53	9.85	6.88	5.08	4.98	3.82	3.01	2.35	1.88	1.71
		XD 100	ULS	Downwards	14.09	9.86	7.25	5.52	4.32	3.45	2.81	2.31	1.92	1.62
				Upwards	21.80	14.76	10.32	7.62	5.29	4.19	3.42	2.86	2.42	2.09
			SLS	Downwards	9.39	6.57	4.83	3.68	5.47	3.91	2.90	2.40	2.02	1.24
				Upwards	14.53	9.85	6.88	5.08	4.66	3.70	3.01	2.38	1.92	1.78

Remarks: **ULS** – Ultimate Limit State – indicated loads should be compared with factored (design) loads, **SLS** – Serviceability Limit State – indicated loads should be compared with characteristic(un-factored) loads. Maximum permissible deflection limit (SLS):  $L/200$ .

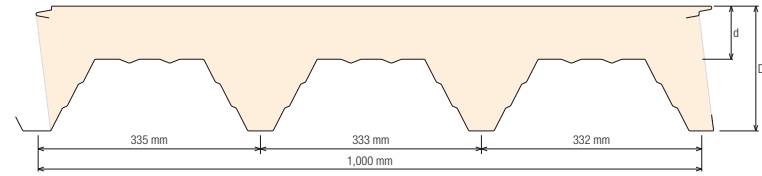
The minimum width of supports: For the span < 4.00 meters: For SINGLE SPAN at ends – 50 mm, For DOUBLE SPAN at ends – 90 mm, intermediate 160 mm

For the span  $\geq$  4.00 meters: For SINGLE SPAN at ends – 40 mm, For DOUBLE SPAN at ends – 40 mm, intermediate 120 mm

The dead load of panels is included in the above figures

## KS1000 X-DEK

Roofpanel KS1000 XD –  
ext. Steel 0.70 mm (Minibox-profiled) / int. Steel 0.9 mm

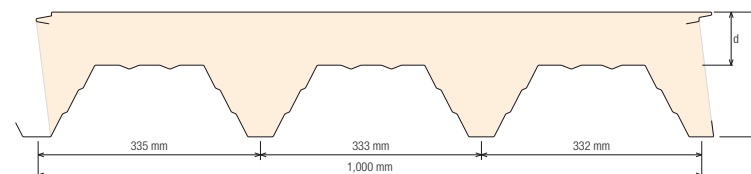


System	Core thickness	Load Case	All loads in kN/m <sup>2</sup> for given span in meters												
			1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
Single Span	XD 80	Downwards	19.68	12.02	8.47	6.23	4.79	3.82	3.12	2.65	2.15	1.70	1.35	1.05	0.80
		Upwards	22.63	13.72	9.49	7.09	5.57	4.52	3.77	3.16	2.56	2.12	1.78	1.52	1.28
		a <sub>min</sub> [mm]	141	115	102	91	82	76	70	68	60	55	49	41	40
	XD 100	Downwards	19.53	12.48	8.96	6.61	5.15	4.15	3.45	2.91	2.47	2.01	1.63	1.31	1.02
		Upwards	23.38	14.45	10.17	7.72	6.15	5.06	4.26	3.61	2.95	2.46	2.07	1.77	1.53
		a <sub>min</sub> [mm]	140	120	108	97	88	82	77	73	68	63	56	44	43
Double Span	XD 80	Downwards	19.67	12.02	8.47	6.23	4.79	3.82	3.13	2.61	2.22	1.90	1.62	1.40	1.20
		Upwards	22.62	13.72	9.49	7.09	5.57	4.52	3.77	3.19	2.75	2.40	2.11	1.87	1.68
		a <sub>min</sub> [mm]	141	115	102	91	82	76	70	66	62	59	56	52	49
		b <sub>min</sub> [mm]	282	231	205	182	165	152	141	132	125	118	111	105	99
	XD 100	Downwards	20.15	12.48	8.96	6.62	5.15	4.03	3.44	2.89	2.47	2.02	1.71	1.47	1.27
		Upwards	23.38	14.45	10.17	7.72	6.15	5.06	4.26	3.65	3.16	2.76	2.44	2.18	1.95
		a <sub>min</sub> [mm]	144	120	108	97	88	80	77	73	69	63	58	55	52
		b <sub>min</sub> [mm]	288	240	216	193	177	160	155	146	139	126	117	110	104

Remarks: The above values of loads are characteristic. For Each value individual and combined load cases with appropriate load factors and temperatures have been considered.  
For Intermediate values linear interpolation may be used. Values have been calculated using the limit state method according to EN 14509, taking imposed loads and temperature into account.  
Maximum permissible deflection limit: downwards and upwards – L/200  
a<sub>min</sub> – the minimum width of end supports, b<sub>min</sub> – the minimum width of intermediate supports  
The dead load of panels is included in the above figures

## KS1000 X-DEK

Roofpanel KS1000 XD –  
ext. Steel 0.70 mm (Minibox-profiled) / int. Steel 1.1 mm



System	Core thickness	Load Case	All loads in kN/m <sup>2</sup> for given span in meters												
			1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
Single Span	XD 80	Downwards	23.66	14.22	9.85	7.41	5.66	4.50	3.67	3.05	2.38	1.87	1.49	1.16	0.89
		Upwards	27.25	16.37	11.21	8.31	6.50	5.26	4.36	3.51	2.84	2.35	1.97	1.68	1.45
		a <sub>min</sub> [mm]	169	136	119	108	97	89	83	77	67	59	43	45	40
	XD 100	Downwards	24.12	14.69	10.32	7.79	6.03	4.85	4.00	3.37	2.75	2.20	1.78	1.45	1.14
		Upwards	28.01	17.09	11.90	8.97	7.10	5.82	4.88	3.98	3.24	2.69	2.27	1.94	1.68
		a <sub>min</sub> [mm]	173	141	125	114	103	96	90	85	77	69	61	55	48
Double Span	XD 80	Downwards	23.66	14.22	9.85	7.41	5.66	4.49	3.67	3.05	2.58	2.21	1.91	1.66	1.46
		Upwards	27.27	16.36	11.21	8.31	6.50	5.26	4.36	3.70	3.18	2.77	2.28	2.16	1.93
		a <sub>min</sub> [mm]	169	136	119	108	97	89	83	77	73	69	65	62	59
		b <sub>min</sub> [mm]	338	273	238	216	194	178	165	154	145	137	130	124	119
	XD 100	Downwards	24.13	14.69	10.32	7.79	6.03	4.84	4.00	3.36	2.87	2.42	2.07	1.79	1.56
		Upwards	28.03	17.09	11.90	8.97	7.10	5.82	4.88	4.17	3.61	3.16	2.80	2.49	2.24
		a <sub>min</sub> [mm]	173	141	125	114	103	96	90	85	80	75	70	66	63
		b <sub>min</sub> [mm]	345	282	249	227	207	191	179	169	161	150	140	132	126

Remarks: The above values of loads are characteristic. For Each value individual and combined load cases with appropriate load factors and temperatures have been considered.  
For Intermediate values linear interpolation may be used. Values have been calculated using the limit state method according to EN 14509, taking imposed loads and temperature into account.  
Maximum permissible deflection limit: downwards and upwards – L/200  
a<sub>min</sub> – the minimum width of end supports, b<sub>min</sub> – the minimum width of intermediate supports  
The dead load of panels is included in the above figures

# Fastener Selection Guide

■	EJOT	6.1.1
■	MAGE	6.2.12
■	SFS intec	6.3.23





## EJOT

Application: **Roof**Type of Panel: **RW**Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 2.0–5.0 mm)	25	JT2-D-6H-5.5×62 V16	JT3-D-6H-5.5×67 E16	JZ2 6.3×50 V16 <sup>1)</sup>	JZ3 6.3×50 E16 <sup>1)</sup>
	40	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×64 V16 <sup>1)</sup>	JZ3 6.3×64 E16 <sup>1)</sup>
	50	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×80 V16 <sup>1)</sup>	JZ3 6.3×80 E16 <sup>1)</sup>
	60	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×90 V16 <sup>1)</sup>	JZ3 6.3×90 E16 <sup>1)</sup>
	70	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×100 E16 <sup>1)</sup>
	80	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×115 E16 <sup>1)</sup>
	100	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×147 E16	JZ2 6.3×125 V16 <sup>1)</sup>	JZ3 6.3×125 E16 <sup>1)</sup>
	120	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×167 E16	JZ2 6.3×150 V16 <sup>1)</sup>	JZ3 6.3×150 E16 <sup>1)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	25	JT2-D-12H-5.5×65 V16	JT3-D-12H-5.5×75 E16	JZ2 6.3×50 V16	JZ3 6.3×50 E16
	40	JT2-D-12H-5.5×80 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×64 V16	JZ3 6.3×64 E16
	50	JT2-D-12H-5.5×95 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×80 V16	JZ3 6.3×80 E16
	60	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×90 V16	JZ3 6.3×90 E16
	70	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×100 V16	JZ3 6.3×100 E16
	80	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×100 V16	JZ3 6.3×115 E16
	100	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2 6.3×125 V16	JZ3 6.3×125 E16
	120	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×175 E16	JZ2 6.3×150 V16	JZ3 6.3×150 E16
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	25	—	—	FBS-R-6.3×60 V16 <sup>3)</sup>	—
	40	—	—	FBS-R-6.3×80 V16 <sup>3)</sup>	—
	50	—	—	FBS-R-6.3×100 V16 <sup>3)</sup>	—
	60	—	—	FBS-R-6.3×100 V16 <sup>3)</sup>	—
	70	—	—	BS-R-6.3×120 V16 <sup>3)</sup>	—
	80	—	—	BS-R-6.3×120 V16 <sup>3)</sup>	—
	100	—	—	BS-R-6.3×140 V16 <sup>3)</sup>	—
	120	—	—	BS-R-6.3×160 V16 <sup>3)</sup>	—
TIMBER		Self-Drilling Fasteners		Self-Tapping Fasteners	
	25	JT2-2-6.5×90 V16	JT3-2-6.5×80 E16	JA2 6.5×90 V16	JA3 6.5×90 E16
	40	JT2-2-6.5×90 V16	JT3-2-6.5×120 E16	JA2 6.5×100 V16	JA3 6.5×100 E16
	50	—	JT3-2-6.5×120 E16	JA2 6.5×125 V16	JA3 6.5×100 E16
	60	—	JT3-2-6.5×140 E16	JA2 6.5×125 V16	JA3 6.5×115 E16
	70	—	JT3-2-6.5×140 E16	JA2 6.5×150 V16	JA3 6.5×125 E16
	80	—	JT3-2-6.5×160 E16	JA2 6.5×150 V16	JA3 6.5×150 E16
	100	—	JT3-2-6.5×180 E16	JA2 6.5×175 V16	JA3 6.5×175 E16
	120	—	JT3-2-6.5×200 E16	JA2 6.5×175 V16	JA3 6.5×175 E16

Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
  - 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- clamping thickness of panels RW, GRP40, HTL for the screw = D+5 mm
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

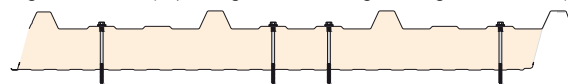
## Recommended Fastener Locations

## KS1000 RW

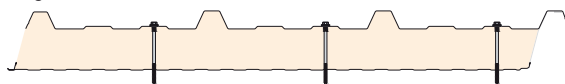
Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



Ridge/Eaves\*



\* Number of fasteners to be specified by structural/static engineer.

## EJOT

Application: Roof

Type of Panel: RW, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 2.0–5.0 mm)	25	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×80 V16 <sup>1)3)</sup>	JZ3 6.3×80 E16 <sup>1)3)</sup>
	40	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×100 V16 <sup>1)3)</sup>	JZ3 6.3×100 E16 <sup>1)3)</sup>
	50	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×100 V16 <sup>1)3)</sup>	JZ3 6.3×100 E16 <sup>1)3)</sup>
	60	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×125 V16 <sup>1)3)</sup>	JZ3 6.3×115 E16 <sup>1)3)</sup>
	70	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×147 E16	JZ2 6.3×125 V16 <sup>1)3)</sup>	JZ3 6.3×125 E16 <sup>1)3)</sup>
	80	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×147 E16	JZ2 6.3×150 V16 <sup>1)3)</sup>	JZ3 6.3×135 E16 <sup>1)3)</sup>
	100	JT2-D-6H-5.5×172 V16	JT3-D-6H-5.5×167 E16	JZ2 6.3×150 V16 <sup>1)3)</sup>	JZ3 6.3×150 E16 <sup>1)3)</sup>
	120	JT2-D-6H-5.5×192 V16	JT3-D-6H-5.5×197 E16	JZ2 6.3×175 V16 <sup>1)3)</sup>	JZ3 6.3×175 E16 <sup>1)3)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	25	JT2-D-12H-5.5×95 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×80 V16 <sup>2)</sup>	JZ3 6.3×80 E16 <sup>2)</sup>
	40	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×100 V16 <sup>2)</sup>	JZ3 6.3×100 E16 <sup>2)</sup>
	50	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×100 V16 <sup>2)</sup>	JZ3 6.3×100 E16 <sup>2)</sup>
	60	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×125 V16 <sup>2)</sup>	JZ3 6.3×115 E16 <sup>2)</sup>
	70	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2 6.3×125 V16 <sup>2)</sup>	JZ3 6.3×125 E16 <sup>2)</sup>
	80	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2 6.3×150 V16 <sup>2)</sup>	JZ3 6.3×135 E16 <sup>2)</sup>
	100	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×175 E16	JZ2 6.3×150 V16 <sup>2)</sup>	JZ3 6.3×150 E16 <sup>2)</sup>
	120	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×195 E16	JZ2 6.3×175 V16 <sup>2)</sup>	JZ3 6.3×175 E16 <sup>2)</sup>
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	25	—	—	FBS-R-6.3×60 V16	—
	40	—	—	FBS-R-6.3×80 V16	—
	50	—	—	FBS-R-6.3×100 V16	—
	60	—	—	FBS-R-6.3×100 V16	—
	70	—	—	FBS-R-6.3×120 V16	—
	80	—	—	FBS-R-6.3×120 V16	—
	100	—	—	FBS-R-6.3×140 V16	—
TIMBER		Self-Drilling Fasteners		Self-Tapping Fasteners	
	25	JT2-2-6.5×90 V16	JT3-2-6.5×120 E16	JA2 6.5×90 V16	JA3 6.5×90 E16
	40	JT2-2-6.5×90 V16	JT3-2-6.5×140 E16	JA2 6.5×100 V16	JA3 6.5×100 E16
	50	—	JT3-2-6.5×160 E16	JA2 6.5×125 V16	JA3 6.5×100 E16
	60	—	JT3-2-6.5×160 E16	JA2 6.5×125 V16	JA3 6.5×115 E16
	70	—	JT3-2-6.5×180 E16	JA2 6.5×150 V16	JA3 6.5×125 E16
	80	—	JT3-2-6.5×180 E16	JA2 6.5×150 V16	JA3 6.5×150 E16
	100	—	JT3-2-6.5×200 E16	JA2 6.5×175 V16	JA3 6.5×175 E16
	120	—	—	JA2 6.5×175 V16	JA3 6.5×175 E16

Note:

- For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- The screw will be completed with the calotte 32–25 (dia. of the washer has to be 16 mm)
- The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
  - for panel RW/GRP40 and RW/HTL has to be use calotte 32–25 (dia. of the washer has to be 16 mm)
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

## Recommended Fastener Locations

## KS1000 RW

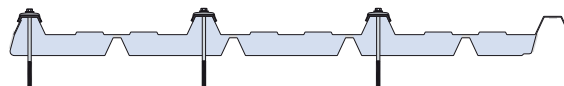
Standard\*



Ridge/Eaves\*



## KS1000 RW/GRP40



## KS1000 RW/HTL



\* Number of fasteners to be specified by structural/static engineer.

## EJOT

Application: **Roof**Type of Panel: **X-DEK, TOP-DEK**Fixing position: **VALLEY**

Support	Type of the panel	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 2.0–5.0 mm)	X-DEK/Steel	JT2-6-5.5×25 V16	JT3-6-5.5×25 E16	JZ2 6.3×25 V16 <sup>1)</sup>	JZ3 6.3×25 E16 <sup>1)</sup>
	X-DEK/TR, TOP-DEK	JT2-6-5.5×25 V16	JT3-6-5.5×25 E16	JZ2 6.3×25 V16 <sup>1)</sup>	JZ3 6.3×25 E16 <sup>1)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	X-DEK/Steel	JT2-12-5.5×35 V16	JT3-12-5.5×40 E16	JZ2 6.3×25 V16 <sup>1)</sup>	JZ3 6.3×25 E16 <sup>1)</sup>
	X-DEK/TR, TOP-DEK	JT2-12-5.5×35 V16	JT3-12-5.5×40 E16	JZ2 6.3×25 V16 <sup>1)</sup>	JZ3 6.3×25 E16 <sup>1)</sup>
<b>CONCRETE</b>		Screw Set Anchor		Self-Tapping Fasteners	
	X-DEK/Steel	SDF-KB 10×60 -V <sup>4)</sup>	SDF-KB 10×60 -E <sup>4)</sup>	BS-R-6.3×35 V16 <sup>3)</sup>	—
	X-DEK/TR, TOP-DEK	SDF-KB 10×60 -V <sup>4)</sup>	SDF-KB 10×60 -E <sup>4)</sup>	BS-R-6.3×35 V16 <sup>3)</sup>	—
<b>TIMBER</b>		Self-Drilling Fasteners		Self-Tapping Fasteners	
	X-DEK/Steel	JT2-2-6.5×50 V16	JT3-2-6.5×50 E16	JA3 6.5×25E16	JA3 6.5×25E16
	X-DEK/TR, TOP-DEK	JT2-2-6.5×50 V16	JT3-2-6.5×50 E16	JA3 6.5×25E16	JA3 6.5×25E16

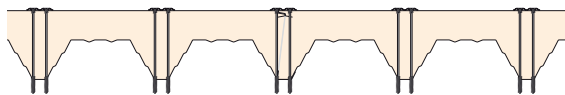
Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 4) Assembling – plastic part of the anchor into pre-drilled hole dia. 10 mm
  - the panel (outer and insulation) must be pre-drilled
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

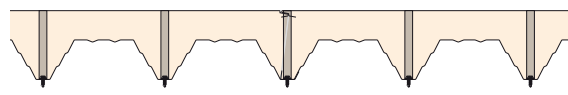
## Recommended Fastener Locations

## KS1000 X-DEK

Steel

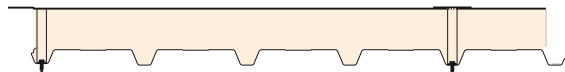


TR

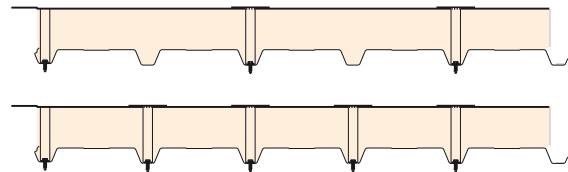


## KS1000 TOP-DEK

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

**EJOT**Application: **Roof**Type of Panel: **X-DEK/ steel**Fixing position: **THROUGH**

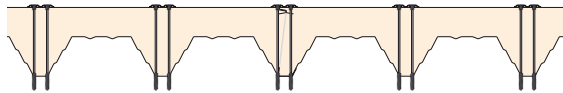
Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 2.0–5.0 mm)	80	—	JT3-D-6H-5.5 × 237	—	JZ3 6.3 × 230 <sup>1)</sup>
	100	—	JT3-D-6H-5.5 × 237	—	JZ3 6.3 × 230 <sup>1)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	80	JT2-D-12H-5.5 × 235	JT3-D-12H-5.5 × 245	—	JZ3 6.3 × 230
	100	JT2-D-12H-5.5 × 250	JT3-D-12H-5.5 × 245	—	JZ3 6.3 × 230
<b>CONCRETE</b>		Screw Set Anchor		Self-Tapping Fasteners	
	80	SDF-S 10U × 275 -V <sup>6) 7)</sup>	—	BS-R-6.3 × 220 <sup>3)</sup>	—
	100	SDF-S 10U × 300 -V <sup>6) 7)</sup>	—	BS-R-6.3 × 240 <sup>3)</sup>	—
<b>TIMBER</b>		Self-Drilling Fasteners		Self-Tapping Fasteners	
	80	—	—	—	JA3 6.5 × 260
	100	—	—	—	JA3 6.5 × 260

Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 6) CONCRETE – The washer is applied onto the screw first and after that can be put into plastic part of the anchor
- 7) Assembling – plastic part of the anchor into pre-drilled hole dia. 10 mm
- All screws in fixing position THROUGH has to be used in a combination with the washer HTV 82/40 F
- The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
- for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
- clamping thickness of panels X-DEK for the screw = crown D + 108 mm
- The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

**Recommended Fastener Locations****KS1000 X-DEK**

Steel



## EJOT

Application: **Roof**Type of Panel: **RT**Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 2.0–5.0 mm)	45	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×64 V16 <sup>1)</sup>	JZ3 6.3×64 E16 <sup>1)</sup>
	60	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×80 V16 <sup>1)</sup>	JZ3 6.3×80 E16 <sup>1)</sup>
	80	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×100 E16 <sup>1)</sup>
	100	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×147 E16	JZ2 6.3×125 V16 <sup>1)</sup>	JZ3 6.3×125 E16 <sup>1)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	45	JT2-D-12H-5.5×80 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×64 V16	JZ3 6.3×64 E16
	60	JT2-D-12H-5.5×95 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×80 V16	JZ3 6.3×80 E16
	80	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×100 V16	JZ3 6.3×100 E16
	100	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2 6.3×125 V16	JZ3 6.3×125 E16
<b>CONCRETE</b>		Screw Set Anchor		Self-Tapping Fasteners	
	45	—	—	FBS-R-6.3×80 V16 <sup>3)</sup>	—
	60	—	—	FBS-R-6.3×100 V16 <sup>3)</sup>	—
	80	—	—	BS-R-6.3×120 V16 <sup>3)</sup>	—
<b>TIMBER</b>		Self-Drilling Fasteners		Self-Tapping Fasteners	
	45	JT2-2-6.5×90 V16	JT3-2-6.5×100 E16	JA2 6.5×100 V16	JA3 6.5×100 E16
	60	—	JT3-2-6.5×120 E16	JA2 6.5×125 V16	JA3 6.5×115 E16
	80	—	JT3-2-6.5×140 E16	JA2 6.5×150 V16	JA3 6.5×150 E16
	100	—	JT3-2-6.5×160 E16	JA2 6.5×150 V16	JA3 6.5×150 E16

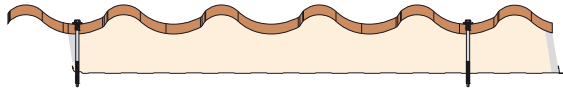
Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- In all cases EJOT recommends to use washers with 3 mm EPDM, i.e. E16/3
- The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
- The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

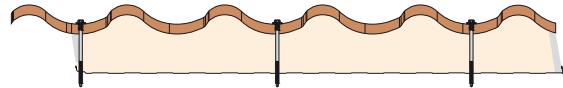
## Recommended Fastener Locations

## KS1000 RT

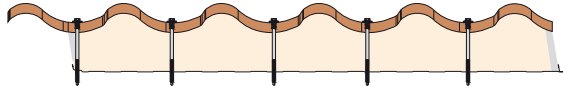
Standard\*



Ridge/Eaves



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

**EJOT**Application: **Roof**Type of Panel: **FF**Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 2.0–5.0 mm)	60	JT2-D-6H-5.5 × 82 V22	JT3-D-6H-5.5 × 107 E22	JZ2-6.3 × 80 V22 <sup>1)</sup>	JZ3-6.3 × 80 E22 <sup>1)</sup>
	80	JT2-D-6H-5.5 × 102 V22	JT3-D-6H-5.5 × 127 E22	JZ2-6.3 × 100 V22 <sup>1)</sup>	JZ3-6.3 × 100 E22 <sup>1)</sup>
	100	JT2-D-6H-5.5 × 122 V22	JT3-D-6H-5.5 × 147 E22	JZ2-6.3 × 125 V22 <sup>1)</sup>	JZ3-6.3 × 125 E22 <sup>1)</sup>
	120	JT2-D-6H-5.5 × 152 V22	JT3-D-6H-5.5 × 167 E22	JZ2-6.3 × 150 V22 <sup>1)</sup>	JZ3-6.3 × 135 E22 <sup>1)</sup>
	150	JT2-D-6H-5.5 × 172 V22	JT3-D-6H-5.5 × 197 E22	JZ2-6.3 × 175 V22 <sup>1)</sup>	JZ3-6.3 × 175 E22 <sup>1)</sup>
	200	—	JT3-D-6H-5.5 × 237 E22	—	JZ3-6.3 × 230 E22 <sup>1)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	60	JT2-D-12H-5.5 × 95 V22	JT3-D-12H-5.5 × 115 E22	JZ2-6.3 × 80 V22	JZ3-6.3 × 80 E22
	80	JT2-D-12H-5.5 × 135 V22	JT3-D-12H-5.5 × 135 E22	JZ2-6.3 × 100 V22	JZ3-6.3 × 100 E22
	100	JT2-D-12H-5.5 × 155 V22	JT3-D-12H-5.5 × 155 E22	JZ2-6.3 × 125 V22	JZ3-6.3 × 125 E22
	120	JT2-D-12H-5.5 × 155 V22	JT3-D-12H-5.5 × 175 E22	JZ2-6.3 × 150 V22	JZ3-6.3 × 135 E22
	150	JT2-D-12H-5.5 × 195 V22	JT3-D-12H-5.5 × 195 E22	JZ2-6.3 × 175 V22	JZ3-6.3 × 175 E22
	200	JT2-D-12H-5.5 × 250 V22	JT3-D-12H-5.5 × 245 E22	—	JZ3-6.3 × 230 E22
<b>CONCRETE</b>		Screw Set Anchor		Self-Tapping Fasteners	
	60	—	—	BS-R-6.3 × 120 V22 <sup>3)</sup>	—
	80	—	—	BS-R-6.3 × 120 V22 <sup>3)</sup>	—
	100	—	—	BS-R-6.3 × 140 V22 <sup>3)</sup>	—
	120	—	—	BS-R-6.3 × 160 V22 <sup>3)</sup>	—
	150	—	—	BS-R-6.3 × 200 V22 <sup>3)</sup>	—
<b>TIMBER</b>		Self-Drilling Fasteners		Self-Tapping Fasteners	
	60	—	JT3-2-6.5 × 120 E22	JA2 6.5 × 125 V22	JA3 6.5 × 115 E22
	80	—	JT3-2-6.5 × 140 E22	JA2 6.5 × 150 V22	JA3 6.5 × 150 E22
	100	—	JT3-2-6.5 × 160 E22	JA2 6.5 × 150 V22	JA3 6.5 × 150 E22
	120	—	JT3-2-6.5 × 180 E22	JA2 6.5 × 175 V22	JA3 6.5 × 175 E22
	150	—	—	JA2 6.5 × 200 V22	JA3 6.5 × 200 E22
	200	—	—	—	JA3 6.5 × 260 E22

Note:

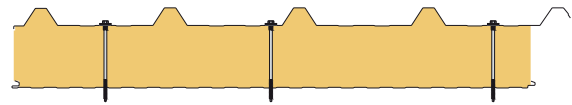
- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
- for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
- The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

**Recommended Fastener Locations****KS1000 FF**

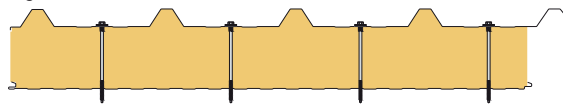
Standard



Ridge/Eaves



High Wind Load



## EJOT

Application: Roof

Type of Panel: FF, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 2.0–5.0 mm)	60	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2-6.3×125 V16 <sup>1)2)</sup>	JZ3-6.3×115 E16 <sup>1)2)</sup>
	80	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×147 E16	JZ2-6.3×150 V16 <sup>1)2)</sup>	JZ3-6.3×135 E16 <sup>1)2)</sup>
	100	JT2-D-6H-5.5×172 V16	JT3-D-6H-5.5×167 E16	JZ2-6.3×150 V16 <sup>1)2)</sup>	JZ3-6.3×150 E16 <sup>1)2)</sup>
	120	JT2-D-6H-5.5×192 V16	JT3-D-6H-5.5×197 E16	JZ2-6.3×175 V16 <sup>1)2)</sup>	JZ3-6.3×175 E16 <sup>1)2)</sup>
	150	—	JT3-D-6H-5.5×237 E16	—	JZ3-6.3×200 E16 <sup>1)2)</sup>
	200	—	—	—	JZ3-6.3×270 E16 <sup>1)2)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	60	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2-6.3×125 V16 <sup>2)</sup>	JZ3-6.3×115 E16 <sup>2)</sup>
	80	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2-6.3×150 V16 <sup>2)</sup>	JZ3-6.3×135 E16 <sup>2)</sup>
	100	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×175 E16	JZ2-6.3×150 V16 <sup>2)</sup>	JZ3-6.3×150 E16 <sup>2)</sup>
	120	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×195 E16	JZ2-6.3×175 V16 <sup>2)</sup>	JZ3-6.3×175 E16 <sup>2)</sup>
	150	JT2-D-12H-5.5×235 V16	JT3-D-12H-5.5×245 E16	—	JZ3-6.3×200 E16 <sup>2)</sup>
	200	JT2-D-12H-5.5×300 V16	—	—	JZ3-6.3×270 E16 <sup>2)</sup>
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	60	SDF-S 8×160 -V + V22 <sup>5)</sup>	SDF-S 8×160 -E + E22 <sup>5)</sup>	BS-R-6.3×140 V22 <sup>2)3)</sup>	—
	80	SDF-S 8×180 -V + V22 <sup>5)</sup>	SDF-S 8×180 -E + E22 <sup>5)</sup>	BS-R-6.3×160 V22 <sup>2)3)</sup>	—
	100	SDF-S 8×200 -V + V22 <sup>5)</sup>	SDF-S 8×200 -E + E22 <sup>5)</sup>	BS-R-6.3×180 V22 <sup>2)3)</sup>	—
	120	SDF-S 8×220 -V + V22 <sup>5)</sup>	SDF-S 8×220 -E + E22 <sup>5)</sup>	BS-R-6.3×200 V22 <sup>2)3)</sup>	—
	150	—	—	BS-R-6.3×220 V22 <sup>2)3)</sup>	—
TIMBER		Self-Drilling Fasteners		Self-Tapping Fasteners	
	60	—	JT3-2-6.5×160 E16	JA2 6.5×150 V16 <sup>2)</sup>	JA3 6.5×150 E16 <sup>2)</sup>
	80	—	JT3-2-6.5×180 E16	JA2 6.5×175 V16 <sup>2)</sup>	JA3 6.5×175 E16 <sup>2)</sup>
	100	—	JT3-2-6.5×200 E16	JA2 6.5×200 V16 <sup>2)</sup>	JA3 6.5×200 E16 <sup>2)</sup>
	120	—	—	—	JA3 6.5×230 E16 <sup>2)</sup>
	150	—	—	—	JA3 6.5×260 E16 <sup>2)</sup>
	200	—	—	—	JA3 6.5×290 E16 <sup>2)</sup>

Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 2) The screw will be completed with the calotte 26–27 (dia. of the washer has to be 16 mm)
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 5) Assembling – plastic part of the anchor into pre-drilled hole dia. 8 mm; screw with both washers (the washer and calotte the storm washer) into plastic part of the anchor
  - for panel FF/GRP40 and FF/HTL has to be use calotte 26–27 (dia. of the washer has to be 16 mm)
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

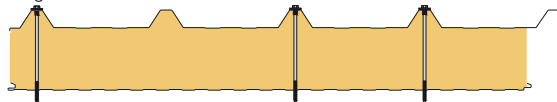
## Recommended Fastener Locations

## KS1000 FF

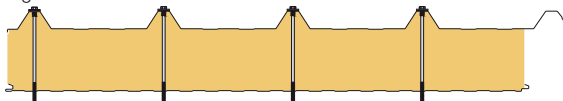
Standard



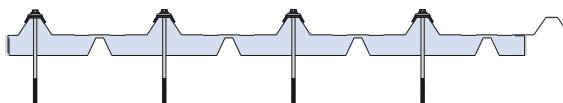
Ridge/Eaves



High Wind Load



## KS1000 FF/GRP40



## KS1000 FF/HTL



## EJOT

Application: **Wall, Ceiling**    Type of Panel: **TF, TC, TL, RW, FR, FA**    Fixing position: **VALLEY**

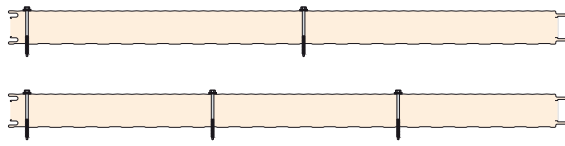
Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (2.0–5.0 mm)	25	JT2-D-6H-5.5×62 V16	JT3-D-6H-5.5×67 E16	JZ2 6.3×50 V16 <sup>1)</sup>	JZ3 6.3×50 E16 <sup>1)</sup>
	40	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×64 V16 <sup>1)</sup>	JZ3 6.3×64 E16 <sup>1)</sup>
	50	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×80 V16 <sup>1)</sup>	JZ3 6.3×80 E16 <sup>1)</sup>
	60	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×90 V16 <sup>1)</sup>	JZ3 6.3×90 E16 <sup>1)</sup>
	70	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×100 E16 <sup>1)</sup>
	80	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×115 E16 <sup>1)</sup>
	100	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×147 E16	JZ2 6.3×125 V16 <sup>1)</sup>	JZ3 6.3×125 E16 <sup>1)</sup>
	120	JT2-D-6H-5.5×152 V16	JT3-D-6H-5.5×167 E16	JZ2 6.3×150 V16 <sup>1)</sup>	JZ3 6.3×150 E16 <sup>1)</sup>
	150	JT2-D-6H-5.5×172 V16	JT3-D-6H-5.5×197 E16	JZ2 6.3×175 V16 <sup>1)</sup>	JZ3 6.3×175 E16 <sup>1)</sup>
	170	JT2-D-6H-5.5×192 V16	JT3-D-6H-5.5×237 E16	JZ2 6.3×200 V16 <sup>1)</sup>	JZ3 6.3×200 E16 <sup>1)</sup>
200	—	JT3-D-6H-5.5×237 E16	—	JZ3 6.3×230 E16 <sup>1)</sup>	
STEEL Hot Rolled (thickness 3.0–12.0 mm)	25	JT2-D-12-5.5×65 V16	JT3-D-12H-5.5×75 E16	JZ2 6.3×50 V16	JZ3 6.3×50 E16
	40	JT2-D-12H-5.5×80 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×64 V16	JZ3 6.3×64 E16
	50	JT2-D-12H-5.5×95 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×80 V16	JZ3 6.3×80 E16
	60	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×90 V16	JZ3 6.3×90 E16
	70	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×100 V16	JZ3 6.3×100 E16
	80	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×100 V16	JZ3 6.3×115 E16
	100	JT2-D-12H-5.5×155 V16	JT3-D-12H-5.5×155 E16	JZ2 6.3×125 V16	JZ3 6.3×125 E16
	120	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×175 E16	JZ2 6.3×150 V16	JZ3 6.3×150 E16
	150	JT2-D-12H-5.5×195 V16	JT3-D-12H-5.5×195 E16	JZ2 6.3×175 V16	JZ3 6.3×175 E16
	170	JT2-D-12H-5.5×235 V16	JT3-D-12H-5.5×245 E16	JZ2 6.3×200 V16	JZ3 6.3×200 E16
200	JT2-D-12H-5.5×235 V16	JT3-D-12H-5.5×245 E16	—	JZ3 6.3×230 E16	
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	25	SDF-KB 10×80 -V <sup>4) ㉔</sup>	SDF-KB 10×80 -E <sup>4) ㉔</sup>	FBS-R-6.3×60 V16 <sup>㉔</sup>	—
	40	SDF-KB 10×100 -V <sup>4) ㉔</sup>	SDF-KB 10×100 -E <sup>4) ㉔</sup>	FBS-R-6.3×80 V16 <sup>㉔</sup>	—
	50	SDF-KB 10×120 -V <sup>4) ㉔</sup>	SDF-KB 10×120 -E <sup>4) ㉔</sup>	FBS-R-6.3×100 V16 <sup>㉔</sup>	—
	60	SDF-KB 10×120 -V <sup>4) ㉔</sup>	SDF-KB 10×120 -E <sup>4) ㉔</sup>	FBS-R-6.3×100 V16 <sup>㉔</sup>	—
	70	SDF-KB 10×140 -V <sup>4) ㉔</sup>	SDF-KB 10×140 -E <sup>4) ㉔</sup>	BS-R-6.3×120 V16 <sup>㉔</sup>	—
	80	SDF-KB 10×140 -V <sup>4) ㉔</sup>	SDF-KB 10×140 -E <sup>4) ㉔</sup>	BS-R-6.3×120 V16 <sup>㉔</sup>	—
	100	SDF-KB 10×160 -V <sup>4) ㉔</sup>	SDF-KB 10×160 -E <sup>4) ㉔</sup>	BS-R-6.3×140 V16 <sup>㉔</sup>	—
	120	SDF-KB 10×180 -V <sup>4) ㉔</sup>	SDF-KB 10×180 -E <sup>4) ㉔</sup>	BS-R-6.3×160 V16 <sup>㉔</sup>	—
	150	SDF-KB 10×220 -V <sup>4) ㉔</sup>	SDF-KB 10×220 -E <sup>4) ㉔</sup>	BS-R-6.3×200 V16 <sup>㉔</sup>	—
	170	SDF-KB 14U×260 -V <sup>4) ㉔</sup>	SDF-KB 14U×260 -E <sup>4) ㉔</sup>	BS-R-6.3×220 V16 <sup>㉔</sup>	—
200	SDF-KB 14U×280 -V <sup>4) ㉔</sup>	SDF-KB 14U×280 -E <sup>4) ㉔</sup>	BS-R-6.3×240 V16 <sup>㉔</sup>	—	
TIMBER		Self-Drilling Fasteners		Self-Tapping Fasteners	
	25	JT2-2-6.5×90 V16	JT3-2-6.5×80 E16	JA2 6.5×90 V16	JA3 6.5× 90 E16
	40	JT2-2-6.5×90 V16	JT3-2-6.5×100 E16	JA2 6.5×100 V16	JA3 6.5×100 E16
	50	—	JT3-2-6.5×100 E16	JA2 6.5×125 V16	JA3 6.5×100 E16
	60	—	JT3-2-6.5×120 E16	JA2 6.5×125 V16	JA3 6.5×115 E16
	70	—	JT3-2-6.5×120 E16	JA2 6.5×150 V16	JA3 6.5×125 E16
	80	—	JT3-2-6.5×140 E16	JA2 6.5×150 V16	JA3 6.5×150 E16
	100	—	JT3-2-6.5×160 E16	JA2 6.5×175 V16	JA3 6.5×175 E16
	120	—	JT3-2-6.5×180 E16	JA2 6.5×175 V16	JA3 6.5×175 E16
	150	—	—	—	JA3 6.5×230 E16
	170	—	—	—	JA3 6.5×230 E16
200	—	—	—	JA3 6.5×260 E16	

Note:

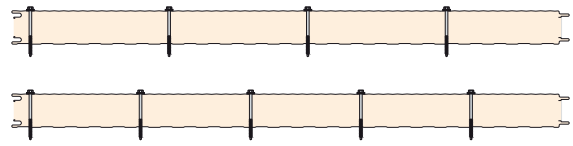
- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 4) Assembling – plastic part of the anchor into pre-drilled hole dia. 10 mm
- 8) the screw set anchor can not be used for panel FR and FA
  - for FR and FA panel has to be use the screw with sealing washer dia. 22 mm
  - clamping thickness of panel RW for the screw =  $D + 5$  mm
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

**EJOT****Recommended Fastener Locations****KS1150 TF/TC**

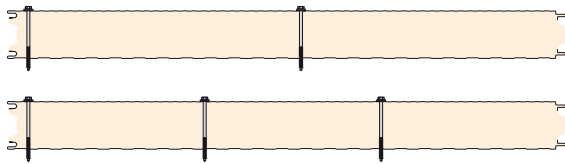
Standard\*



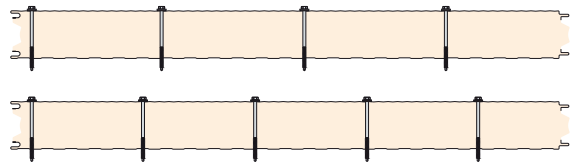
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1150 TL**

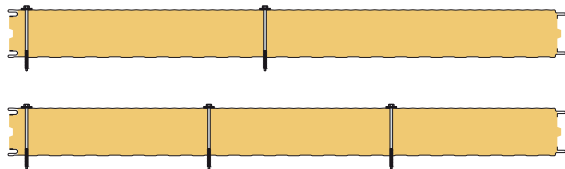
Standard\*



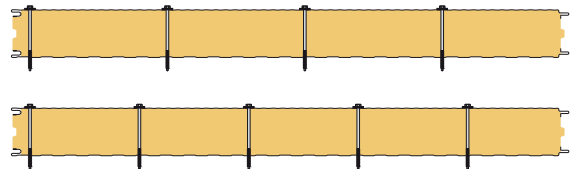
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1150 FR**

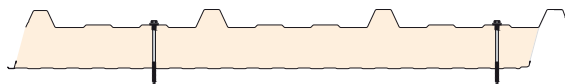
Standard\*



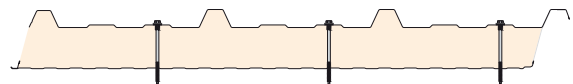
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1000 RW**

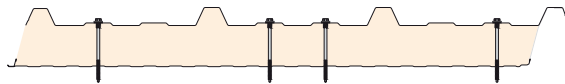
Standard\*



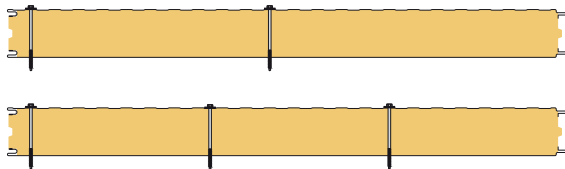
Ridge/Eaves\*



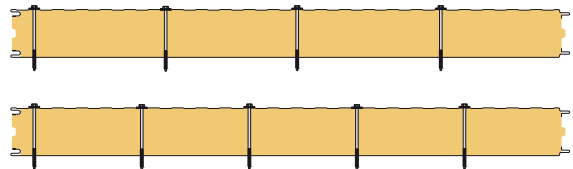
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1150 FA**

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## EJOT

Application: Wall, Ceiling

Type of Panel: AWP

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 2.0–5.0 mm)	50	JT2-6-6.3×50 V16	JT3-6-5.5×50 E16	JZ2 6.3×50 V16 <sup>1)</sup>	JZ3 6.3×50 E16 <sup>1)</sup>
	60	JT2-D-6H-5.5×62 V16	JT3-D-6H-5.5×67 E16	JZ2 6.3×64 V16 <sup>1)</sup>	JZ3 6.3×64 E16 <sup>1)</sup>
	70	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×80 V16 <sup>1)</sup>	JZ3 6.3×80 E16 <sup>1)</sup>
	80	JT2-D-6H-5.5×82 V16	JT3-D-6H-5.5×87 E16	JZ2 6.3×90 V16 <sup>1)</sup>	JZ3 6.3×90 E16 <sup>1)</sup>
	100	JT2-D-6H-5.5×102 V16	JT3-D-6H-5.5×107 E16	JZ2 6.3×100 V16 <sup>1)</sup>	JZ3 6.3×100 E16 <sup>1)</sup>
	120	JT2-D-6H-5.5×122 V16	JT3-D-6H-5.5×127 E16	JZ2 6.3×125 V16 <sup>1)</sup>	JZ3 6.3×125 E16 <sup>1)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	50	JT2-12-5.5×65 V16	JT3-12-5.5×78 E16	JZ2 6.3×50 V16	JZ3 6.3×50 E16
	60	JT2-12-5.5×65 V16	JT3-12-5.5×78 E16	JZ2 6.3×64 V16	JZ3 6.3×64 E16
	70	JT2-D-12H-5.5×80 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×80 V16	JZ3 6.3×80 E16
	80	JT2-D-12H-5.5×95 V16	JT3-D-12H-5.5×95 E16	JZ2 6.3×90 V16	JZ3 6.3×90 E16
	100	JT2-D-12H-5.5×115 V16	JT3-D-12H-5.5×115 E16	JZ2 6.3×100 V16	JZ3 6.3×100 E16
	120	JT2-D-12H-5.5×135 V16	JT3-D-12H-5.5×135 E16	JZ2 6.3×125 V16	JZ3 6.3×125 E16
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	50	SDF-KB 10×80 -V <sup>4)</sup>	SDF-KB 10×80 -E <sup>4)</sup>	FBS-R-6.3×60 V16 <sup>3)</sup>	—
	60	SDF-KB 10×100 -V <sup>4)</sup>	SDF-KB 10×100 -E <sup>4)</sup>	FBS-R-6.3×80 V16 <sup>3)</sup>	—
	70	SDF-KB 10×100 -V <sup>4)</sup>	SDF-KB 10×100 -E <sup>4)</sup>	FBS-R-6.3×80 V16 <sup>3)</sup>	—
	80	SDF-KB 10×120 -V <sup>4)</sup>	SDF-KB 10×120 -E <sup>4)</sup>	FBS-R-6.3×100 V16 <sup>3)</sup>	—
	100	SDF-KB 10×140 -V <sup>4)</sup>	SDF-KB 10×140 -E <sup>4)</sup>	BS-R-6.3×120 V16 <sup>3)</sup>	—
TIMBER		Self-Drilling Fasteners		Self-Tapping Fasteners	
	50	JT2-2-6.5×90 V16	JT3-2-6.5×80 E16	JA2 6.5×90 V16	JA3 6.5×90 E16
	60	JT2-2-6.5×90 V16	JT3-2-6.5×100 E16	JA2 6.5×90 V16	JA3 6.5×90 E16
	70	—	JT3-2-6.5×100 E16	JA2 6.5×100 V16	JA3 6.5×100 E16
	80	—	JT3-2-6.5×120 E16	JA2 6.5×125 V16	JA3 6.5×115 E16
	100	—	JT3-2-6.5×140 E16	JA2 6.5×150 V16	JA3 6.5×150 E16
	120	—	JT3-2-6.5×160 E16	JA2 6.5×150 V16	JA3 6.5×150 E16

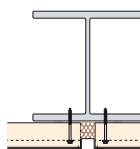
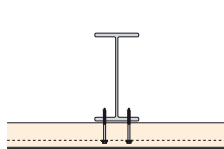
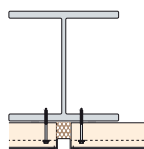
Note:

- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 4) Assembling – plastic part of the anchor into pre-drilled hole dia. 10 mm
  - clamping thickness of panel AWP for the screw = D – 22 mm
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1"
  - (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

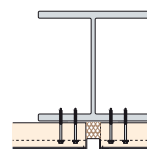
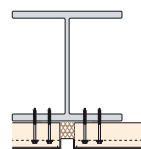
## Recommended Fastener Locations

## KS1000 AWP

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## EJOT

Application: Wall, Ceiling

Type of Panel: FH

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 2.0–5.0 mm)	60	JT2-D-6H-5.5 × 82 V22	JT3-D-6H-5.5 × 87 E22	JZ26.3 × 64 V22 <sup>1)</sup>	JZ36.3 × 64 E22 <sup>1)</sup>
	80	JT2-D-6H-5.5 × 102 V22	JT3-D-6H-5.5 × 107 E22	JZ26.3 × 90 V22 <sup>1)</sup>	JZ36.3 × 90 E22 <sup>1)</sup>
	100	JT2-D-6H-5.5 × 122 V22	JT3-D-6H-5.5 × 127 E22	JZ26.3 × 125 V22 <sup>1)</sup>	JZ36.3 × 115 E22 <sup>1)</sup>
	120	JT2-D-6H-5.5 × 152 V22	JT3-D-6H-5.5 × 147 E22	JZ26.3 × 125 V22 <sup>1)</sup>	JZ36.3 × 125 E22 <sup>1)</sup>
	150	JT2-D-6H-5.5 × 172 V22	JT3-D-6H-5.5 × 167 E22	JZ26.3 × 175 V22 <sup>1)</sup>	JZ36.3 × 175 E22 <sup>1)</sup>
	200	—	JT3-D-6H-5.5 × 237 E22	JZ26.3 × 200 V22 <sup>1)</sup>	JZ36.3 × 200 E22 <sup>1)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	60	JT2-D-12H-5.5 × 80 V22	JT3-D-12H-5.5 × 95 E22	JZ26.3 × 64 V22	JZ36.3 × 64 E22
	80	JT2-D-12H-5.5 × 115 V22	JT3-D-12H-5.5 × 115 E22	JZ26.3 × 90 V22	JZ36.3 × 90 E22
	100	JT2-D-12H-5.5 × 135 V22	JT3-D-12H-5.5 × 135 E22	JZ26.3 × 125 V22	JZ36.3 × 115 E22
	120	JT2-D-12H-5.5 × 155 V22	JT3-D-12H-5.5 × 155 E22	JZ26.3 × 175 V22	JZ36.3 × 175 E22
	150	JT2-D-12H-5.5 × 195 V22	JT3-D-12H-5.5 × 175 E22	JZ26.3 × 175 V22	JZ36.3 × 175 E22
	200	—	JT3-D-12H-5.5 × 245 E22	—	JZ36.3 × 230 E22
CONCRETE		Screw Set Anchor		Self-Tapping Fasteners	
	60	SDF-S 8 × 100 -V + V22 <sup>7)</sup>	SDF-S 8 × 100 -E + E22 <sup>7)</sup>	FBS-R- 6.3 × 80 V22 <sup>3)</sup>	—
	80	SDF-S 8 × 120 -V + V22 <sup>7)</sup>	SDF-S 8 × 120 -E + E22 <sup>7)</sup>	FBS-R- 6.3 × 100 V22 <sup>3)</sup>	—
	100	SDF-S 8 × 140 -V + V22 <sup>7)</sup>	SDF-S 8 × 140 -E + E22 <sup>7)</sup>	BS-R- 6.3 × 120 V22 <sup>3)</sup>	—
	120	SDF-S 8 × 160 -V + V22 <sup>7)</sup>	SDF-S 8 × 160 -E + E22 <sup>7)</sup>	BS-R- 6.3 × 140 V22 <sup>3)</sup>	—
	150	SDF-S 8 × 200 -V + V22 <sup>7)</sup>	SDF-S 8 × 200 -E + E22 <sup>7)</sup>	BS-R- 6.3 × 180 V22 <sup>3)</sup>	—
TIMBER	60	—	JT3-2-6.5 × 100 E22	JA26.5 × 100 V22	JA36.5 × 100 E22
	80	—	JT3-2-6.5 × 120 E22	JA26.5 × 125 V22	JA36.5 × 125 E22
	100	—	JT3-2-6.5 × 140 E22	JA26.5 × 150 V22	JA36.5 × 150 E22
	120	—	JT3-2-6.5 × 160 E22	JA26.5 × 175 V22	JA36.5 × 175 E22
	150	—	JT3-2-6.5 × 180 E22	JA26.5 × 200 V22	JA36.5 × 200 E22
	200	—	—	—	JA36.5 × 260 E22

Note:

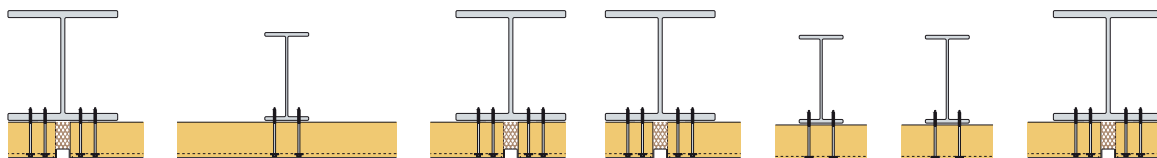
- 1) For the steel construction with the thickness under 2 mm are determined "JA" screws of the corresponding lengths and types
- 3) The screws are usually pre-drilled with the dia. 5 mm; when they are used into concrete of the higher solidity or are applied deeper than min. 30 mm it is allowed to predrill onto dia. 5.5 mm
- 7) Assembling - plastic part of the anchor into pre-drilled hole dia. 8 mm
  - for FH panel has to be use the screw with sealing washer dia. 22 mm
  - clamping thickness of panel FH for the screw = D – 14 mm
  - The "JZ" screws are usually pre-drilled with dia. According to thickness of structure and information in the catalogue of the producer
  - for higher strength steel are usually screws "JZ7" (CRONIMAKS), not "JZ3" and for highly aggressive environments (e.g. Swimming pool) "JZ1" (CORREMAKS).
  - The "JA" screws are usually pre-drilled with dia. 4.5 mm and minimal length of the screw in the timber is 50 mm

## Recommended Fastener Locations

## KS1000 FH

Standard\*

High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## MAGE

Application: **Roof**Type of Panel: **RW**Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	25	7360-5.5/6.3×60/G16	7570-5.5/6.3×70/E16	7373-6.3×50/G16	7673-6.3×50/E16
	40	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×65/G16	7673-6.3×65/E16
	50	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×75/G16	7673-6.3×75/E16
	60	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16	7673-6.3×90/E16
	70	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×100/G16	7673-6.3×100/E16
	80	7360-5.5/6.3×115/G16	7570-5.5/6.3×110/E16	7373-6.3×125/G16	7673-6.3×115/E16
	100	7360-5.5/6.3×130/G16	7570-5.5/6.3×125/E16	7373-6.3×125/G16	7673-6.3×125/E16
	120	7360-5.5/6.3×150/G16	7570-5.5/6.3×145/E16	7373-6.3×150/G16	7673K-6.3×150/E16 <sup>1)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	25	7370-5.5/6.3×76/G16	7575-5.5/6.3×80/E16	7373-6.3×50/G16	7673-6.3×50/E16
	40	7370-5.5/6.3×76/G16	7575-5.5/6.3×80/E16	7373-6.3×65/G16	7673-6.3×65/E16
	50	7370-5.5/6.3×92/G16	7575-5.5/6.3×95/E16	7373-6.3×75/G16	7673-6.3×75/E16
	60	7370-5.5/6.3×102/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16	7673-6.3×90/E16
	70	7370-5.5/6.3×120/G16	7575-5.5/6.3×115/E16	7373-6.3×100/G16	7673-6.3×100/E16
	80	7370-5.5/6.3×120/G16	7575-5.5/6.3×135/E16	7373-6.3×125/G16	7673-6.3×115/E16
	100	7370-5.5/6.3×140/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16	7673-6.3×125/E16
	120	7370-5.5/6.3×155/G16	7575-5.5/6.3×175/E16	7373-6.3×150/G16	7673K-6.3×150/E16 <sup>1)</sup>
<b>CONCRETE</b>	25	—	—	—	—
	40	—	—	—	—
	50	—	—	—	—
	60	—	—	—	—
	70	—	—	—	—
	80	—	—	7890-6.5/7.0×120/G16 <sup>1)</sup>	—
	100	—	—	7890-6.5/7.0×140/G16 <sup>1)</sup>	—
	120	—	—	7890-6.5/7.0×160/G16 <sup>1)</sup>	—
<b>TIMBER</b>	25	7380-6.0/7.0×75/G16	7580-6.0/7.2×75/E16	7353-6.5×65/G16	7653-6.5×65/E16
	40	7380-6.0/7.0×90/G16	7580-6.0/7.0×102/E16	7353-6.5×75/G16	7653-6.5×75/E16
	50	7380-6.0/7.0×110/G16	7580-6.0/7.0×102/E16	7353-6.5×90/G16	7653-6.5×90/E16
	60	7380-6.0/7.0×110/G16	7580-6.0/7.0×122/E16	7353-6.5×100/G16	7653-6.5×100/E16
	70	7380-6.0/7.0×130/G16	7580-6.0/7.0×122/E16	7353-6.5×125/G16	7653-6.5×115/E16
	80	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16	7653-6.5×125/E16
	100	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16	7653-6.5×150/E16
	120	7380-6.0/7.0×175/G16	7580-6.0/7.0×177/E16	7353-6.5×175/G16	7653-6.5×175/E16

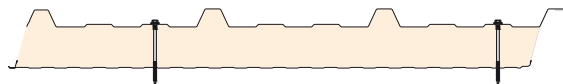
Note:

- 1) the Self-Tapping screw has thread under the head
- clamping thickness of panel RW for the screw = valley D + 5 mm
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

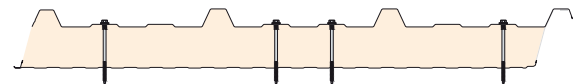
## Recommended Fastener Locations

## KS1000 RW

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



Ridge/Eaves\*



\* Number of fasteners to be specified by structural/static engineer.

## MAGE

Application: Roof

Type of Panel: RW, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	25	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16 <sup>2)</sup>	7673-6.3×90/E16 <sup>2)</sup>
	40	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×100/G16 <sup>2)</sup>	7673-6.3×100/E16 <sup>2)</sup>
	50	7360-5.5/6.3×115/G16	7570-5.5/6.3×125/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×115/E16 <sup>2)</sup>
	60	7360-5.5/6.3×130/G16	7570-5.5/6.3×125/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×125/E16 <sup>2)</sup>
	70	7360-5.5/6.3×130/G16	7570-5.5/6.3×145/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×125/E16 <sup>2)</sup>
	80	7360-5.5/6.3×150/G16	7570-5.5/6.3×145/E16	7374-6.3×150/G16 <sup>2)</sup>	7673-6.3×135/E16 <sup>2)</sup>
	100	7360-5.5/6.3×165/G16	7570-5.5/6.3×175/E16	7375-6.3×175/G16 <sup>2)</sup>	7673-6.3×175/E16 <sup>2)</sup>
	120	7360-5.5/6.3×190/G16	—	7376-6.3×175/G16 <sup>2)</sup>	7673-6.3×175/E16 <sup>2)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	25	7370-5.5/6.3×102/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16 <sup>2)</sup>	7673-6.3×90/E16 <sup>2)</sup>
	40	7370-5.5/6.3×120/G16	7575-5.5/6.3×135/E16	7373-6.3×100/G16 <sup>2)</sup>	7673-6.3×100/E16 <sup>2)</sup>
	50	7370-5.5/6.3×130/G16	7575-5.5/6.3×135/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×115/E16 <sup>2)</sup>
	60	7370-5.5/6.3×140/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×125/E16 <sup>2)</sup>
	70	7370-5.5/6.3×155/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16 <sup>2)</sup>	7673-6.3×125/E16 <sup>2)</sup>
	80	7370-5.5/6.3×155/G16	7575-5.5/6.3×175/E16	7373-6.3×150/G16 <sup>2)</sup>	7673-6.3×135/E16 <sup>2)</sup>
	100	7370-5.5/6.3×175/G16	7575-5.5/6.3×195/E16	7373-6.3×175/G16 <sup>2)</sup>	7673-6.3×175/E16 <sup>2)</sup>
	120	7370-5.5/6.3×190/G16	7575-5.5/6.3×195/E16	7373-6.3×175/G16 <sup>2)</sup>	7673-6.3×175/E16 <sup>2)</sup>
CONCRETE	25	—	—	—	—
	40	—	—	7890-6.5/7.0×120/G16 <sup>2)</sup>	—
	50	—	—	7890-6.5/7.0×120/G16 <sup>2)</sup>	—
	60	—	—	7890-6.5/7.0×140/G16 <sup>2)</sup>	—
	70	—	—	7890-6.5/7.0×140/G16 <sup>2)</sup>	—
	80	—	—	7890-6.5/7.0×160/G16 <sup>2)</sup>	—
	100	—	—	7890-6.5/7.0×180/G16 <sup>2)</sup>	—
	120	—	—	7890-6.5/7.0×200/G16 <sup>2)</sup>	—
TIMBER	25	7380-6.0/7.0×110/G16	7580-6.0/7.0×122/E16	7353-6.5×100/G16 <sup>2)</sup>	7653-6.5×100/E16 <sup>2)</sup>
	40	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16 <sup>2)</sup>	7653-6.5×115/E16 <sup>2)</sup>
	50	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16 <sup>2)</sup>	7653-6.5×125/E16 <sup>2)</sup>
	60	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16 <sup>2)</sup>	7653-6.5×150/E16 <sup>2)</sup>
	70	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16 <sup>2)</sup>	7653-6.5×150/E16 <sup>2)</sup>
	80	7380-6.0/7.0×175/G16	7580-6.0/7.0×177/E16	7353-6.5×150/G16 <sup>2)</sup>	7653-6.5×150/E16 <sup>2)</sup>
	100	7380-6.0/7.0×200/G16	7580-6.0/7.0×200/E16	7353-6.5×175/G16 <sup>2)</sup>	7653-6.5×175/E16 <sup>2)</sup>
	120	7380-6.0/7.0×200/G16	7580-6.0/7.0×220/E16	7353-6.5×200/G16 <sup>2)</sup>	7653-6.5×200/E16 <sup>2)</sup>

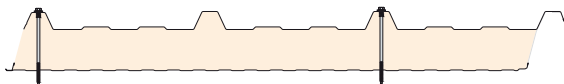
Note:

- 2) The screw will be completed with the calotte 32–25 (dia. of the washer has to be 16 mm)
- for panel RW/GRP40 and RW/HTL has to be use calotte 32–25
  - clamping thickness of panels RW, GRP40, HTL for the screw = crown D + 35 mm
  - Dia. pre-drilling for screws is shown in the catalogue of suppliers

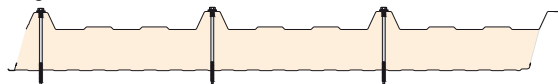
## Recommended Fastener Locations

## KS1000 RW

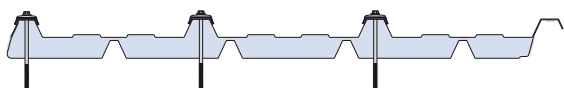
Standard\*



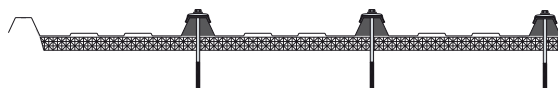
Ridge/Eaves\*



## KS1000 RW/GRP40



## KS1000 RW/HTL



\* Number of fasteners to be specified by structural/static engineer.

**MAGE**Application: **Roof**Type of Panel: **X-DEK, TOP-DEK**Fixing position: **VALLEY**

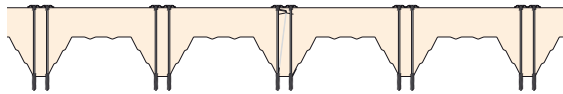
Support	Type of the panel	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	X-DEK/Steel	7343-6.3 × 22 <sup>1)</sup>	7520-5.5 × 26/E16	7373-6.5 × 20/G16	7673-6.5 × 20/E16
	X-DEK/TR or PVC, TOP-DEK	7343-6.3 × 22 <sup>1)</sup>	7520-5.5 × 26/E16	7373-6.5 × 20/G16	7673-6.5 × 20/E16
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	X-DEK/Steel	7344-5.5 × 32 <sup>1)</sup>	7530-5.5 × 40/E16	7373-6.5 × 25/G16	7673-6.5 × 25/E16
	X-DEK/TR or PVC, TOP-DEK	7344-5.5 × 32 <sup>1)</sup>	7530-5.5 × 40/E16	7373-6.5 × 25/G16	7673-6.5 × 25/E16
<b>CONCRETE</b>	X-DEK/Steel	—	—	7890-6.5 × 40 <sup>1)</sup>	—
	X-DEK/TR or PVC, TOP-DEK	—	—	7890-6.5 × 40 <sup>1)</sup>	—
<b>TIMBER</b>	X-DEK/Steel	7347-6.0 × 45/G16	7565-6.5 × 50/E16	7353-6.5 × 50/G16	7653-6.5 × 45/E16
	X-DEK/TR or PVC, TOP-DEK	7347-6.0 × 45/G16	7565-6.5 × 50/E16	7353-6.5 × 50/G16	7653-6.5 × 45/E16

Note:

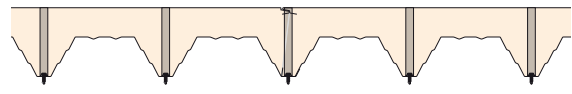
- 1) the screw is with the augmented head and without the washer
- the panel (outer and insulation) must be pre-drilled
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

**Recommended Fastener Locations****KS1000 X-DEK**

Steel



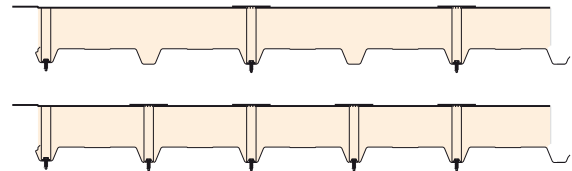
TR

**KS1000 TOP-DEK**

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

**MAGE**Application: **Roof**Type of Panel: **X-DEK / steel**Fixing position: **THROUGH**

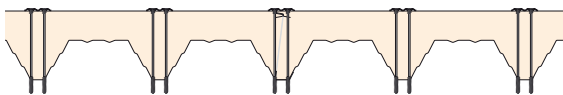
Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	80	7360-5.5/6.3 × 220	—	—	7674-6.3 × 200
	100	—	—	—	7674-6.3 × 240
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	80	7370-5.5/6.3 × 240	—	—	7674-6.3 × 220
	100	—	—	—	7674-6.3 × 240
<b>CONCRETE</b>	80	—	—	—	—
	100	—	—	—	—
<b>TIMBER</b>	80	—	—	—	7654-6.5 × 240
	100	—	—	—	7654-6.5 × 260

Note:

- for this panel has to be use plate washer 6130B-80 × 40
- Dia. pre-drilling for screws is shown in the catalogue of suppliers
- before applying the PVC membrane can be inserted over head of screws geotextile

**Recommended Fastener Locations****KS1000 X-DEK**

Steel



**MAGE**Application: **Roof**Type of Panel: **RT**Fixing position: **VALLEY**

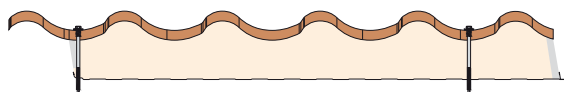
Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	45	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×65/G16	7673-6.3×65/E16
	60	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16	7673-6.3×90/E16
	80	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×100/G16	7673-6.3×100/E16
	100	7360-5.5/6.3×130/G16	7570-5.5/6.3×145/E16	7373-6.3×125/G16	7673-6.3×125/E16
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	45	7370-5.5/6.3×92/G16	7575-5.5/6.3×95/E16	7373-6.3×65/G16	7673-6.3×65/E16
	60	7370-5.5/6.3×102/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16	7673-6.3×90/E16
	80	7370-5.5/6.3×120/G16	7575-5.5/6.3×135/E16	7373-6.3×100/G16	7673-6.3×100/E16
	100	7370-5.5/6.3×140/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16	7673-6.3×125/E16
<b>CONCRETE</b>	45	—	—	—	—
	60	—	—	—	—
	80	—	—	7890-6.5/7.0×120/G16	—
	100	—	—	7890-6.5/7.0×140/G16	—
<b>TIMBER</b>	45	7380-6.0/7.0×90/G16	7580-6.0/7.0×102/E16	7353-6.5×90/G16	7653-6.5×90/E16
	60	7380-6.0/7.0×110/G16	7580-6.0/7.0×122/E16	7353-6.5×100/G16	7653-6.5×100/E16
	80	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16	7653-6.5×125/E16
	100	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16	7653-6.5×150/E16

Note:

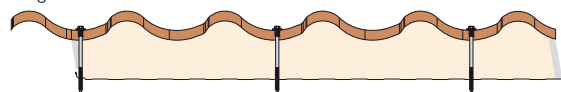
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

**Recommended Fastener Locations****KS1000 RT**

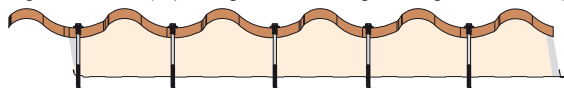
Standard\*



Ridge/Eaves



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## MAGE

Application: **Roof**Type of Panel: **FF**Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	60	7360-5.5/6.3×100/G22	7570-5.5/6.3×110/E22	7373-6.3×90/G22	7673-6.3×90/E22
	80	7360-5.5/6.3×115/G22	7570-5.5/6.3×110/E22	7373-6.3×100/G22	7673-6.3×100/E22
	100	7360-5.5/6.3×130/G22	7570-5.5/6.3×125/E22	7373-6.3×125/G22	7673-6.3×125/E22
	120	7360-5.5/6.3×150/G22	7570-5.5/6.3×145/E22	7373-6.3×150/G22	7673K-6.3×135/E22
	150	7360-5.5/6.3×220/G22	7570-5.5/6.3×175/E22	7373-6.3×175/G22	7673K-6.3×175/E22
	200	—	—	—	7674-6.3×220/E22
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	60	7370-5.5/6.3×102/G22	7575-5.5/6.3×115/E22	7373-6.3×90/G22	7673-6.3×75/E22
	80	7370-5.5/6.3×120/G22	7575-5.5/6.3×135/E22	7373-6.3×100/G22	7673-6.3×100/E22
	100	7370-5.5/6.3×140/G22	7575-5.5/6.3×155/E22	7373-6.3×125/G22	7673-6.3×125/E22
	120	7370-5.5/6.3×155/G22	7575-5.5/6.3×175/E22	7373-6.3×150/G22	7673K-6.3×135/E22
	150	7370-5.5/6.3×190/G22	7575-5.5/6.3×195/E22	7373-6.3×175/G22	7673K-6.3×175/E22
	200	7370-5.5/6.3×240/G22	—	—	7674-6.3×220/E22
<b>CONCRETE</b>	60	—	—	—	—
	80	—	—	7890-6.5/7.0×120/G22	—
	100	—	—	7890-6.5/7.0×140/G22	—
	120	—	—	7890-6.5/7.0×160/G22	—
	150	—	—	7890-6.5/7.0×200/G22	—
	200	—	—	—	—
<b>TIMBER</b>	60	7380-6.0/7.0×110/G22	7580-6.0/7.0×122/E22	7353-6.5×90/G22	7653-6.5×90/E22
	80	7380-6.0/7.0×130/G22	7580-6.0/7.0×142/E22	7353-6.5×125/G22	7653-6.5×125/E22
	100	7380-6.0/7.0×150/G22	7580-6.0/7.0×162/E22	7353-6.5×150/G22	7653-6.5×150/E22
	120	7380-6.0/7.0×175/G22	7580-6.0/7.0×177/E22	7353-6.5×175/G22	7653-6.5×175/E22
	150	7380-6.0/7.0×200/G22	7580-6.0/7.0×200/E22	7353-6.5×200/G22	7653-6.5×200/E22
	200	—	—	—	7654-6.5×240/E22

Note:

— Dia. pre-drilling for screws is shown in the catalogue of suppliers

## Recommended Fastener Locations

## KS1000 FF

Standard



Ridge/Eaves



High Wind Load



## MAGE

Application: Roof

Type of Panel: FF, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	60	7360-5.5/6.3 × 130/G16	7570-5.5/6.3 × 125/E16	7373-6.3 × 125/G16 <sup>2)</sup>	7673-6.3 × 115/E16 <sup>2)</sup>
	80	7360-5.5/6.3 × 150/G16	7570-5.5/6.3 × 145/E16	7373-6.3 × 150/G16 <sup>2)</sup>	7673-6.3 × 150/E16 <sup>2)</sup>
	100	7360-5.5/6.3 × 165/G16	7570-5.5/6.3 × 175/E16	7373-6.3 × 175/G16 <sup>2)</sup>	7673-6.3 × 175/E16 <sup>2)</sup>
	120	7360-5.5/6.3 × 190/G16	—	7373-6.3 × 175/G16 <sup>2)</sup>	7673-6.3 × 175/E16 <sup>2)</sup>
	150	7360-5.5/6.3 × 220/G16	—	7373-6.3 × 200/G16 <sup>2)</sup>	7674-6.3 × 220/E16 <sup>2)</sup>
	200	—	—	—	7674-6.3 × 260/E16 <sup>2)</sup>
STEEL Hot Rolled (thickness 3.0–12.0 mm)	60	7370-5.5/6.3 × 140/G16	7575-5.5/6.3 × 155/E16	7373-6.3 × 125/G16 <sup>2)</sup>	7673-6.3 × 115/E16 <sup>2)</sup>
	80	7370-5.5/6.3 × 155/G16	7575-5.5/6.3 × 175/E16	7373-6.3 × 150/G16 <sup>2)</sup>	7673-6.3 × 135/E16 <sup>2)</sup>
	100	7370-5.5/6.3 × 175/G16	7575-5.5/6.3 × 195/E16	7373-6.3 × 175/G16 <sup>2)</sup>	7673-6.3 × 175/E16 <sup>2)</sup>
	120	7370-5.5/6.3 × 190/G16	7575-5.5/6.3 × 195/E16	7373-6.3 × 175/G16 <sup>2)</sup>	7673-6.3 × 175/E16 <sup>2)</sup>
	150	7370-5.5/6.3 × 240/G16	—	—	7674-6.3 × 220/E16 <sup>2)</sup>
	200	—	—	—	7674-6.3 × 260/E16 <sup>2)</sup>
CONCRETE	60	—	—	7890-6.5/7.0 × 140/G16 <sup>2)</sup>	—
	80	—	—	7890-6.5/7.0 × 160/G16 <sup>2)</sup>	—
	100	—	—	7890-6.5/7.0 × 180/G16 <sup>2)</sup>	—
	120	—	—	7890-6.5/7.0 × 200/G16 <sup>2)</sup>	—
	150	—	—	—	—
	200	—	—	—	—
TIMBER	60	7380-6.0/7.0 × 150/G16	7580-6.0/7.0 × 162/E16	7353-6.5 × 150/G16 <sup>2)</sup>	7653-6.5 × 150/E16 <sup>2)</sup>
	80	7380-6.0/7.0 × 175/G16	7580-6.0/7.0 × 177/E16	7353-6.5 × 150/G16 <sup>2)</sup>	7653-6.5 × 150/E16 <sup>2)</sup>
	100	7380-6.0/7.0 × 200/G16	7580-6.0/7.0 × 200/E16	7353-6.5 × 175/G16 <sup>2)</sup>	7653-6.5 × 175/E16 <sup>2)</sup>
	120	—	7580-6.0/7.0 × 220/E16	7353-6.5 × 200/G16 <sup>2)</sup>	7653-6.5 × 200/E16 <sup>2)</sup>
	150	—	—	—	7654-6.5 × 240/E16 <sup>2)</sup>
	200	—	—	—	—

Note:

- 2) The screw will be completed with the calotte 26–27 (dia. of the washer has to be 16 mm)
- for panel FF/GRP40 and FF/HTL has to be use calotte 26–27
  - clamping thickness of panels FF, GRP40, HTL for the screw = crown D + 34 mm
  - Dia. pre-drilling for screws is shown in the catalogue of suppliers

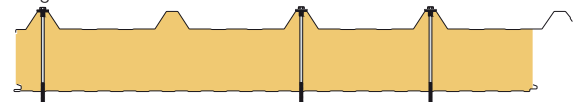
## Recommended Fastener Locations

## KS1000 FF

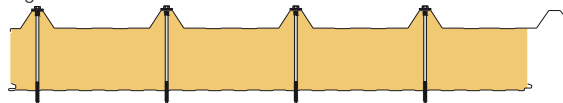
Standard



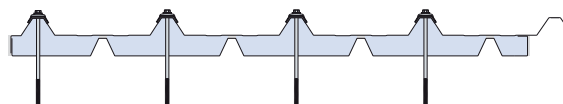
Ridge/Eaves



High Wind Load



## KS1000 FF/GRP40



## KS1000 FF/HTL



## MAGE

Application: Wall, Ceiling Type of Panel: TF, TC, TL, RW, FR, FA Fixing position: VALLEY

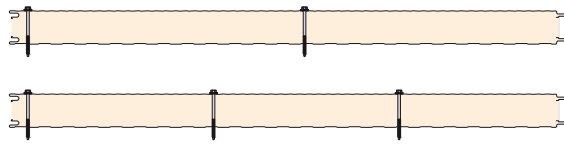
Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	25	—	7570-5.5/6.3×70/E16	7373-6.3×50/G16	7673-6.3×50/E16
	40	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×65/G16	7673-6.3×65/E16
	50	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×75/G16	7673-6.3×75/E16
	60	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16	7673-6.3×90/E16
	70	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16	7673-6.3×90/E16
	80	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×100/G16	7673-6.3×100/E16
	100	7360-5.5/6.3×130/G16	7570-5.5/6.3×125/E16	7373-6.3×125/G16	7673-6.3×125/E16
	120	7360-5.5/6.3×150/G16	7570-5.5/6.3×145/E16	7373-6.3×150/G16	7673K-6.3×135/E16
	150	7360-5.5/6.3×190/G16	7570-5.5/6.3×175/E16	7373-6.3×175/G16	7673K-6.3×175/E16
	170	7360-5.5/6.3×190/G16	—	7373-6.3×200/G16	7673-6.3×200/E16
STEEL Hot Rolled (thickness 3.0–12.0 mm)	200	7360-5.5/6.3×220/G16	—	—	7674-6.3×220/E16
	25	—	—	7373-6.3×50/G16	7673-6.3×50/E16
	40	7370-5.5/6.3×76/G16	7575-5.5/6.3×80/E16	7373-6.3×65/G16	7673-6.3×65/E16
	50	7370-5.5/6.3×92/G16	7575-5.5/6.3×95/E16	7373-6.3×75/G16	7673-6.3×75/E16
	60	7370-5.5/6.3×102/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16	7673-6.3×90/E16
	70	7370-5.5/6.3×120/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16	7673-6.3×90/E16
	80	7370-5.5/6.3×120/G16	7575-5.5/6.3×135/E16	7373-6.3×100/G16	7673-6.3×100/E16
	100	7370-5.5/6.3×130/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16	7673-6.3×125/E16
	120	7370-5.5/6.3×155/G16	7575-5.5/6.3×175/E16	7373-6.3×150/G16	7673K-6.3×135/E16
	150	7370-5.5/6.3×190/G16	7575-5.5/6.3×195/E16	7373-6.3×175/G16	7673K-6.3×175/E16
CONCRETE	170	7370-5.5/6.3×210/G16	—	7373-6.3×200/G16	7673-6.3×200/E16
	200	7370-5.5/6.3×240/G16	—	—	7674-6.3×220/E16
	25	—	—	—	—
	40	—	—	—	—
	50	—	—	—	—
	60	—	—	—	—
	70	—	—	—	—
	80	—	—	7890-6.5/7.0×120/G16	—
	100	—	—	7890-6.5/7.0×140/G16	—
	120	—	—	7890-6.5/7.0×160/G16	—
TIMBER	150	—	—	7890-6.5/7.0×200/G16	—
	170	—	—	7890-6.5/7.0×200/G16	—
	200	—	—	—	—
	25	7380-6.0/7.0×75/G16	7580-6.0/7.0×75/E16	7353-6.5×65/G16	7653-6.5×65/E16
	40	7380-6.0/7.0×90/G16	7580-6.0/7.0×102/E16	7353-6.5×75/G16	7653-6.5×75/E16
	50	7380-6.0/7.0×110/G16	7580-6.0/7.0×102/E16	7353-6.5×90/G16	7653-6.5×90/E16
	60	7380-6.0/7.0×110/G16	7580-6.0/7.0×122/E16	7353-6.5×100/G16	7653-6.5×100/E16
	70	7380-6.0/7.0×130/G16	7580-6.0/7.0×122/E16	7353-6.5×125/G16	7653-6.5×115/E16
	80	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16	7653-6.5×125/E16
	100	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16	7653-6.5×150/E16
	120	7380-6.0/7.0×175/G16	7580-6.0/7.0×177/E16	7353-6.5×175/G16	7653-6.5×175/E16
	150	7380-6.0/7.0×200/G16	7580-6.0/7.0×200/E16	7353-6.5×200/G16	7653-6.5×200/E16
	170	—	7580-6.0/7.0×220/E16	—	7654-6.5×220/E16
	200	—	—	—	7654-6.5×240/E16

Note:

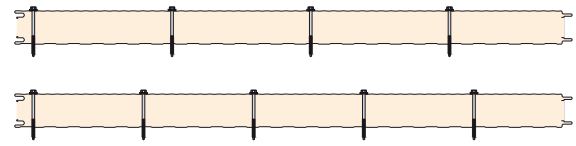
- for FR and FA panel has to be use the screw with sealing washer d. 22 mm
- clamping thickness of panel RW for the screw = D + 5 mm
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

**MAGE****Recommended Fastener Locations****KS1150 TF/TC**

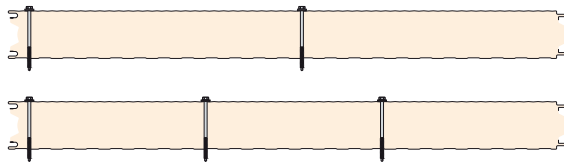
Standard\*



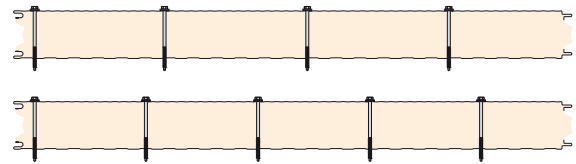
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1150 TL**

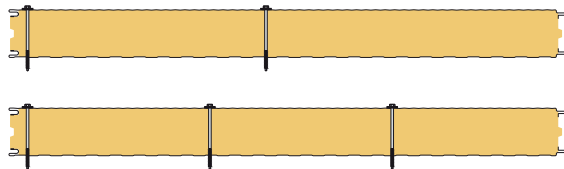
Standard\*



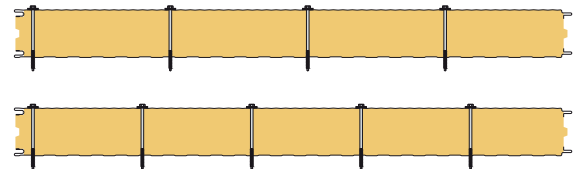
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1150 FR**

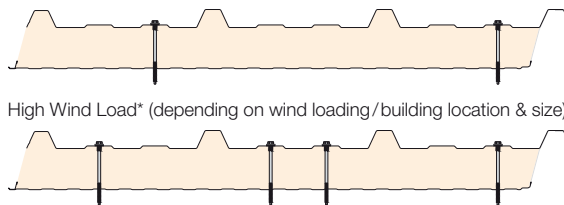
Standard\*



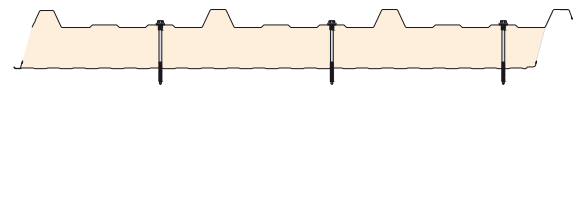
High Wind Load\* (depending on wind loading/building location &amp; size)

**KS1000 RW**

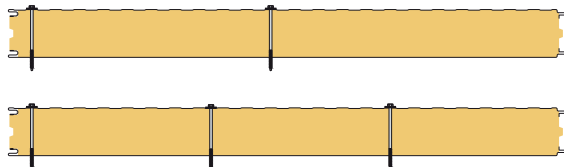
Standard\*



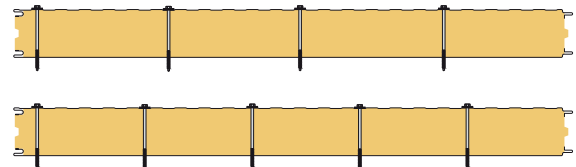
Ridge/Eaves\*

**KS1150 FA**

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## MAGE

Application: Wall

Type of Panel: AWP

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	50	—	7570-5.5/6.3×70/E16	7373-6.3×50/G16	7673-6.3×50/E16
	60	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×65/G16	7673-6.3×65/E16
	70	7360-5.5/6.3×75/G16	7570-5.5/6.3×85/E16	7373-6.3×75/G16	7673-6.3×75/E16
	80	7360-5.5/6.3×100/G16	7570-5.5/6.3×110/E16	7373-6.3×90/G16	7673-6.3×90/E16
	100	7360-5.5/6.3×115/G16	7570-5.5/6.3×110/E16	7373-6.3×100/G16	7673-6.3×100/E16
	120	7360-5.5/6.3×130/G16	7570-5.5/6.3×125/E16	7373-6.3×125/G16	7673-6.3×125/E16
STEEL Hot Rolled (thickness 3.0–12.0 mm)	50	—	7575-5.5/6.3×80/E16	7373-6.3×50/G16	7673-6.3×50/E16
	60	7370-5.5/6.3×76/G16	7575-5.5/6.3×95/E16	7373-6.3×65/G16	7673-6.3×65/E16
	70	7370-5.5/6.3×92/G16	7575-5.5/6.3×95/E16	7373-6.3×75/G16	7673-6.3×75/E16
	80	7370-5.5/6.3×102/G16	7575-5.5/6.3×115/E16	7373-6.3×90/G16	7673-6.3×90/E16
	100	7370-5.5/6.3×120/G16	7575-5.5/6.3×135/E16	7373-6.3×100/G16	7673-6.3×100/E16
	120	7370-5.5/6.3×140/G16	7575-5.5/6.3×155/E16	7373-6.3×125/G16	7673-6.3×125/E16
CONCRETE	50	—	—	—	—
	60	—	—	—	—
	70	—	—	—	—
	80	—	—	—	—
	100	—	—	7890-6.5/7.0×120/G16	—
	120	—	—	7890-6.5/7.0×140/G16	—
TIMBER	50	7380-6.0/7.0×75/G16	7680-6.5/7.2×75/E16	7353-6.5×75/G16	7653-6.5×75/E16
	60	7380-6.0/7.0×90/G16	7580-6.0/7.0×102/E16	7353-6.5×90/G16	7653-6.5×90/E16
	70	7380-6.0/7.0×110/G16	7580-6.0/7.0×102/E16	7353-6.5×90/G16	7653-6.5×90/E16
	80	7380-6.0/7.0×110/G16	7580-6.0/7.0×122/E16	7353-6.5×100/G16	7653-6.5×100/E16
	100	7380-6.0/7.0×130/G16	7580-6.0/7.0×142/E16	7353-6.5×125/G16	7653-6.5×125/E16
	120	7380-6.0/7.0×150/G16	7580-6.0/7.0×162/E16	7353-6.5×150/G16	7653-6.5×150/E16

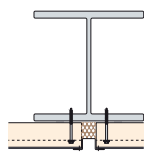
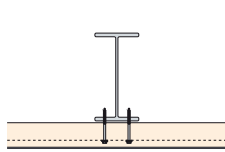
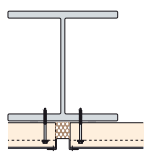
Note:

- clamping thickness of panel AWP for the screw = D – 22 mm
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

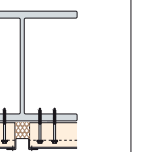
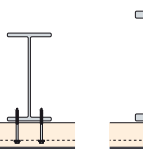
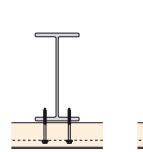
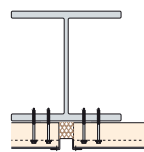
## Recommended Fastener Locations

## KS1000 AWP

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## MAGE

Application: Wall

Type of Panel: FH

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	60	7360-5.5/6.3 × 75/G22	7570-5.5/6.3 × 85/E22	7373-6.3 × 65/G22	7673-6.3 × 65/E22
	80	7360-5.5/6.3 × 100/G22	7570-5.5/6.3 × 110/E22	7373-6.3 × 90/G22	7673-6.3 × 90/E22
	100	7360-5.5/6.3 × 115/G22	7570-5.5/6.3 × 125/E22	7373-6.3 × 125/G22	7673-6.3 × 115/E22
	120	7360-5.5/6.3 × 130/G22	7570-5.5/6.3 × 145/E22	7373-6.3 × 125/G22	7673-6.3 × 125/E22
	150	7360-5.5/6.3 × 165/G22	7570-5.5/6.3 × 175/E22	7373-6.3 × 175/G22	7673-6.3 × 175/E22
	200	7360-5.5/6.3 × 220/G22	—	—	7673-6.3 × 220/E22
STEEL Hot Rolled (thickness 3.0–12.0 mm)	60	7370-5.5/6.3 × 92/G22	7575-5.5/6.3 × 80/E22	7373-6.3 × 65/G22	7673-6.3 × 65/E22
	80	7370-5.5/6.3 × 102/G22	7575-5.5/6.3 × 115/E22	7373-6.3 × 90/G22	7673-6.3 × 90/E22
	100	7370-5.5/6.3 × 130/G22	7575-5.5/6.3 × 135/E22	7373-6.3 × 125/G22	7673-6.3 × 115/E22
	120	7370-5.5/6.3 × 140/G22	7575-5.5/6.3 × 155/E22	7373-6.3 × 125/G22	7673-6.3 × 125/E22
	150	7370-5.5/6.3 × 190/G22	7575-5.5/6.3 × 175/E22	7373-6.3 × 175/G22	7673-6.3 × 175/E22
	200	7370-5.5/6.3 × 240/G22	—	—	7673-6.3 × 220/E22
CONCRETE	60	—	—	—	—
	80	—	—	—	—
	100	—	—	7890-6.5/7.0 × 120/G22	—
	120	—	—	7890-6.5/7.0 × 140/G22	—
	150	—	—	7890-6.5/7.0 × 180/G22	—
	200	—	—	—	—
TIMBER	60	7380-6.0/7.0 × 90/G22	7580-6.0/7.0 × 102/E22	7353-6.5 × 90/G22	7653-6.5 × 90/E22
	80	7380-6.0/7.0 × 110/G22	7580-6.0/7.0 × 122/E22	7353-6.5 × 100/G22	7653-6.5 × 100/E22
	100	7380-6.0/7.0 × 130/G22	7580-6.0/7.0 × 142/E22	7353-6.5 × 125/G22	7653-6.5 × 125/E22
	120	7380-6.0/7.0 × 150/G22	7580-6.0/7.0 × 162/E22	7353-6.5 × 150/G22	7653-6.5 × 150/E22
	150	7380-6.0/7.0 × 200/G22	7580-6.0/7.0 × 200/E22	7353-6.5 × 175/G22	7653-6.5 × 175/E22
	200	—	—	—	7654-6.5 × 240/E22

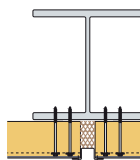
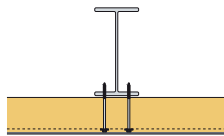
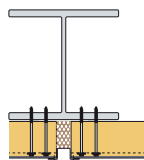
Note:

- clamping thickness of panel FH for the screw = D – 14 mm
- Dia. pre-drilling for screws is shown in the catalogue of suppliers

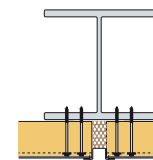
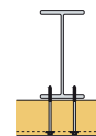
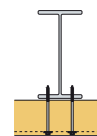
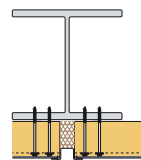
## Recommended Fastener Locations

## KS1000 FH

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Roof

Type of Panel: RW

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–5.0 mm)	25	SD5-A19-5.5 × 57	SXC5-S19-5.5 × 62	not recommended	not recommended
	40	SDT5-A19-5.5 × 67	SXC5-S19-5.5 × 82	not recommended	not recommended
	50	SDT5-A19-5.5 × 77	SXC5-S19-5.5 × 82	not recommended	not recommended
	60	SDT5-A19-5.5 × 97	SXC5-S19-5.5 × 92	not recommended	not recommended
	70	SDT5-A19-5.5 × 112	SXC5-S19-5.5 × 113	not recommended	not recommended
	80	SDT5-A19-5.5 × 137	SXC5-S19-5.5 × 113	not recommended	not recommended
	100	SDT5-A19-5.5 × 137	SXC5-S19-5.5 × 133	not recommended	not recommended
	120	SDT5-A19-5.5 × 162	SXC5-S19-5.5 × 163	not recommended	not recommended
STEEL Hot Rolled (thickness 3.0–14.0 mm)	25	SDT14-A19-5.5 × 60	SXC14-S19-5.5 × 71	not recommended	not recommended
	40	SDT14-A19-5.5 × 74	SXC14-S19-5.5 × 80	not recommended	not recommended
	50	SDT14-A19-5.5 × 93	SXC14-S19-5.5 × 99	not recommended	not recommended
	60	SDT14-A19-5.5 × 93	SXC14-S19-5.5 × 99	not recommended	not recommended
	70	SDT14-A19-5.5 × 113	SXC14-S19-5.5 × 118	not recommended	not recommended
	80	SDT14-A19-5.5 × 113	SXC14-S19-5.5 × 118	not recommended	not recommended
	100	SDT14-A19-5.5 × 142	SXC14-S19-5.5 × 138	not recommended	not recommended
	120	SDT14-A19-5.5 × 160	SXC14-S19-5.5 × 168	not recommended	not recommended
CONCRETE	25	No	No	not recommended	not recommended
	40	No	No	not recommended	not recommended
	50	No	No	not recommended	not recommended
	60	No	No	not recommended	not recommended
	70	No	No	not recommended	not recommended
	80	No	No	not recommended	not recommended
	100	No	No	not recommended	not recommended
	120	No	No	not recommended	not recommended
TIMBER	25	SDTW-A19-6.5 × 75	SXCW-S19-6.5 × 90	not recommended	not recommended
	40	No	SXCW-S19-6.5 × 105	not recommended	not recommended
	50	No	SXCW-S19-6.5 × 105	not recommended	not recommended
	60	No	SXCW-S19-6.5 × 115	not recommended	not recommended
	70	SDTW-A19-6.5 × 115	SXCW-S19-6.5 × 135	not recommended	not recommended
	80	SDTW-A19-6.5 × 125	SXCW-S19-6.5 × 135	not recommended	not recommended
	100	No	SXCW-S19-6.5 × 155	not recommended	not recommended
	120	No	SXCW-S19-6.5 × 185	not recommended	not recommended

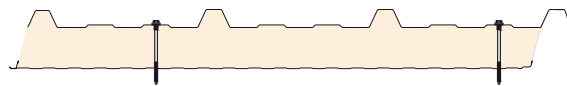
Note:

- No = doesn't produced
- not recommended = this application is not used with warranty – the fasteners are without second thread under head
- clamping thickness of panel RW for the screw = valley D + 5 mm
- Roof application – position valley: = washer dia. 19 mm recommended

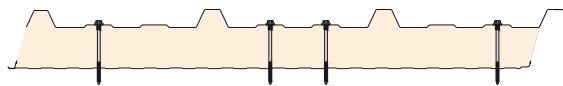
## Recommended Fastener Locations

## KS1000 RW

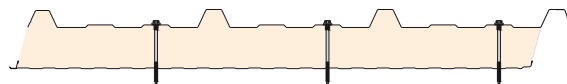
Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



Ridge/Eaves\*



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Roof

Type of Panel: RW, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–3.0 mm)	25	SDT5-A16-5.5×97	SXC5-S16-5.5×92	TDA-T-T16-6.5×76 <sup>9)</sup>	TDA-S-S16-6.5×76 <sup>9)</sup>
	40	SDT5-A16-5.5×97	SXC5-S16-5.5×113	TDA-T-T16-6.5×100 <sup>9)</sup>	TDA-S-S16-6.5×100 <sup>9)</sup>
	50	SDT5-A16-5.5×112	SXC5-S16-5.5×113	TDA-T-T16-6.5×100 <sup>9)</sup>	TDA-S-S16-6.5×100 <sup>9)</sup>
	60	SDT5-A16-5.5×137	SXC5-S16-5.5×133	TDA-T-T16-6.5×127 <sup>9)</sup>	TDA-S-S16-6.5×127 <sup>9)</sup>
	70	SDT5-A16-5.5×137	SXC5-S16-5.5×133	TDA-T-T16-6.5×127 <sup>9)</sup>	TDA-S-S16-6.5×127 <sup>9)</sup>
	80	SDT5-A16-5.5×162	SXC5-S16-5.5×163	TDA-T-T16-6.5×152 <sup>9)</sup>	TDA-S-S16-6.5×152 <sup>9)</sup>
	100	SDT5-A16-5.5×162	SXC5-S16-5.5×163	TDA-T-T16-6.5×152 <sup>9)</sup>	TDA-S-S16-6.5×152 <sup>9)</sup>
	120	SDT5-A16-5.5×182	SXC5-S16-5.5×193	TDA-T-T16-6.5×178 <sup>9)</sup>	TDA-S-S16-6.5×178 <sup>9)</sup>
STEEL Hot Rolled (thickness 3.0–14.0 mm)	25	SDT14-A16-5.5×93	SXC14-A16-5.5×99	TDB-T-T16-6.3×76 <sup>9)</sup>	TDB-S-S16-6.3×76 <sup>9)</sup>
	40	SDT14-A16-5.5×113	SXC14-A16-5.5×118	TDB-T-T16-6.3×100 <sup>9)</sup>	TDB-S-S16-6.3×100 <sup>9)</sup>
	50	SDT14-A16-5.5×113	SXC14-A16-5.5×118	TDB-T-T16-6.3×100 <sup>9)</sup>	TDB-S-S16-6.3×100 <sup>9)</sup>
	60	SDT14-A16-5.5×142	SXC14-A16-5.5×138	TDB-T-T16-6.3×127 <sup>9)</sup>	TDB-S-S16-6.3×127 <sup>9)</sup>
	70	SDT14-A16-5.5×142	SXC14-A16-5.5×138	TDB-T-T16-6.3×127 <sup>9)</sup>	TDB-S-S16-6.3×127 <sup>9)</sup>
	80	SDT14-A16-5.5×142	SXC14-A16-5.5×147	TDB-T-T16-6.3×152 <sup>9)</sup>	TDB-S-S16-6.3×152 <sup>9)</sup>
	100	SDT14-A16-5.5×186	SXC14-A16-5.5×168	TDB-T-T16-6.3×152 <sup>9)</sup>	TDB-S-S16-6.3×152 <sup>9)</sup>
	120	SDT14-A16-5.5×186	SXC14-A16-5.5×193	TDB-T-T16-6.3×178 <sup>9)</sup>	TDB-S-S16-6.3×178 <sup>9)</sup>
CONCRETE	25	No	No	TI-T16-6.3×95 <sup>9)</sup>	DT-S-S16-6.3×102 <sup>10)</sup>
	40	No	No	TI-T16-6.3×105 <sup>9)</sup>	DT-S-S16-6.3×127 <sup>10)</sup>
	50	No	No	TI-T16-6.3×115 <sup>9)</sup>	DT-S-S16-6.3×127 <sup>10)</sup>
	60	No	No	TI-T16-6.3×135 <sup>9)</sup>	DT-S-S16-6.3×140 <sup>10)</sup>
	70	No	No	TI-T16-6.3×145 <sup>9)</sup>	DT-S-S16-6.3×140 <sup>10)</sup>
	80	No	No	TI-T16-6.3×155 <sup>9)</sup>	DT-S-S16-6.3×152 <sup>10)</sup>
	100	No	No	TI-T16-6.3×175 <sup>9)</sup>	DT-S-S16-6.3×178 <sup>10)</sup>
	120	No	No	TI-T16-6.3×195 <sup>9)</sup>	DT-S-S16-6.3×191 <sup>10)</sup>
TIMBER	25	No	SXCW-S16-6.5×115	TDA-T-T16-6.5×76 <sup>9)</sup>	TDA-S-S16-6.5×76 <sup>9)</sup>
	40	SDTW-A16-6.5×115	SXCW-S16-6.5×135	TDA-T-T16-6.5×100 <sup>9)</sup>	TDA-S-S16-6.5×100 <sup>9)</sup>
	50	SDTW-A16-6.5×125	SXCW-S16-6.5×135	TDA-T-T16-6.5×100 <sup>9)</sup>	TDA-S-S16-6.5×100 <sup>9)</sup>
	60	SDTW-A16-6.5×135	SXCW-S16-6.5×155	TDA-T-T16-6.5×127 <sup>9)</sup>	TDA-S-S16-6.5×127 <sup>9)</sup>
	70	No	SXCW-S16-6.5×155	TDA-T-T16-6.5×127 <sup>9)</sup>	TDA-S-S16-6.5×127 <sup>9)</sup>
	80	No	SXCW-S16-6.5×185	TDA-T-T16-6.5×152 <sup>9)</sup>	TDA-S-S16-6.5×152 <sup>9)</sup>
	100	No	SXCW-S16-6.5×185	TDA-T-T16-6.5×152 <sup>9)</sup>	TDA-S-S16-6.5×152 <sup>9)</sup>
	120	No	SXCW-S16-6.5×205	TDA-T-T16-6.5×178 <sup>9)</sup>	TDA-S-S16-6.5×178 <sup>9)</sup>

Note:

9) the self-tapping screw has to be use with calotte 32–25

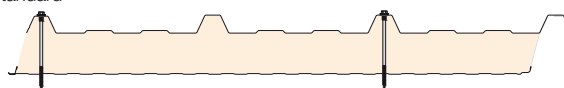
10) the spike twister fastener has to be use with calotte 32–25

- all fasteners are tested for steel quality up to grade 52 (grade 37 is the standard)
- clamping thickness of panels RW, GRP40, HTL for the screw = crown D + 35 mm
- the self-drilling screw is not recommended with calotte (the screw has thread under the head)
- for panel GRP40 and HTL has to be use calotte 32–25
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

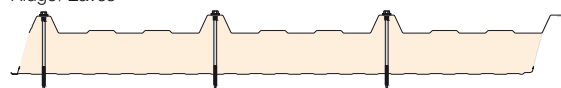
## Recommended Fastener Locations

## KS1000 RW

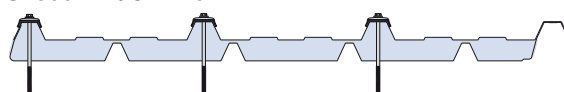
Standard\*



Ridge/Eaves\*



## KS1000 RW/GRP40



\* Number of fasteners to be specified by structural / static engineer.

## SFS intec

Application: **Roof**Type of Panel: **X-DEK, TOP-DEK**Fixing position: **VALLEY**

Support	Type of the panel	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–3.0 mm)	X-DEK/Steel	SD5-T15-5.5 × 25 <sup>1)</sup>	SX5/8-S16-5.5 × 33 <sup>1)</sup>	TDA-T-T16-6.5 × 25 <sup>4)</sup>	TDA-S-S16-6.5 × 25 <sup>4)</sup>
	X-DEK/TR, TOP-DEK	SD3-D10-T19/C9-5.5x30 <sup>2)</sup>	SX5/8-S16-5.5 × 33 <sup>3)</sup>	TDA-T-T16-6.5 × 25 <sup>5)</sup>	TDA-S-S16-6.5 × 25 <sup>5)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–14.0 mm)	X-DEK/Steel	SD14-T15-5.5 × 32 <sup>1)</sup>	SX14/12-S16-5.5 × 40 <sup>1)</sup>	TDB-T-T16-6.3 × 25 <sup>4)</sup>	TDB-S-S16-6.3 × 25 <sup>4)</sup>
	X-DEK/TR, TOP-DEK	SD14-D10-T19/C9-5.5x46 <sup>2)</sup>	SX14/12-S16-5.5 × 40 <sup>3)</sup>	TDB-T-T16-6.3 × 25 <sup>5)</sup>	TDB-S-S16-6.3 × 25 <sup>5)</sup>
<b>CONCRETE</b>	X-DEK/Steel	No	No	TI-T16-6.3 × 32 <sup>4)</sup>	DT-S-S16-6.3 × 38 <sup>4)</sup>
	X-DEK/TR, TOP-DEK	No	No	TI-T16-6.3 × 32 <sup>5)</sup>	DT-S-S16-6.3 × 38 <sup>5)</sup>
<b>TIMBER</b>	X-DEK/Steel	SW3-T-T16-6.5 × 50 <sup>1)</sup>	SXW-S16-6.5 × 54 <sup>1)</sup>	TDA-T-T16-6.5 × 25 <sup>4)</sup>	TDA-S-S16-6.5 × 25 <sup>4)</sup>
	X-DEK/TR, TOP-DEK	SW3-T-T16-6.5 × 50 <sup>3)</sup>	SXW-S16-6.5 × 54 <sup>3)</sup>	TDA-T-T16-6.5 × 25 <sup>5)</sup>	TDA-S-S16-6.5 × 25 <sup>5)</sup>

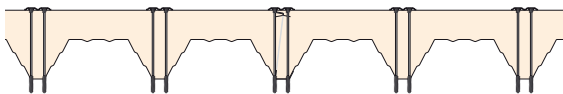
Note:

- 1) metal sheet pre-drilling with HSS dia. 22 mm, term-insulation cylinder dia. 20 mm out, self-drilling fastener fix, the cylinder then fill with term-insulation
- 2) self-drilling fastener with self-drilling washer fix, then the membrane seal
- 3) term-insulation cylinder dia. 20 mm out, self-drilling fastener fix, the cylinder then fill with term-insulation and the membrane seal
- 4) metal sheet pre-drilling with HSS dia. 22 mm, term-insulation cylinder dia. 20 mm out, self-tapping fastener pre-drill and fix, the cylinder then fill with term-insulation
- 5) term-insulation cylinder dia. 20 mm out, self-tapping fastener pre-drill and fix, the cylinder then fill with term-insulation and the membrane seal

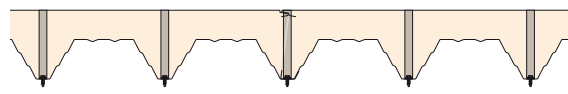
## Recommended Fastener Locations

## KS1000 X-DEK

Steel

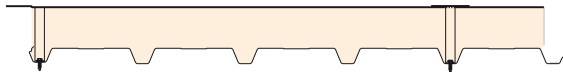


TR

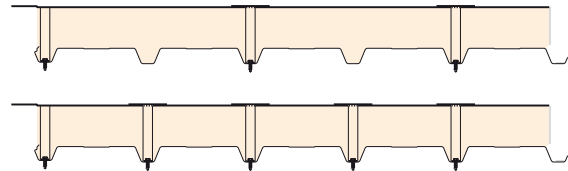


## KS1000 TOP-DEK

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Roof

Type of Panel: X-DEK/ steel

Fixing position: THROUGH

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	80	SDT5-A19-5.5 × 226 <sup>11) 12)</sup>	SXC5-S19-5.5 × 236 <sup>11) 12)</sup>	TDB-T-6.3 × 215 <sup>11) 12)</sup>	TDB-S-6.3 × 215 <sup>11) 12)</sup>
	100	No	SXC5-S19-5.5 × 236 <sup>11) 12)</sup>	No	TDB-S-6.3 × 265 <sup>11) 12)</sup>
<b>STEEL Hot Rolled</b> (thickness 3.0–12.0 mm)	80	SDT14-A19-5.5 × 233 <sup>11) 12)</sup>	SXC14-S19-5.5 × 243 <sup>11) 12)</sup>	TDB-T-6.3 × 215 <sup>11) 12)</sup>	TDB-S-6.3 × 215 <sup>11) 12)</sup>
	100	No	SXC14-S19-5.5 × 243 <sup>11) 12)</sup>	No	TDB-S-6.3 × 265 <sup>11) 12)</sup>
<b>CONCRETE</b>	80	No	No	TI-6.3 × 235 <sup>7)</sup>	DT-S-6.3 × 229 <sup>8)</sup>
	100	No	No	TI-6.3 × 255 <sup>7)</sup>	DT-S-6.3 × 229 <sup>8)</sup>
<b>TIMBER</b>	80	No	No	TS-T25-6.0 × 220 <sup>7)</sup>	No
	100	No	No	TS-T25-6.0 × 240 <sup>7)</sup>	No

Note:

7) self-tapping fastener pre-drill and fix with flat roof washer IE-C-82 × 40, then seal the membrane

8) self-tapping fastener (spike) pre-drill and fix with flat roof washer IE-C-82 × 40 or IF/IG-C-82 × 40, then seal the membrane

11) these screws have sealing washer, has to be removed

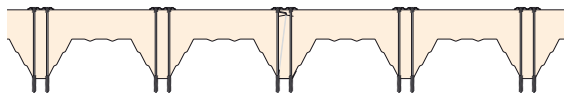
12) before applying the PVC membrane can be inserted over head of screws geotextile

- No = doesn't produced
- all fasteners are tested for steel quality up to grade 52 (grade 37 is the standard)
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- clamping thickness of panels X-DEK for the screw = crown D + 108 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

## Recommended Fastener Locations

## KS1000 X-DEK

Steel



Application: **Roof**

Type of Panel: **RT**

Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–3.0 mm)	45	SDT5-A16-5.5×77	SXC5-S16-5.5×82	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	60	SDT5-A16-5.5×97	SXC5-S16-5.5×92	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	80	SDT5-A16-5.5×112	SXC5-S16-5.5×113	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	100	SDT5-A16-5.5×137	SXC5-S16-5.5×133	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127
<b>STEEL Hot Rolled</b> (thickness 3.0–14.0 mm)	45	SDT14-A16-5.5×74	SXC14-S16-5.5×80	TDB-T-T16-6.3×64	TDB-S-S16-6.3×64
	60	SDT14-A16-5.5×93	SXC14-S16-5.5×99	TDB-T-T16-6.3×76	TDB-S-S16-6.3×76
	80	SDT14-A16-5.5×113	SXC14-S16-5.5×118	TDB-T-T16-6.3×100	TDB-S-S16-6.3×100
	100	SDT14-A16-5.5×142	SXC14-S16-5.5×138	TDB-T-T16-6.3×127	TDB-S-S16-6.3×127
<b>CONCRETE</b>	45	No	No	TI-A16-6.3×85	DT-S-6.3×102
	60	No	No	TI-A16-6.3×105	DT-S-6.3×102
	80	No	No	TI-A16-6.3×115	DT-S-6.3×127
	100	No	No	TI-A16-6.3×135	DT-S-6.3×140
<b>TIMBER</b>	45	No	SXCW-S16-6.5×105	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	60	No	SXCW-S16-6.5×115	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	80	SDTW-A16-6.5×125	SXCW-S16-6.5×135	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	100	SDTW-A16-6.5×135	SXCW-S16-6.5×155	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127

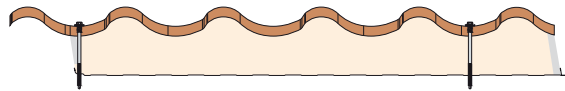
Note:

- All screw with hexagonal head 8 mm, only DT fastener is spike twister (pre-drilling and hammering)
- No = doesn't produced
- all fasteners are tested for steel quality up to grade 52 (grade 37 is the standard)
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

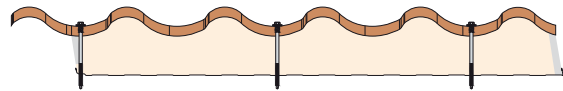
## Recommended Fastener Locations

### KS1000 RT

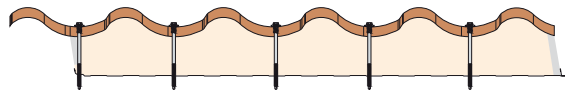
Standard\*



Ridge/Eaves



High Wind Load\* (depending on wind loading/building location & size)



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Roof

Type of Panel: FF

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–5.0 mm)	60	SDT5-A22-5.5 × 97	SXC5-S22-5.5 × 92	not recommended	not recommended
	80	SDT5-A22-5.5 × 112	SXC5-S22-5.5 × 113	not recommended	not recommended
	100	SDT5-A22-5.5 × 137	SXC5-S22-5.5 × 133	not recommended	not recommended
	120	SDT5-A22-5.5 × 162	SXC5-S22-5.5 × 163	not recommended	not recommended
	150	SDT5-A22-5.5 × 182	SXC5-S22-5.5 × 193	not recommended	not recommended
	200	SDT5-A22-5.5 × 226	SXC5-S22-5.5 × 236	not recommended	not recommended
<b>STEEL Hot Rolled</b> (thickness 3.0–14.0 mm)	60	SDT14-A22-5.5 × 93	SXC14-S22-5.5 × 99	not recommended	not recommended
	80	SDT14-A22-5.5 × 113	SXC14-S22-5.5 × 118	not recommended	not recommended
	100	SDT14-A22-5.5 × 142	SXC14-S22-5.5 × 138	not recommended	not recommended
	120	SDT14-A22-5.5 × 160	SXC14-S22-5.5 × 168	not recommended	not recommended
	150	SDT14-A22-5.5 × 186	SXC14-S22-5.5 × 193	not recommended	not recommended
	200	SDT14-A22-5.5 × 233	SXC14-S22-5.5 × 243	not recommended	not recommended
<b>CONCRETE</b>	60	No	No	not recommended	not recommended
	80	No	No	not recommended	not recommended
	100	No	No	not recommended	not recommended
	120	No	No	not recommended	not recommended
	150	No	No	not recommended	not recommended
	200	No	No	not recommended	not recommended
<b>TIMBER</b>	60	No	SXCW-S22-6.5 × 115	not recommended	not recommended
	80	SDTW-A22-6.5 × 115	SXCW-S22-6.5 × 135	not recommended	not recommended
	100	SDTW-A22-6.5 × 135	SXCW-S22-6.5 × 155	not recommended	not recommended
	120	No	SXCW-S22-6.5 × 185	not recommended	not recommended
	150	No	SXCW-S22-6.5 × 205	not recommended	not recommended
	200	No	SXCW-S22-6.5 × 275	not recommended	not recommended

Note:

- No = doesn't produced
- not recommended: = this application is not used with warranty – the fasteners are without second thread under head

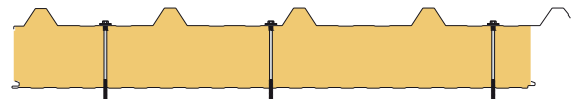
## Recommended Fastener Locations

## KS1000 FF

Standard



Ridge/Eaves



High Wind Load



## SFS intec

Application: Roof

Type of Panel: FF, GRP40, HTL

Fixing position: CROWN

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–3.0 mm)	60	SDT5-A22-5.5 × 137	SXC5-S22-5.5 × 133	TDA-T-T16-6.5 × 127 <sup>6)</sup>	TDA-S-S16-6.5 × 127 <sup>6)</sup>
	80	SDT5-A22-5.5 × 162	SXC5-S22-5.5 × 163	TDA-T-T16-6.5 × 127 <sup>6)</sup>	TDA-S-S16-6.5 × 127 <sup>6)</sup>
	100	SDT5-A22-5.5 × 162	SXC5-S22-5.5 × 163	TDA-T-T16-6.5 × 152 <sup>6)</sup>	TDA-S-S16-6.5 × 152 <sup>6)</sup>
	120	SDT5-A22-5.5 × 182	SXC5-S22-5.5 × 193	TDA-T-T16-6.5 × 178 <sup>6)</sup>	TDA-S-S16-6.5 × 178 <sup>6)</sup>
	150	SDT5-A22-5.5 × 226	SXC5-S22-5.5 × 236	TDA-T-T16-6.5 × 215 <sup>6)</sup>	TDA-S-S16-6.5 × 215 <sup>6)</sup>
	200	SDT5-A22-5.5 × 276	SXC5-S22-5.5 × 261	No	TDA-S-S16-6.5 × 250 <sup>6)</sup>
STEEL Hot Rolled (thickness 3.0–14.0 mm)	60	SDT14-A22-5.5 × 142	SXC14-S22-5.5 × 138	TDB-T-T16-6.3 × 127 <sup>6)</sup>	TDB-S-S16-6.3 × 127 <sup>6)</sup>
	80	SDT14-A22-5.5 × 142	SXC14-S22-5.5 × 147	TDB-T-T16-6.3 × 127 <sup>6)</sup>	TDB-S-S16-6.3 × 127 <sup>6)</sup>
	100	SDT14-A22-5.5 × 160	SXC14-S22-5.5 × 168	TDB-T-T16-6.3 × 152 <sup>6)</sup>	TDB-S-S16-6.3 × 152 <sup>6)</sup>
	120	SDT14-A22-5.5 × 186	SXC14-S22-5.5 × 193	TDB-T-T16-6.3 × 178 <sup>6)</sup>	TDB-S-S16-6.3 × 178 <sup>6)</sup>
	150	SDT14-A22-5.5 × 212	SXC14-S22-5.5 × 218	TDB-T-T16-6.3 × 215 <sup>6)</sup>	TDB-S-S16-6.3 × 215 <sup>6)</sup>
	200	SDT14-A22-5.5 × 280	SXC14-S22-5.5 × 268	No	TDB-S-S16-6.3 × 250 <sup>6)</sup>
CONCRETE	60	No	No	TI-T16-6.3 × 135 <sup>6)</sup>	DT-S-S16-6.3 × 127 <sup>6)</sup>
	80	No	No	TI-T16-6.3 × 145 <sup>6)</sup>	DT-S-S16-6.3 × 152 <sup>6)</sup>
	100	No	No	TI-T16-6.3 × 165 <sup>6)</sup>	DT-S-S16-6.3 × 178 <sup>6)</sup>
	120	No	No	TI-T16-6.3 × 195 <sup>6)</sup>	DT-S-S16-6.3 × 191 <sup>6)</sup>
	150	No	No	TI-T16-6.3 × 215 <sup>6)</sup>	DT-S-S16-6.3 × 216 <sup>6)</sup>
	200	No	No	TI-T16-6.3 × 275 <sup>6)</sup>	DT-S-S16-6.3 × 267 <sup>6)</sup>
TIMBER	60	SDTW-A22-6.5 × 135	SXCW-S22-6.5 × 155	TDA-T-T16-6.5 × 127 <sup>6)</sup>	TDA-S-S16-6.5 × 127 <sup>6)</sup>
	80	No	SXCW-S22-6.5 × 185	TDA-T-T16-6.5 × 127 <sup>6)</sup>	TDA-S-S16-6.5 × 127 <sup>6)</sup>
	100	No	SXCW-S22-6.5 × 185	TDA-T-T16-6.5 × 152 <sup>6)</sup>	TDA-S-S16-6.5 × 152 <sup>6)</sup>
	120	No	SXCW-S22-6.5 × 205	TDA-T-T16-6.5 × 178 <sup>6)</sup>	TDA-S-S16-6.5 × 178 <sup>6)</sup>
	150	No	SXCW-S22-6.5 × 235	TDA-T-T16-6.5 × 215 <sup>6)</sup>	TDA-S-S16-6.5 × 215 <sup>6)</sup>
	200	No	SXCW-S22-6.5 × 305	No	TDA-S-S16-6.5 × 250 <sup>6)</sup>

Note:

- 6) the fastener is recommended with calotte (the fastener has not thread under the head)
- for panels FF/GRP40 and FF/HTL has to be use calotte 26–27 (dia. of the washer has to be 16 mm)
- No = doesn't produced
- all fasteners are tested for steel quality up to grade S2 (grade S37 is the standard)
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

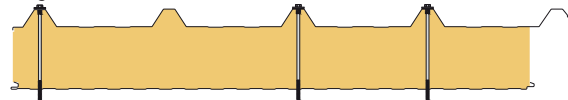
## Recommended Fastener Locations

## KS1000 FF

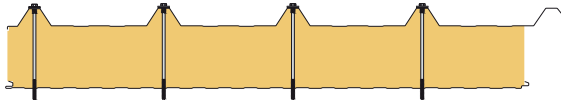
Standard



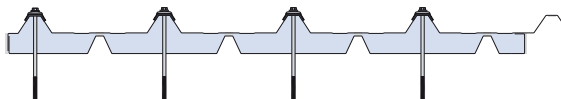
Ridge/Eaves



High Wind Load



## KS1000 FF/GRP40



## KS1000 FF/HTL



## SFS intec

Application: **Wall, Ceiling** Type of Panel: **TF, TC, TL, RW, FR, FA** Fixing position: **VALLEY**

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–3.0 mm)	25	SD5-A16-5.5×57	SX5/20-30-S16-5.5×54	TDA-T-T16-6.5×45	TDA-S-S16-6.5×45
	40	SDT5-A16-5.5×67	SXC5-S16-5.5×82	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	50	SDT5-A16-5.5×77	SXC5-S16-5.5×82	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	60	SDT5-A16-5.5×97	SXC5-S16-5.5×92	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	70	SDT5-A16-5.5×97	SXC5-S16-5.5×113	TDA-T-T16-6.5×90	TDA-S-S16-6.5×90
	80	SDT5-A16-5.5×112	SXC5-S16-5.5×113	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	100	SDT5-A16-5.5×137	SXC5-S16-5.5×133	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127
	120	SDT5-A16-5.5×162	SXC5-S16-5.5×163	TDA-T-T16-6.5×152	TDA-S-S16-6.5×152
	150	SDT5-A16-5.5×182	SXC5-S16-5.5×193	TDA-T-T16-6.5×178	TDA-S-S16-6.5×178
	170	SDT5-A16-5.5×226	SXC5-S16-5.5×236	TDA-T-T16-6.5×215	TDA-S-S16-6.5×215
<b>STEEL Hot Rolled</b> (thickness 3.0–14.0 mm)	25	SD14-A16-5.5×56	SX14/38-S16-5.5×63	TDB-T-T16-6.3×45	TDB-S-S16-6.3×45
	40	SDT14-A16-5.5×74	SXC14-S16-5.5×80	TDB-T-T16-6.3×64	TDB-S-S16-6.3×64
	50	SDT14-A16-5.5×93	SXC14-S16-5.5×99	TDB-T-T16-6.3×76	TDB-S-S16-6.3×76
	60	SDT14-A16-5.5×93	SXC14-S16-5.5×99	TDB-T-T16-6.3×76	TDB-S-S16-6.3×76
	70	SDT14-A16-5.5×113	SXC14-S16-5.5×118	TDB-T-T16-6.3×90	TDB-S-S16-6.3×90
	80	SDT14-A16-5.5×113	SXC14-S16-5.5×118	TDB-T-T16-6.3×100	TDB-S-S16-6.3×100
	100	SDT14-A16-5.5×142	SXC14-S16-5.5×138	TDB-T-T16-6.3×127	TDB-S-S16-6.3×127
	120	SDT14-A16-5.5×160	SXC14-S16-5.5×168	TDB-T-T16-6.3×152	TDB-S-S16-6.3×152
	150	SDT14-A16-5.5×186	SXC14-S16-5.5×193	TDB-T-T16-6.3×178	TDB-S-S16-6.3×178
	170	SDT14-A16-5.5×212	SXC14-S16-5.5×218	TDB-T-T16-6.3×215	TDB-S-S16-6.3×215
<b>CONCRETE</b>	25	No	No	TI-A16-6.3×65	DT-S-S16-6.3×102
	40	No	No	TI-A16-6.3×75	DT-S-S16-6.3×102
	50	No	No	TI-A16-6.3×85	DT-S-S16-6.3×102
	60	No	No	TI-A16-6.3×95	DT-S-S16-6.3×102
	70	No	No	TI-A16-6.3×115	DT-S-S16-6.3×127
	80	No	No	TI-A16-6.3×115	DT-S-S16-6.3×127
	100	No	No	TI-A16-6.3×135	DT-S-S16-6.3×140
	120	No	No	TI-A16-6.3×155	DT-S-S16-6.3×165
	150	No	No	TI-A16-6.3×195	DT-S-S16-6.3×191
	170	No	No	TI-A16-6.3×205	DT-S-S16-6.3×216
<b>TIMBER</b>	25	SDTW-A16-6.5×75	SXCW-S16-6.5×90	TDA-T-T16-6.5×45	TDA-S-S16-6.5×45
	40	SDTW-A16-6.5×75	SXCW-S16-6.5×105	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	50	No	SXCW-S16-6.5×105	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	60	No	SXCW-S16-6.5×115	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	70	SDTW-A16-6.5×115	SXCW-S16-6.5×135	TDA-T-T16-6.5×90	TDA-S-S16-6.5×90
	80	SDTW-A16-6.5×135	SXCW-S16-6.5×135	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	100	SDTW-A16-6.5×135	SXCW-S16-6.5×185	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127
	120	No	SXCW-S16-6.5×185	TDA-T-T16-6.5×152	TDA-S-S16-6.5×152
	150	No	SXCW-S16-6.5×205	TDA-T-T16-6.5×178	TDA-S-S16-6.5×178
	170	No	SXCW-S16-6.5×235	TDA-T-T16-6.5×215	TDA-S-S16-6.5×215
<b>TIMBER</b>	200	No	SXCW-S16-6.5×275	TDA-T-T16-6.5×215	TDA-S-S16-6.5×215

## Note:

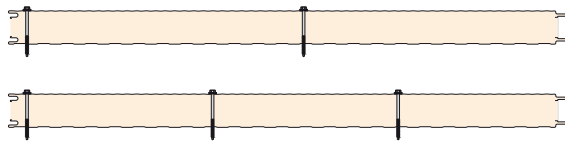
- for FR and FA panel has to be use the screw with sealing washer d. 22 mm
- clamping thickness of panel RW for the screw = D + 5 mm
- No = doesn't produced
- all fasteners are tested for steel quality up to grade 52 (grade 37 is the standard)
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

## SFS intec

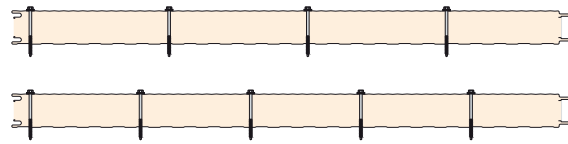
### Recommended Fastener Locations

#### KS1150 TF/TC

Standard\*

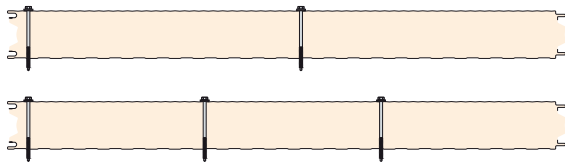


High Wind Load\* (depending on wind loading/building location & size)

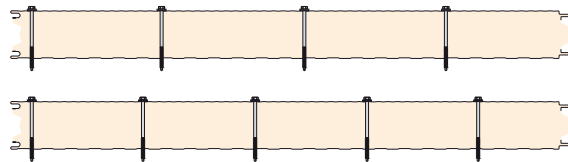


#### KS1150 TL

Standard\*

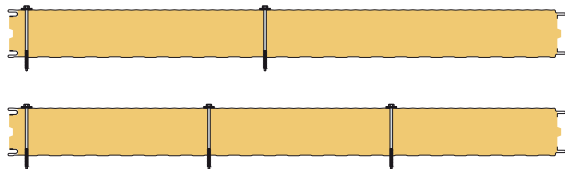


High Wind Load\* (depending on wind loading/building location & size)

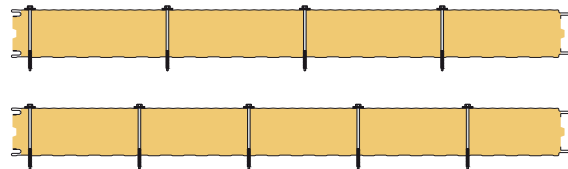


#### KS1150 FR

Standard\*

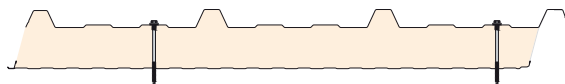


High Wind Load\* (depending on wind loading/building location & size)

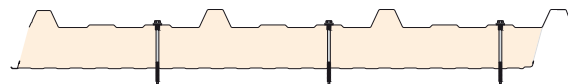


#### KS1000 RW

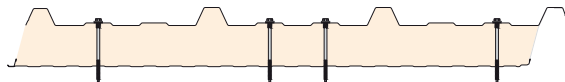
Standard\*



Ridge/Eaves\*

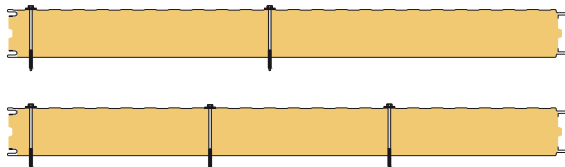


High Wind Load\* (depending on wind loading/building location & size)

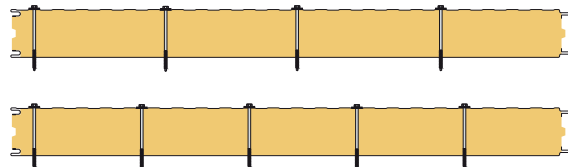


#### KS1150 FA

Standard\*



High Wind Load\* (depending on wind loading/building location & size)



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Wall

Type of Panel: AWP

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
<b>STEEL Cold Rolled</b> (thickness 1.5–3.0 mm)	50	SD5-A16-5.5×57	SX5/20-30-S16-5.5×54	TDA-T-T16-6.5×51	TDA-S-S16-6.5×51
	60	SDT5-A16-5.5×67	SXC5-S16-5.5×82	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	70	SDT5-A16-5.5×77	SXC5-S16-5.5×92	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	80	SDT5-A16-5.5×97	SXC5-S16-5.5×113	TDA-T-T16-6.5×90	TDA-S-S16-6.5×90
	100	SDT5-A16-5.5×112	SXC5-S16-5.5×133	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	120	SDT5-A16-5.5×137	SXC5-S16-5.5×163	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127
<b>STEEL Hot Rolled</b> (thickness 3.0–14.0 mm)	50	SD14-A16-5.5×56	SX14/38-S16-5.5×63	TDB-T-T16-6.3×51	TDB-S-S16-6.3×51
	60	SDT14-A16-5.5×74	SXC14-S16-5.5×80	TDB-T-T16-6.3×64	TDB-S-S16-6.3×64
	70	SDT14-A16-5.5×93	SXC14-S16-5.5×99	TDB-T-T16-6.3×76	TDB-S-S16-6.3×76
	80	SDT14-A16-5.5×93	SXC14-S16-5.5×99	TDB-T-T16-6.3×90	TDB-S-S16-6.3×90
	100	SDT14-A16-5.5×113	SXC14-S16-5.5×118	TDB-T-T16-6.3×100	TDB-S-S16-6.3×100
	120	SDT14-A16-5.5×142	SXC14-S16-5.5×138	TDB-T-T16-6.3×127	TDB-S-S16-6.3×127
<b>CONCRETE</b>	50	No	No	TI-A16-6.3×65	DT-S-S16-6.3×102
	60	No	No	TI-A16-6.3×75	DT-S-S16-6.3×102
	70	No	No	TI-A16-6.3×85	DT-S-S16-6.3×102
	80	No	No	TI-A16-6.3×95	DT-S-S16-6.3×102
	100	No	No	TI-A16-6.3×115	DT-S-S16-6.3×127
	120	No	No	TI-A16-6.3×135	DT-S-S16-6.3×140
<b>TIMBER</b>	50	SDTW-A16-6.5×75	SXCW-A16-6.5×90	TDA-T-T16-6.5×51	TDA-S-S16-6.5×51
	60	No	SXCW-A16-6.5×105	TDA-T-T16-6.5×64	TDA-S-S16-6.5×64
	70	No	SXCW-A16-6.5×115	TDA-T-T16-6.5×76	TDA-S-S16-6.5×76
	80	No	SXCW-A16-6.5×115	TDA-T-T16-6.5×90	TDA-S-S16-6.5×90
	100	SDTW-A16-6.5×125	SXCW-A16-6.5×155	TDA-T-T16-6.5×100	TDA-S-S16-6.5×100
	120	No	SXCW-A16-6.5×155	TDA-T-T16-6.5×127	TDA-S-S16-6.5×127

Note:

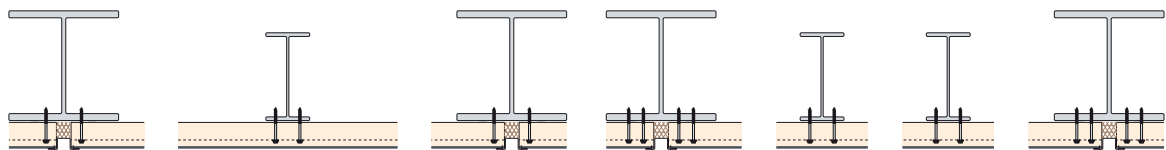
- clamping thickness of panel AWP for the screw = D – 22 mm
- No = doesn't produced
- all fasteners are tested for steel quality up to grade 52 (grade 37 is the standard)
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

## Recommended Fastener Locations

## KS1000 AWP

Standard\*

High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

## SFS intec

Application: Wall

Type of Panel: FH

Fixing position: VALLEY

Support	Insulation Core Thickness (mm)	Code Numbers			
		Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304	Carbon Steel Case Hardened	Austenitic stainless Steel, Grade 304
		Self-Drilling Fasteners		Self-Tapping Fasteners	
STEEL Cold Rolled (thickness 1.5–3.0 mm)	60	SDT5-A22-5.5 × 67	SXC5-S22-5.5 × 82	TDA-T-T22-6.5 × 64	TDA-S-S22-6.5 × 64
	80	SDT5-A22-5.5 × 97	SXC5-S22-5.5 × 113	TDA-T-T22-6.5 × 90	TDA-S-S22-6.5 × 90
	100	SDT5-A22-5.5 × 112	SXC5-S22-5.5 × 133	TDA-T-T22-6.5 × 100	TDA-S-S22-6.5 × 100
	120	SDT5-A22-5.5 × 137	SXC5-S22-5.5 × 163	TDA-T-T22-6.5 × 127	TDA-S-S22-6.5 × 127
	150	SDT5-A22-5.5 × 162	SXC5-S22-5.5 × 163	TDA-T-T22-6.5 × 152	TDA-S-S22-6.5 × 152
	200	SDT5-A22-5.5 × 226	SXC5-S22-5.5 × 236	TDA-T-T22-6.5 × 215	TDA-S-S22-6.5 × 215
STEEL Hot Rolled (thickness 3.0–14.0 mm)	60	SDT14-A22-5.5 × 74	SXC14-S22-5.5 × 80	TDB-T-T22-6.3 × 64	TDB-S-S22-6.3 × 64
	80	SDT14-A22-5.5 × 93	SXC14-S22-5.5 × 99	TDB-T-T22-6.3 × 90	TDB-S-S22-6.3 × 90
	100	SDT14-A22-5.5 × 113	SXC14-S22-5.5 × 118	TDB-T-T22-6.3 × 100	TDB-S-S22-6.3 × 100
	120	SDT14-A22-5.5 × 142	SXC14-S22-5.5 × 138	TDB-T-T22-6.3 × 127	TDB-S-S22-6.3 × 127
	150	SDT14-A22-5.5 × 186	SXC14-S22-5.5 × 193	TDB-T-T22-6.3 × 152	TDB-S-S22-6.3 × 152
	200	SDT14-A22-5.5 × 233	SXC14-S22-5.5 × 243	TDB-T-T22-6.3 × 215	TDB-S-S22-6.3 × 215
CONCRETE	60	No	No	TI-A22-6.3 × 75	DT-S-S22-6.3 × 102
	80	No	No	TI-A22-6.3 × 95	DT-S-S22-6.3 × 102
	100	No	No	TI-A22-6.3 × 115	DT-S-S22-6.3 × 127
	120	No	No	TI-A22-6.3 × 135	DT-S-S22-6.3 × 140
	150	No	No	TI-A22-6.3 × 165	DT-S-S22-6.3 × 178
	200	No	No	TI-A22-6.3 × 215	DT-S-S22-6.3 × 229
TIMBER	60	No	SXCW-A22-6.5 × 105	TDA-T-T22-6.5 × 64	TDA-S-S22-6.5 × 64
	80	No	SXCW-A22-6.5 × 115	TDA-T-T22-6.5 × 90	TDA-S-S22-6.5 × 90
	100	SDTW-A22-6.5 × 125	SXCW-A22-6.5 × 155	TDA-T-T22-6.5 × 100	TDA-S-S22-6.5 × 100
	120	No	SXCW-A22-6.5 × 155	TDA-T-T22-6.5 × 127	TDA-S-S22-6.5 × 127
	150	No	SXCW-A22-6.5 × 205	TDA-T-T22-6.5 × 152	TDA-S-S22-6.5 × 152
	200	No	SXCW-A22-6.5 × 275	TDA-T-T22-6.5 × 215	TDA-S-S22-6.5 × 215

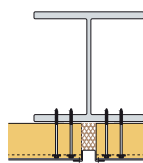
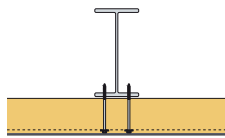
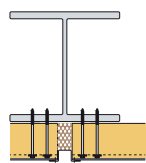
Note:

- for FH panel has to be use the screw with sealing washer d. 22 mm
- clamping thickness of panel FH for the screw = D – 14 mm
- No = doesn't produced
- all fasteners are tested for steel quality up to grade S2 (grade S37 is the standard)
- Pre-drilling for TDA is for steel 1.0–1.25 mm dia. 4.50 mm, for steel 1.5–3.0 dia. 5.0 mm
- Pre-drilling for TDA is for wood dia. 4.80 mm
- Pre-drilling for TDB is for steel 1.5–4.0 mm dia. 5.3 mm, for steel 4.1–6.0 dia. 5.5 mm
- Pre-drilling for TDB is for steel 6.0–10.0 mm dia. 5.7 mm, for steel more than 10.0 mm dia. 5.8 mm
- Pre-drilling for concrete screw TI is usually with hammer drill bit dia. 5.2 mm (according pull out test)
- Pre-drilling for concrete spike DT 6.3 is usually with hammer drill bit dia. 6.3 mm
- the standard quality of stainless steel is A2, quality A4 (swimming pool, etc.) is on request produced

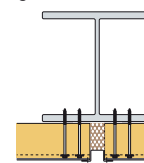
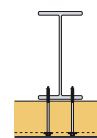
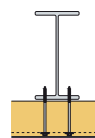
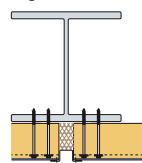
## Recommended Fastener Locations

## KS1000 FH

Standard\*



High Wind Load\* (depending on wind loading/building location &amp; size)



\* Number of fasteners to be specified by structural/static engineer.

# Construction details

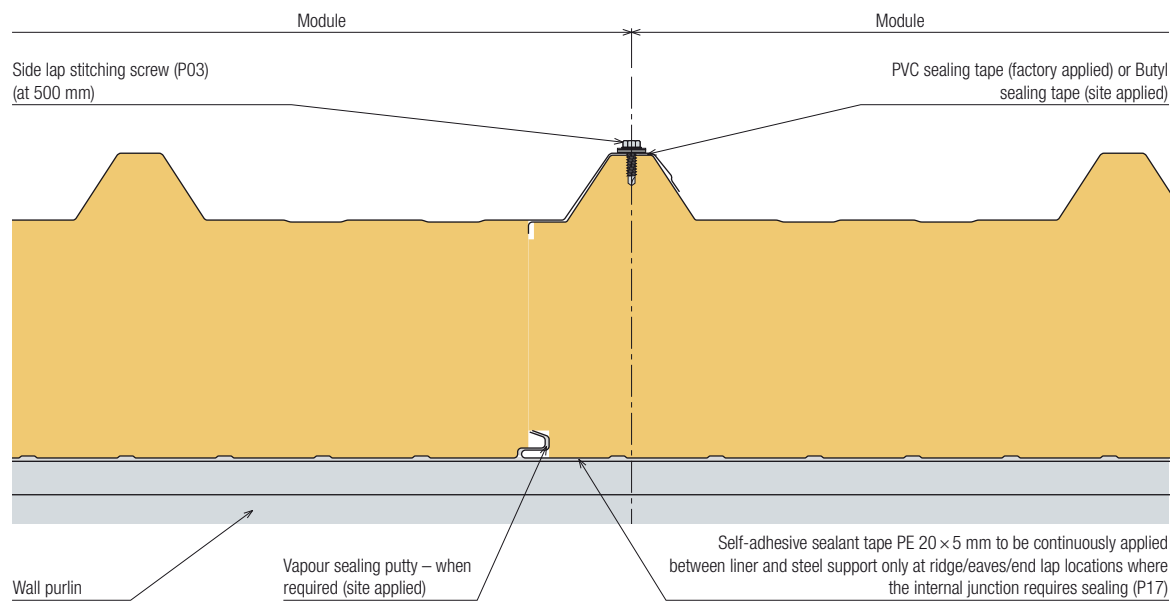
■	Trapezoidal Roof Panels	7.1.1
■	Flat Roof Panels	7.2.18
■	Rooftile	7.3.40
■	Rooflights	7.4.45
■	Wall Panels	7.5.52



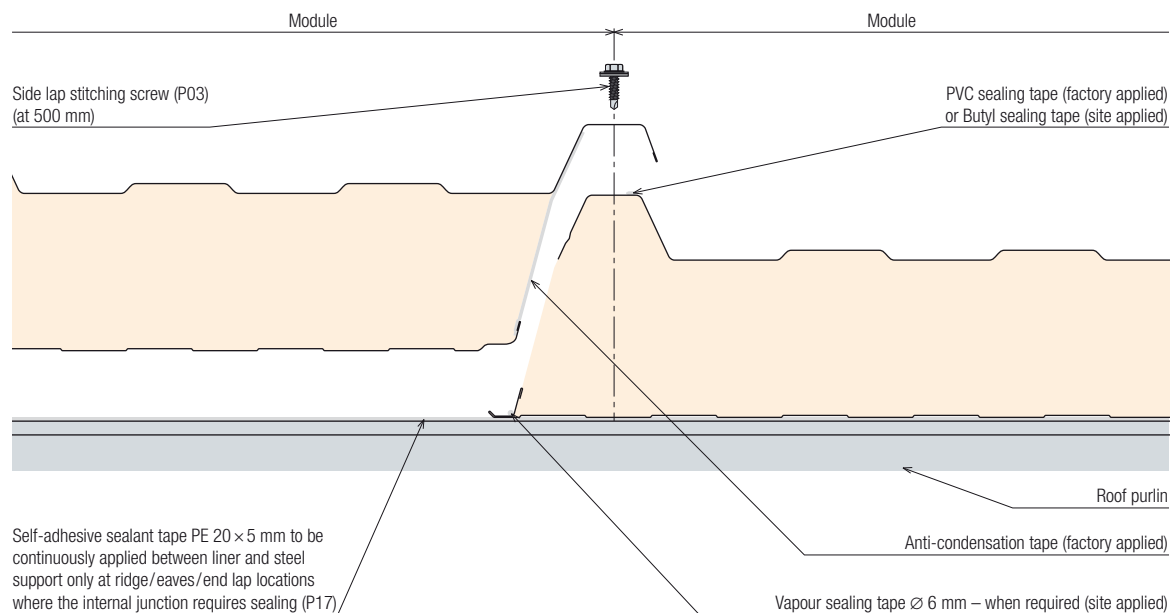


## Trapezoidal Roof Panels

### Panel Side Lap (FF)



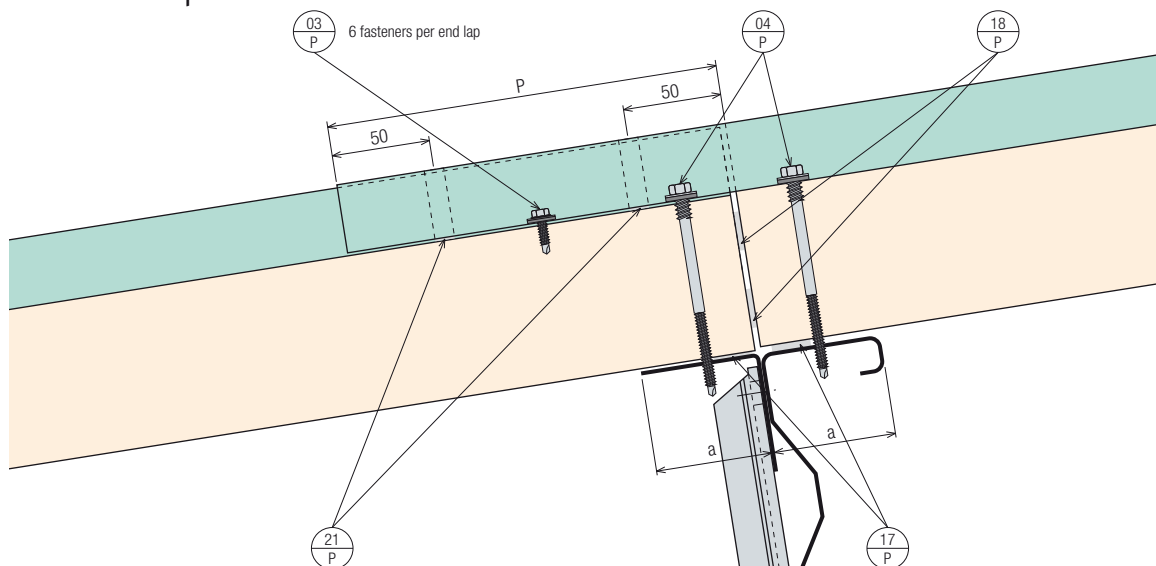
### Panel Side Lap (RW)



All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Panel End Lap



**Note:**

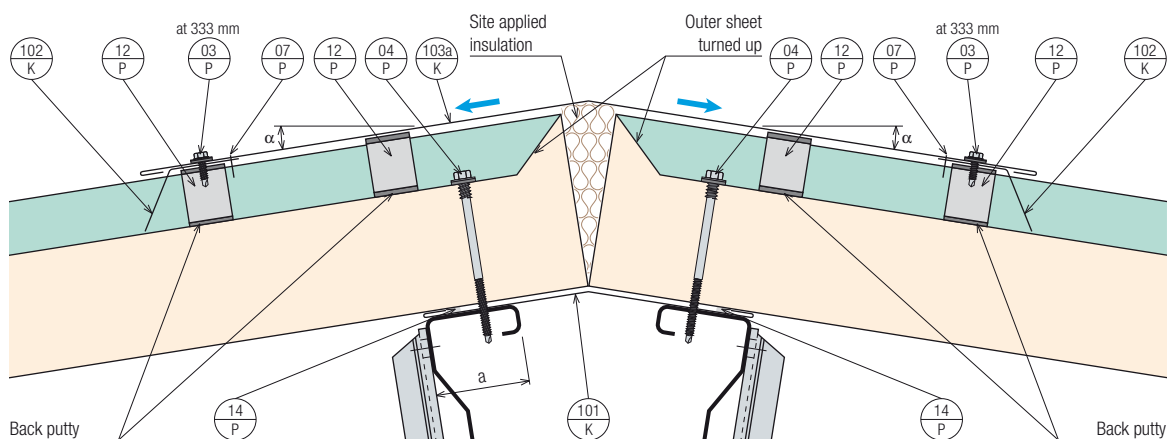
**P** Cut back dimensions:

- for roof slope  $> 10\%$  – 200 mm (supplied/delivered to site with cut backs)
- for roof slope  $\leq 10\%$  – 250 mm (supplied/delivered to site with cut backs)

Maximum cut backs available on panels from Kingspan is 250 mm.

**a** according to structural/static requirements

### Ridge



**Note:**

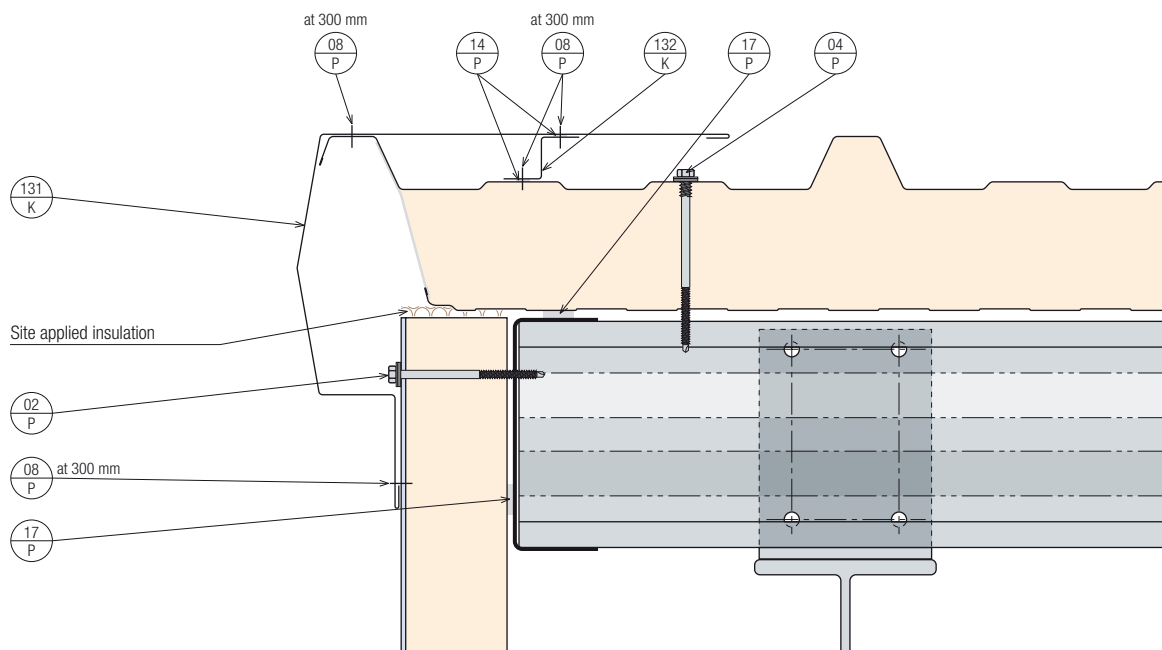
**a** according to structural/static requirements

**P12** for roof slope  $\leq 10\%$  – 4 pcs/m  
 $> 10\%$  – 2 pcs/m

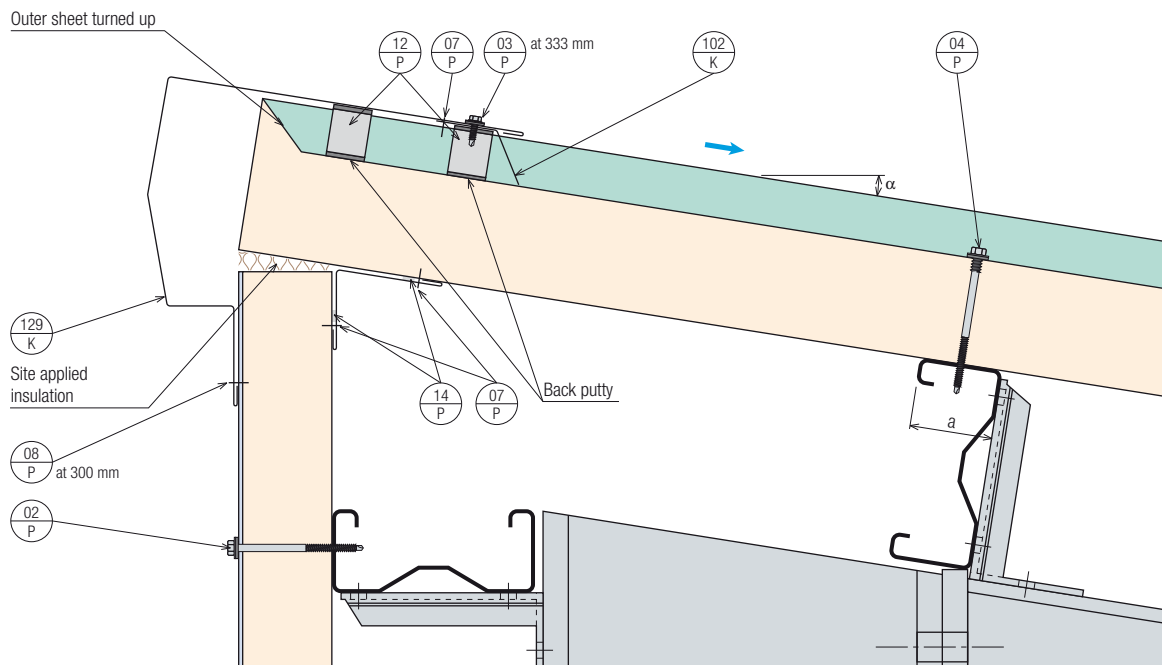
*All technical information is subject to alterations. Errors and omissions excepted.*

## Trapezoidal Roof Panels

### Gable



### Mono Ridge



**Note:**

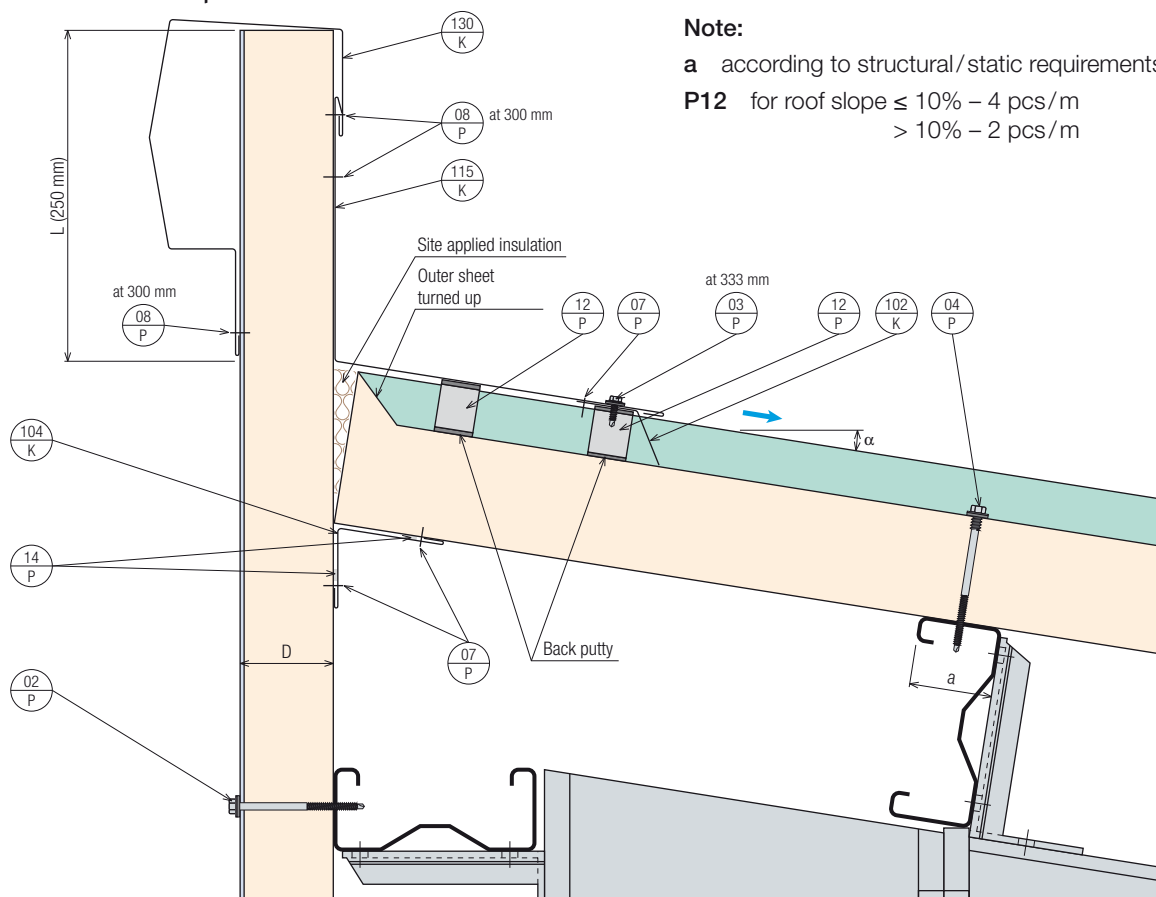
**a** according to structural / static requirements

**P12** for roof slope  $\leq 10\%$  – 4 pcs/m  
 $> 10\%$  – 2 pcs/m

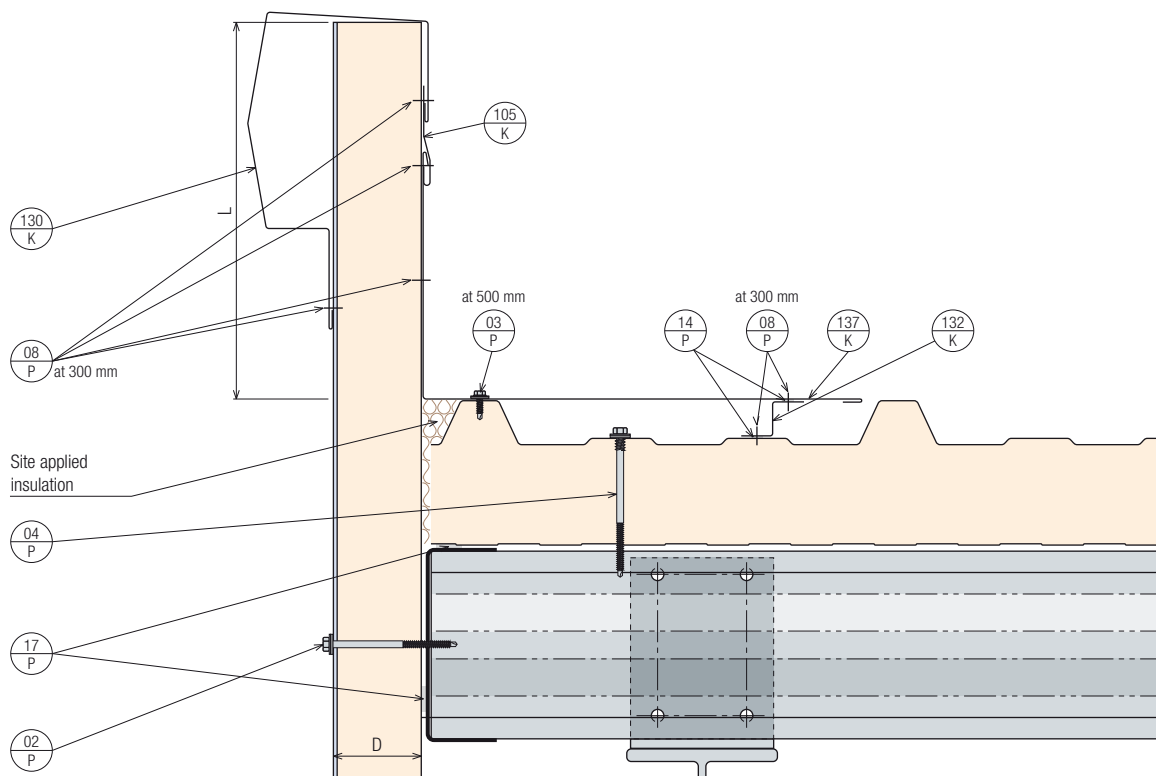
All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Side Wall Parapet



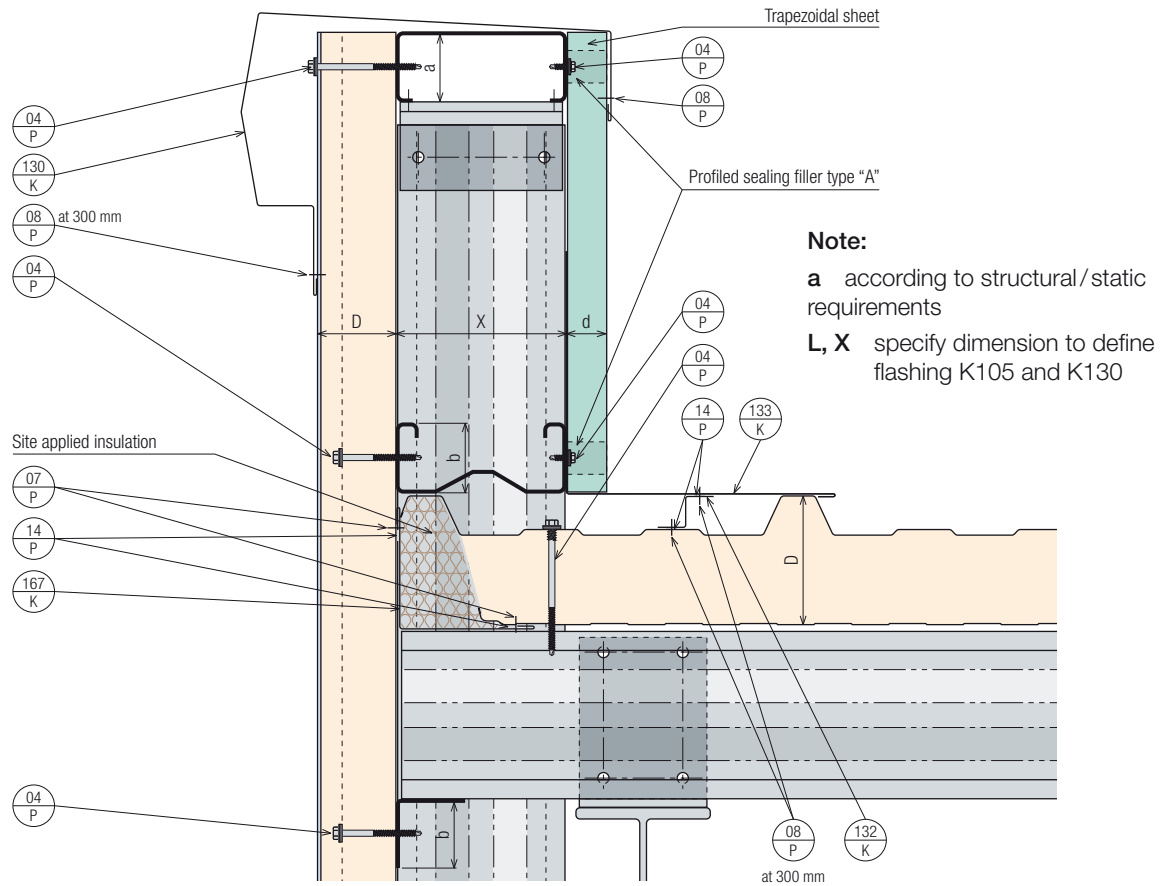
### Parapet in Slope – Single



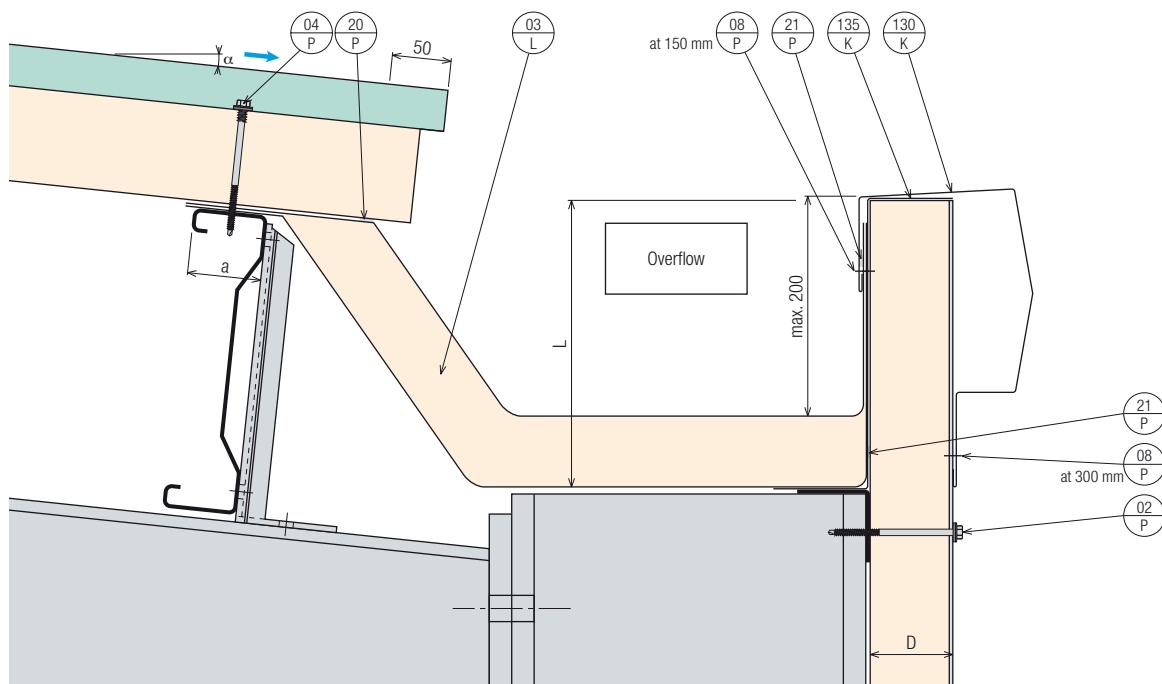
All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Parapet in Slope – Double



### Eaves Parapet Gutter – Prefabricated



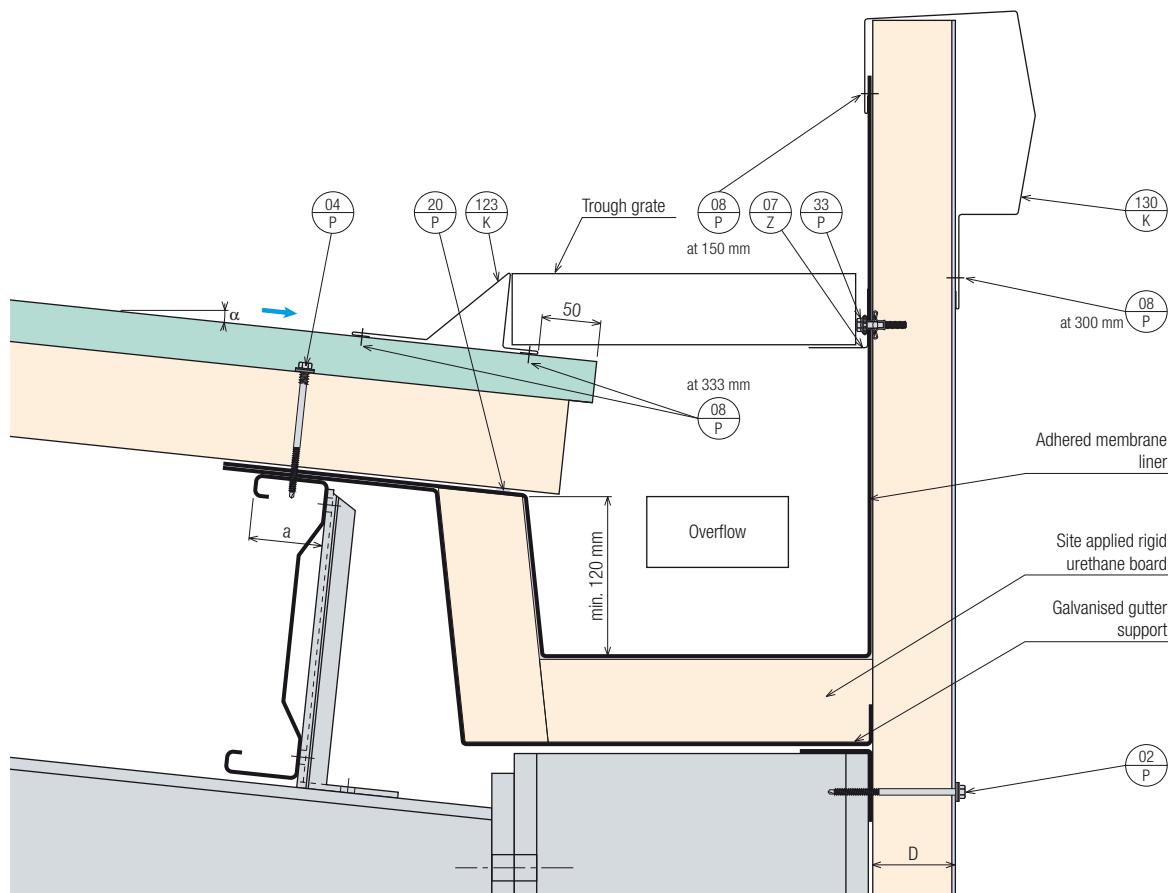
**Note:**

The prefabricated gutter is recommend to be supported every 2,000 mm.

All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Eaves Parapet Gutter – Membrane Lined



**Note:**

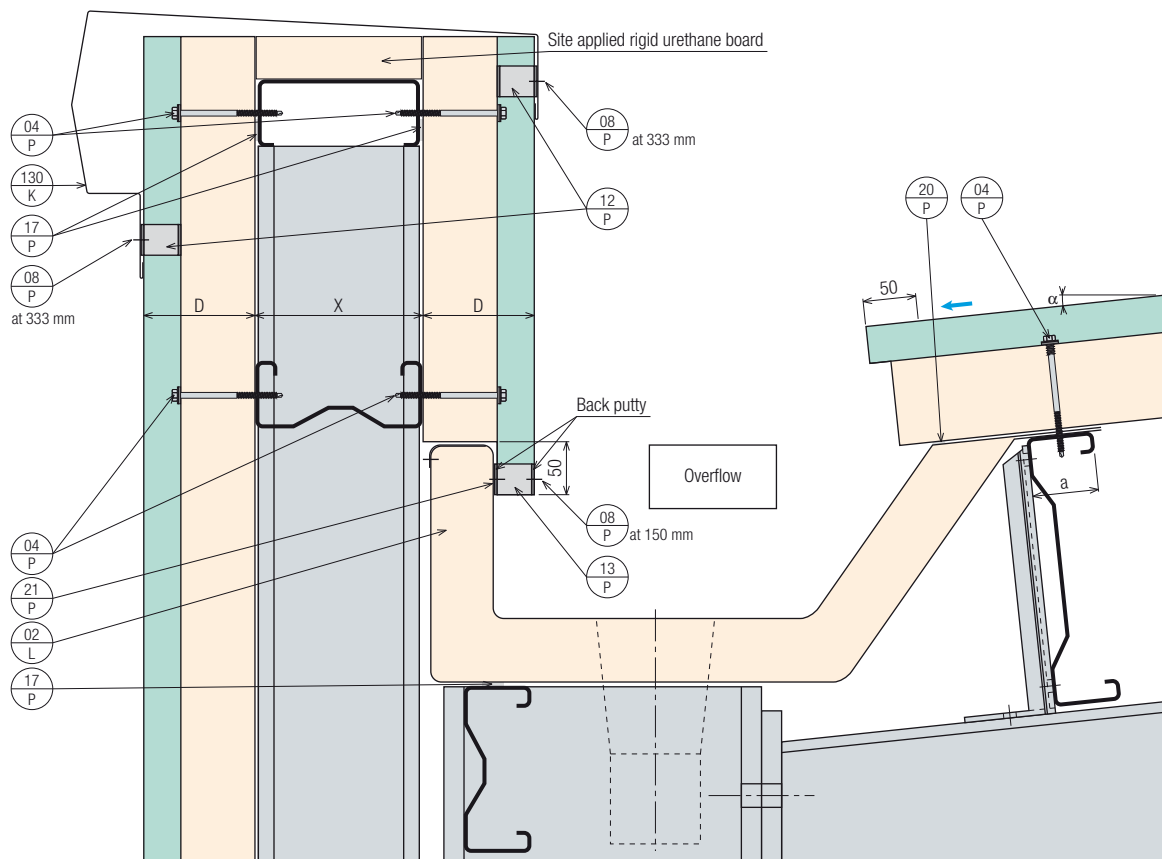
**a** according to structural/static requirements

**L** specify dimension to define flashing K135

**P33, Z07, K123** when required

## Trapezoidal Roof Panels

### Eaves Gutter Parapet – Prefabricated



**Note:**

**a** according to structural/static requirements

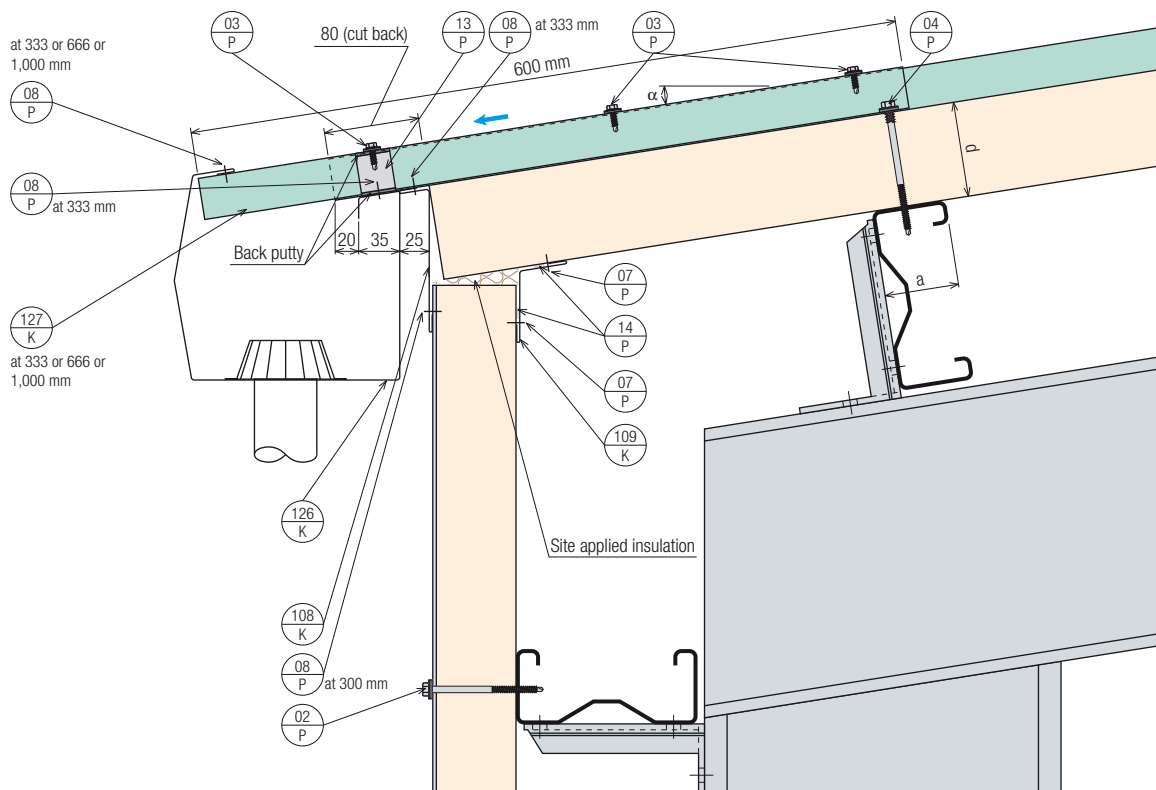
**X** specify dimension to define flashing K130

The prefabricated gutter is recommended to be supported every 2,000 mm.

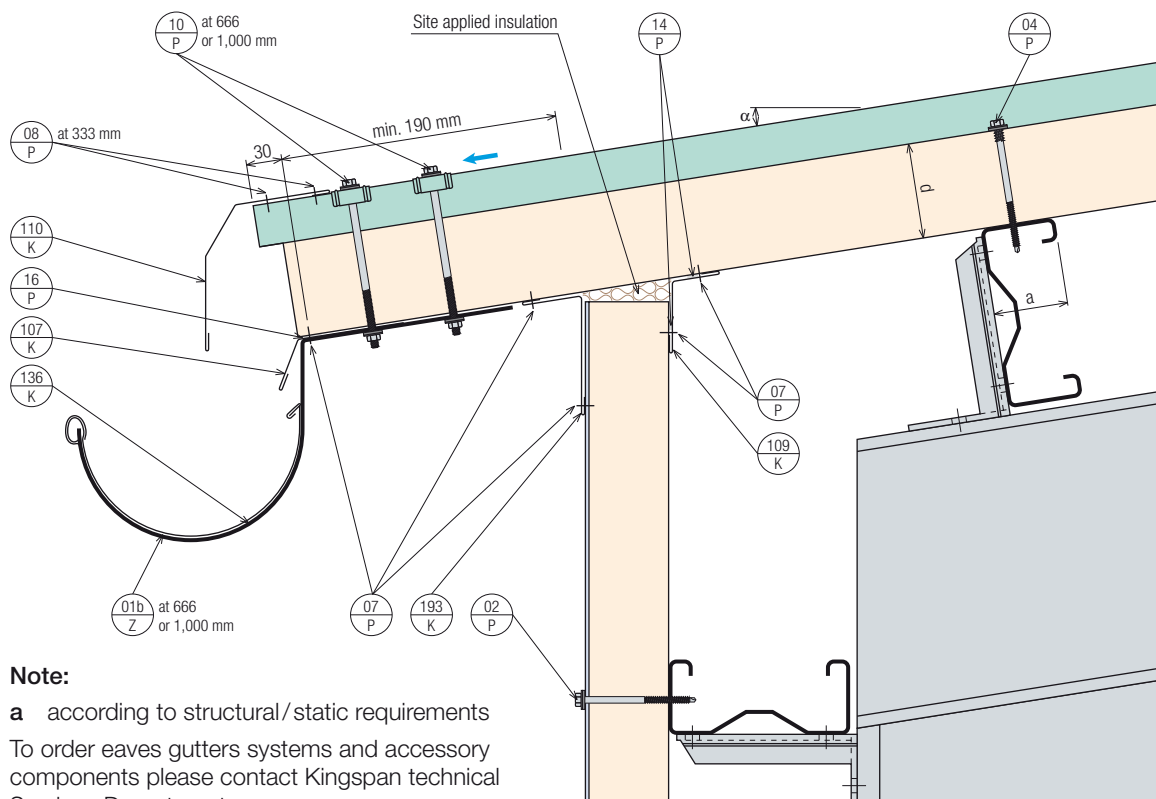
All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### External Gutter



### External Gutter



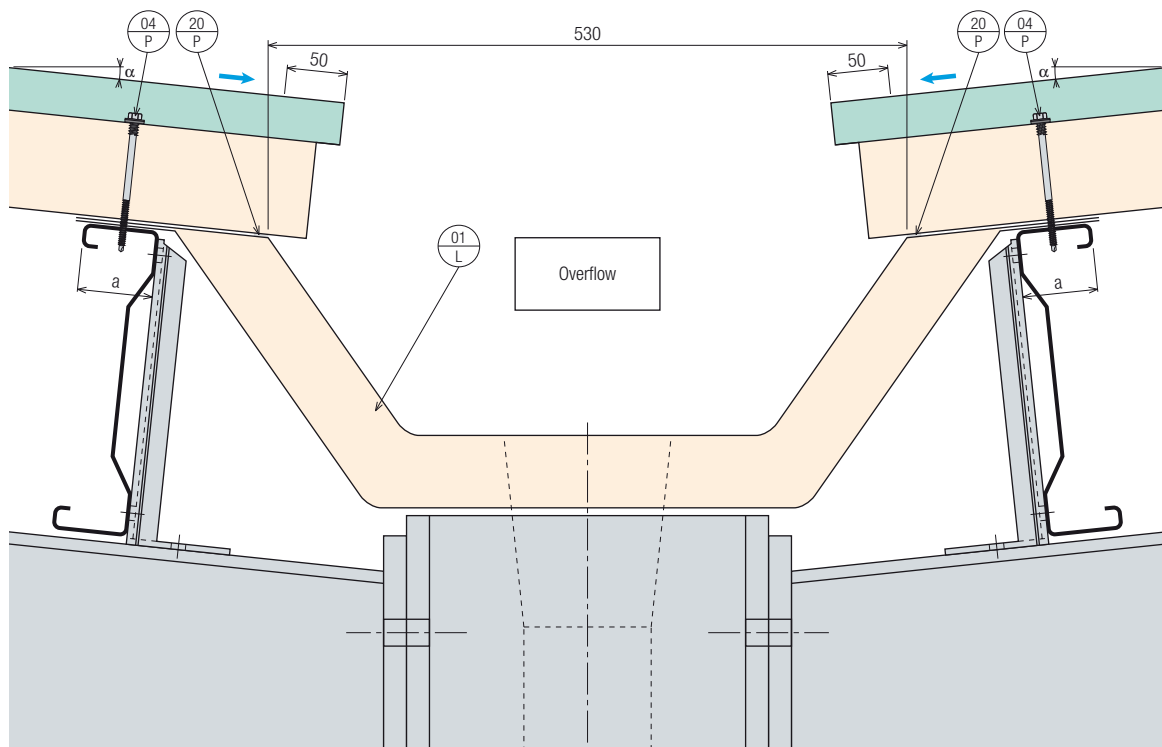
**Note:**

**a** according to structural/static requirements  
To order eaves gutters systems and accessory components please contact Kingspan technical Services Department.

*All technical information is subject to alterations. Errors and omissions excepted.*

## Trapezoidal Roof Panels

### Valley Gutter



**Note:**

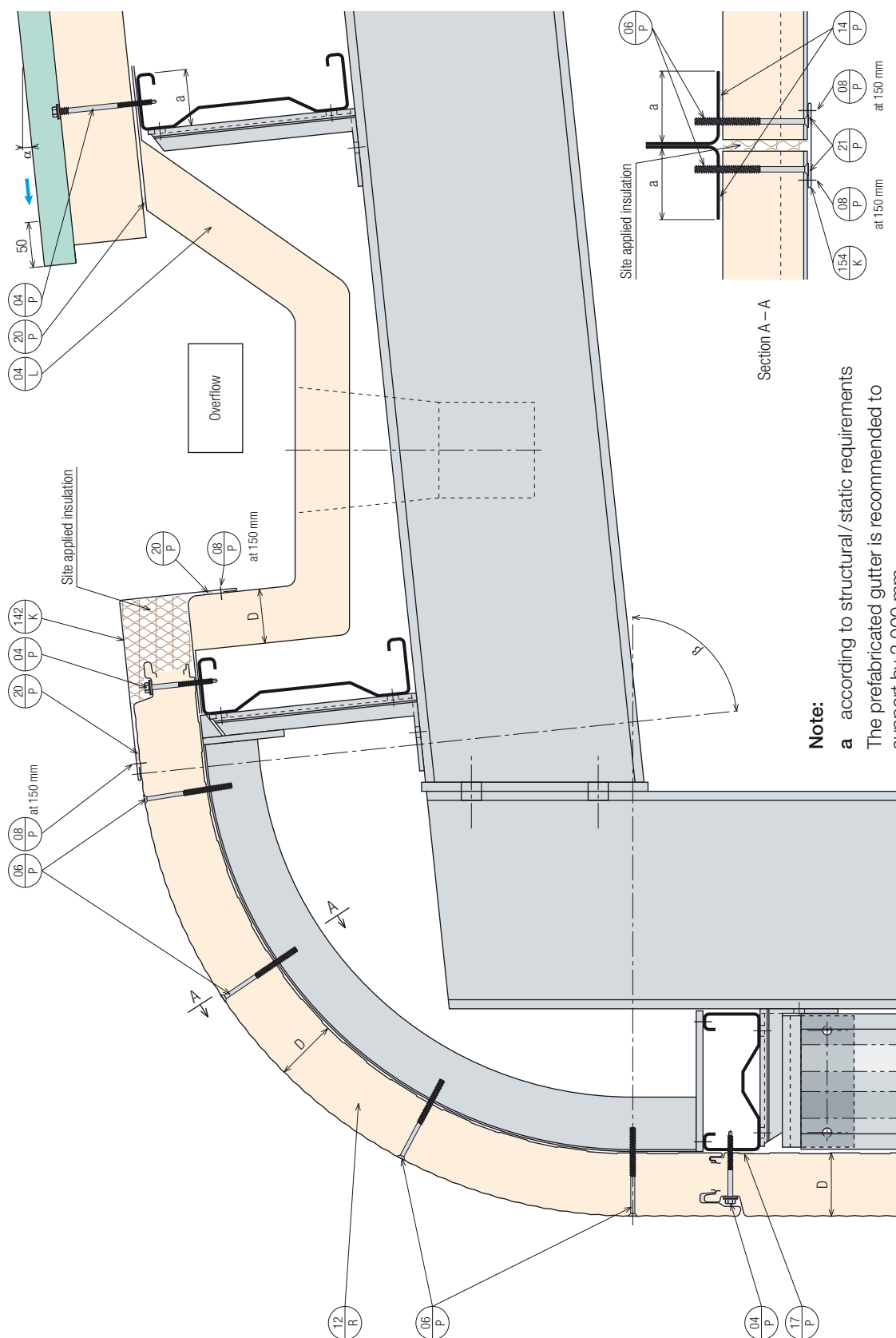
**a, b** according to structural/static requirements

The prefabricated gutter is recommended to support by 2,000 mm.

To order eaves gutters systems and accessory components please contact Kingspan technical Services Department.

## Trapezoidal Roof Panels

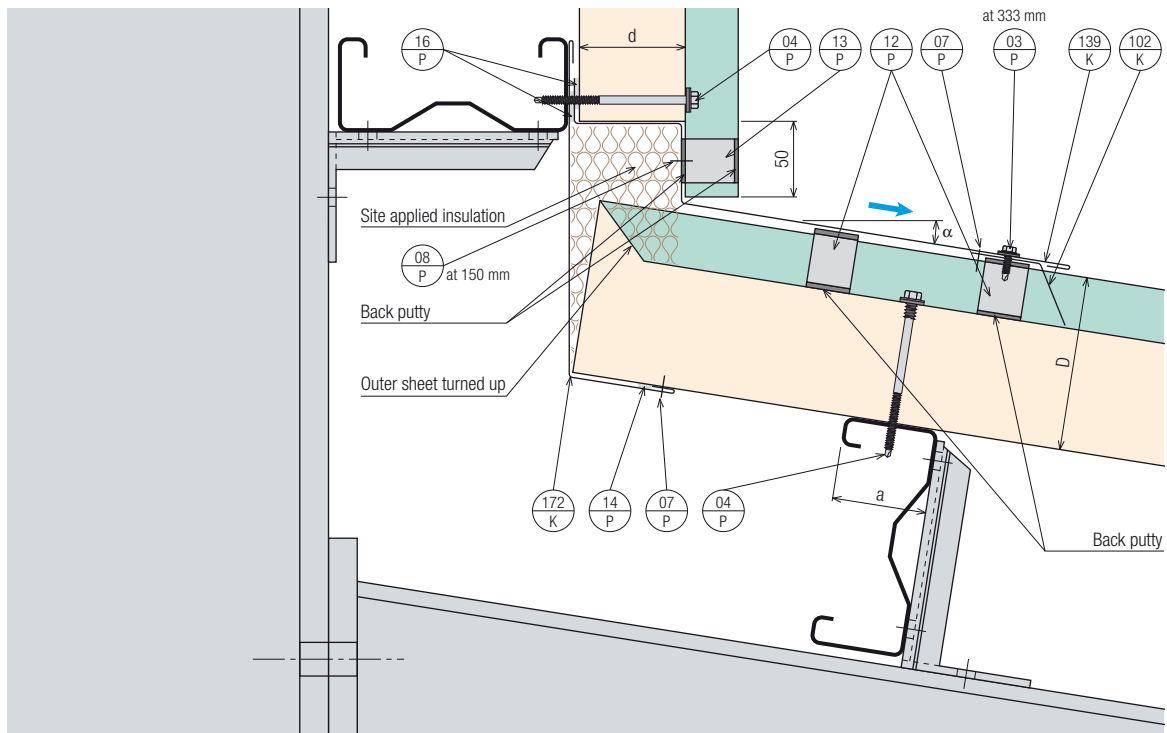
### Curved Eaves with Gutter – Roof to Wall



*All technical information is subject to alterations. Errors and omissions excepted.*

## Trapezoidal Roof Panels

### Roof to Wall Junction

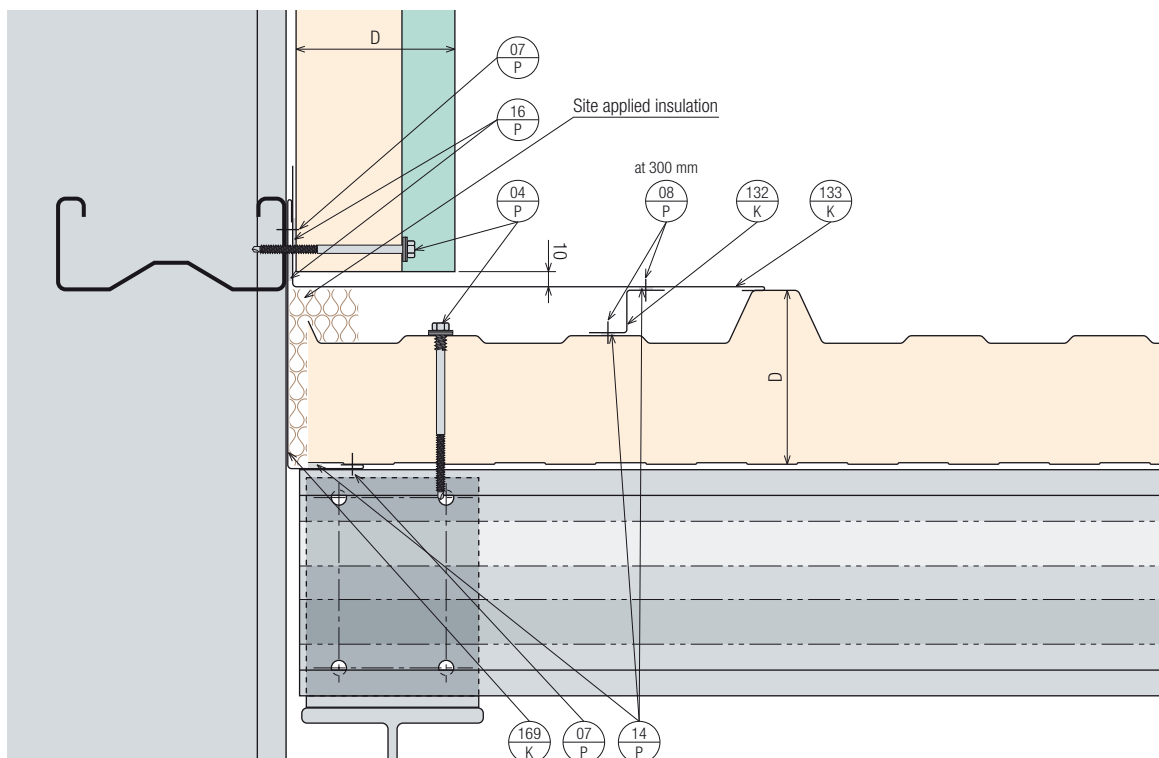


#### Note:

**a** according to structural/static requirements

**P12** for roof slope  $\leq 10\%$  – 4 pcs/m  
 $> 10\%$  – 2 pcs/m

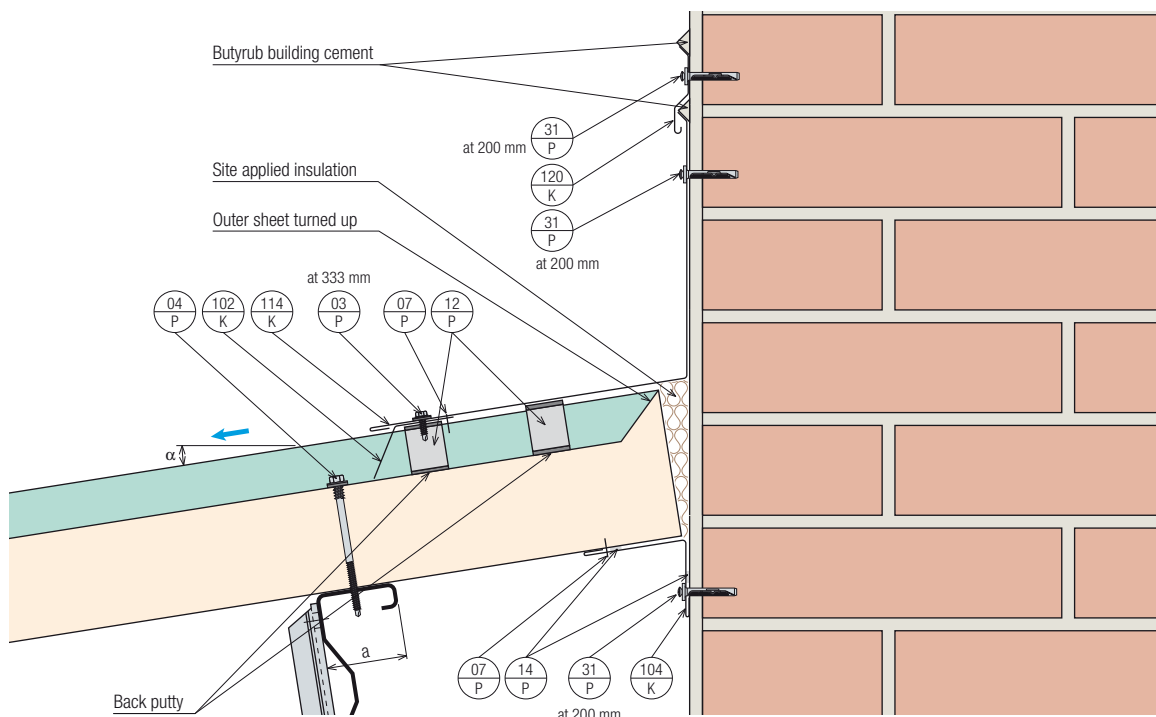
### Roof to Wall Junction in Slope



All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Roof to Brickwork Junction

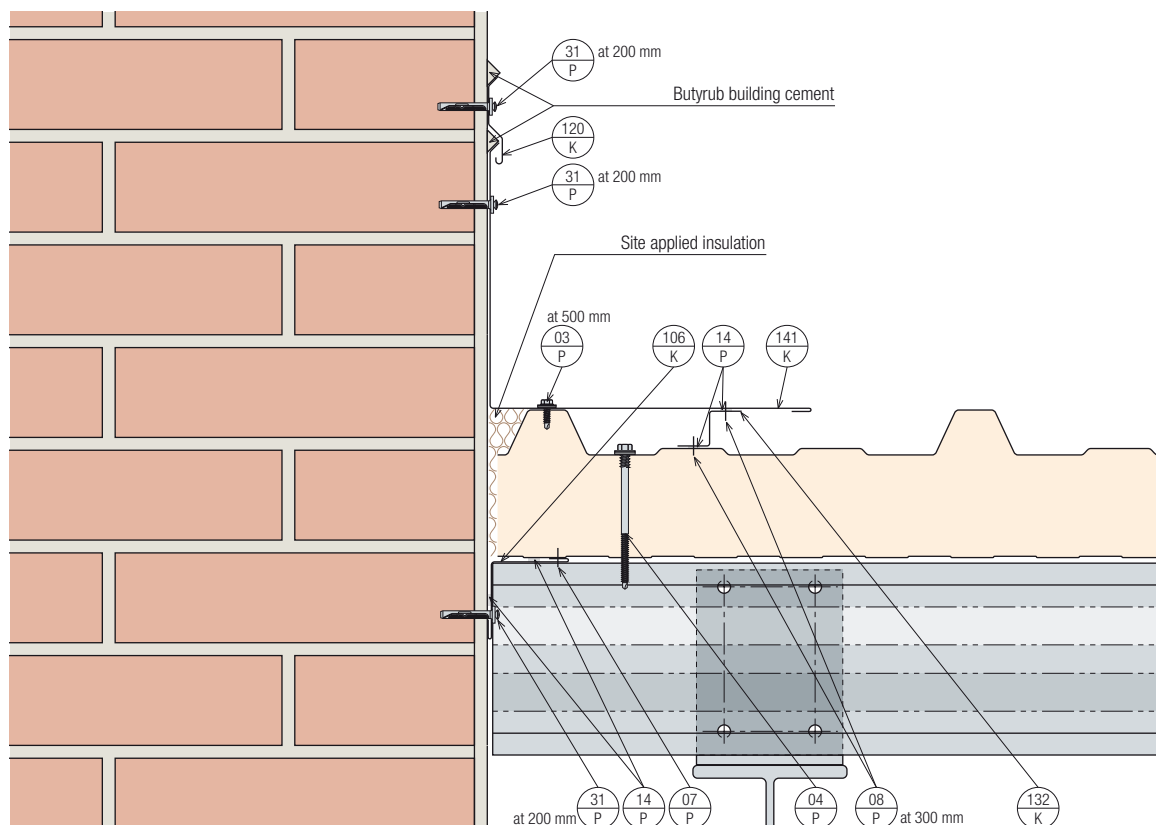


#### Note:

**a** according to structural/static requirements

**P12** for roof slope  $\leq 10\%$  – 4 pcs/m  
 $> 10\%$  – 2 pcs/m

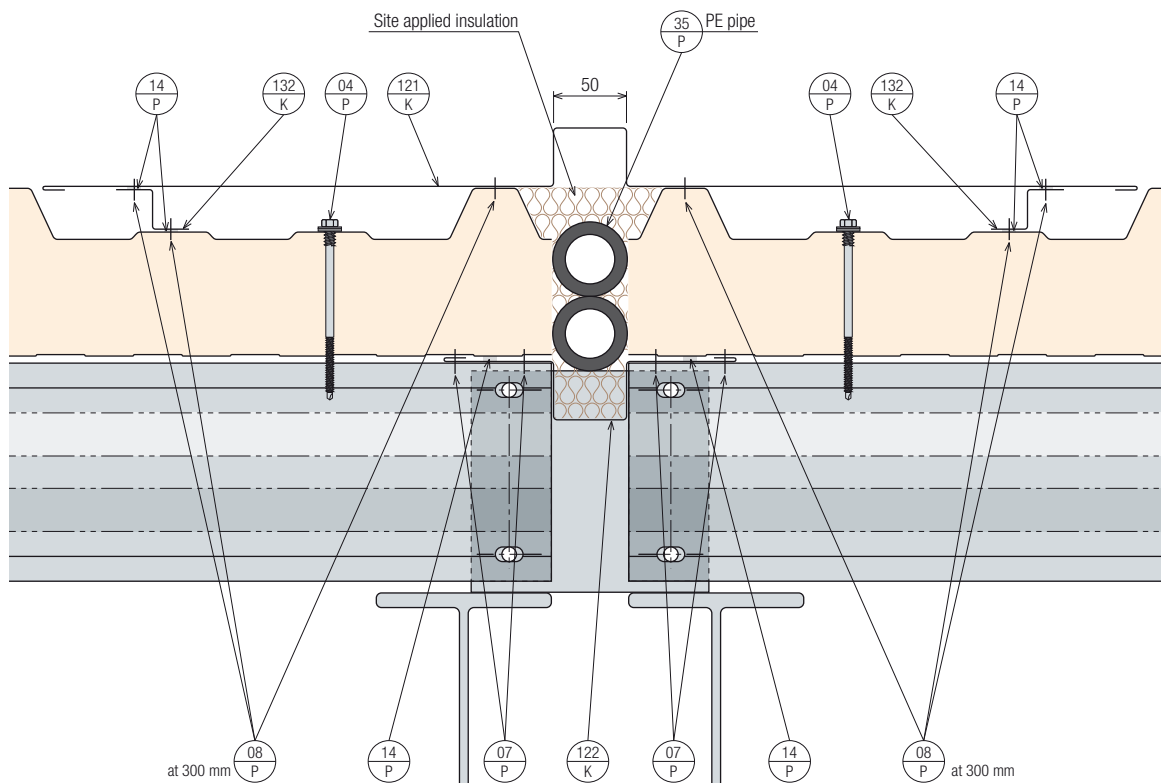
### Roof to Brickwork Junction in Slope



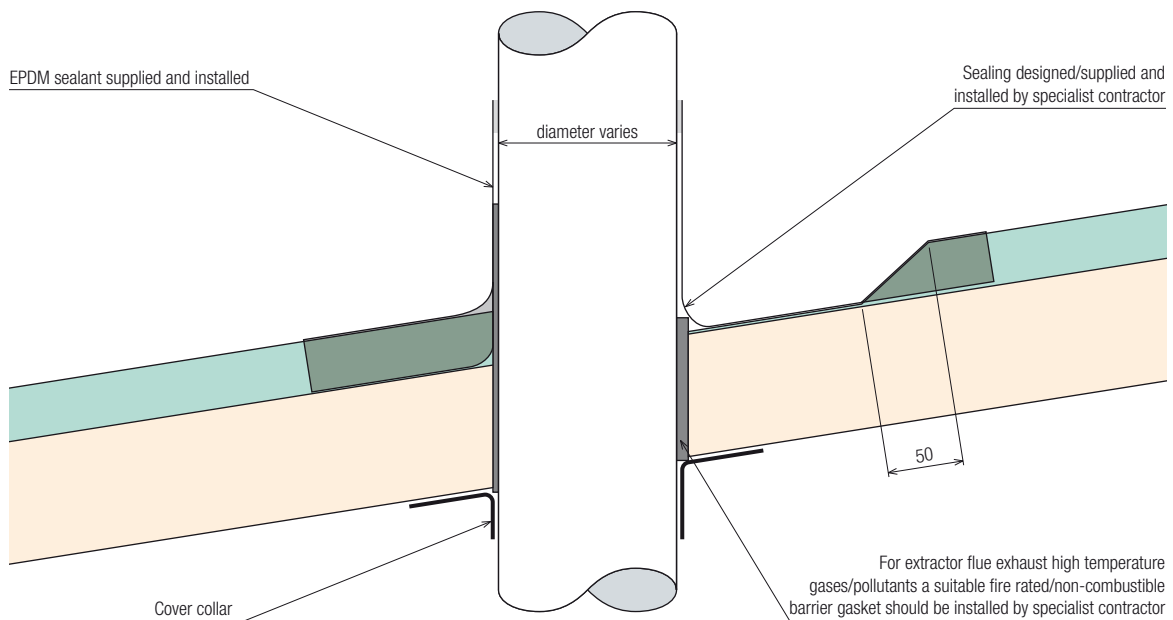
All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Expansion Joint



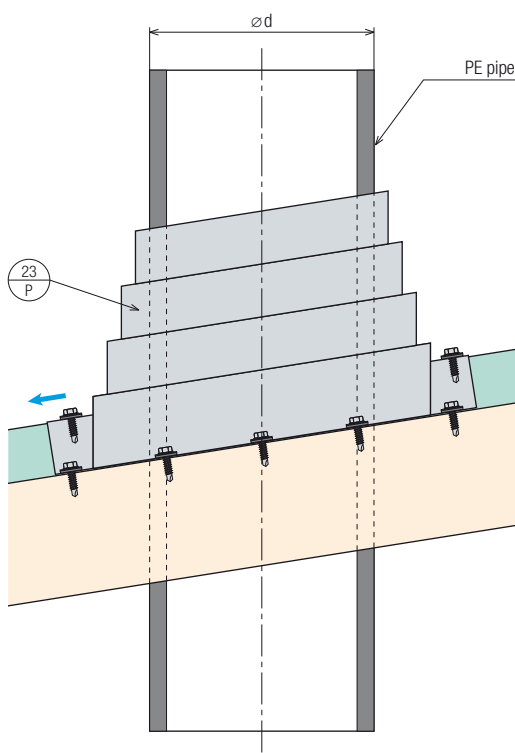
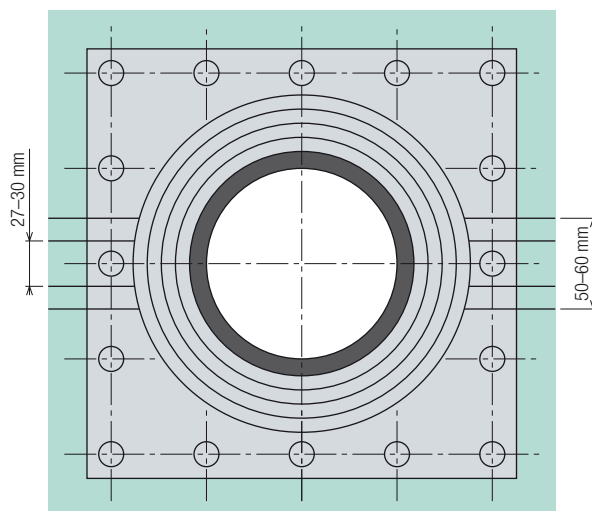
### Roof Penetration Extractor Flue



All technical information is subject to alterations. Errors and omissions excepted.

## Trapezoidal Roof Panels

### Roof Pipe Extractor Flue



**Note:**

Complete installation contents:

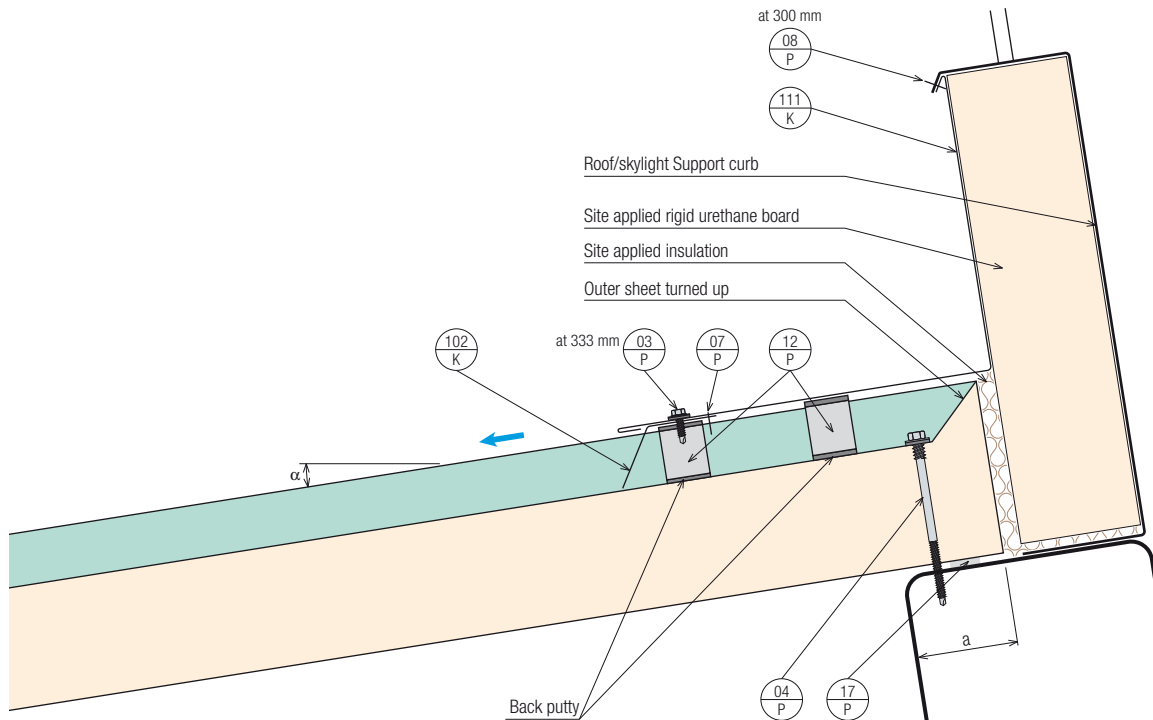
- passage piping packing
- sealing material
- necessary quantity of fasteners

Piping sleeves for better additional sealing of passages can be ordered according to diameter of piping.

See to the section of the Accessories or contact Kingspan Technical Service Department for range of piping sleeves.

## Trapezoidal Roof Panels

### Ridge – Roof/ Skylight

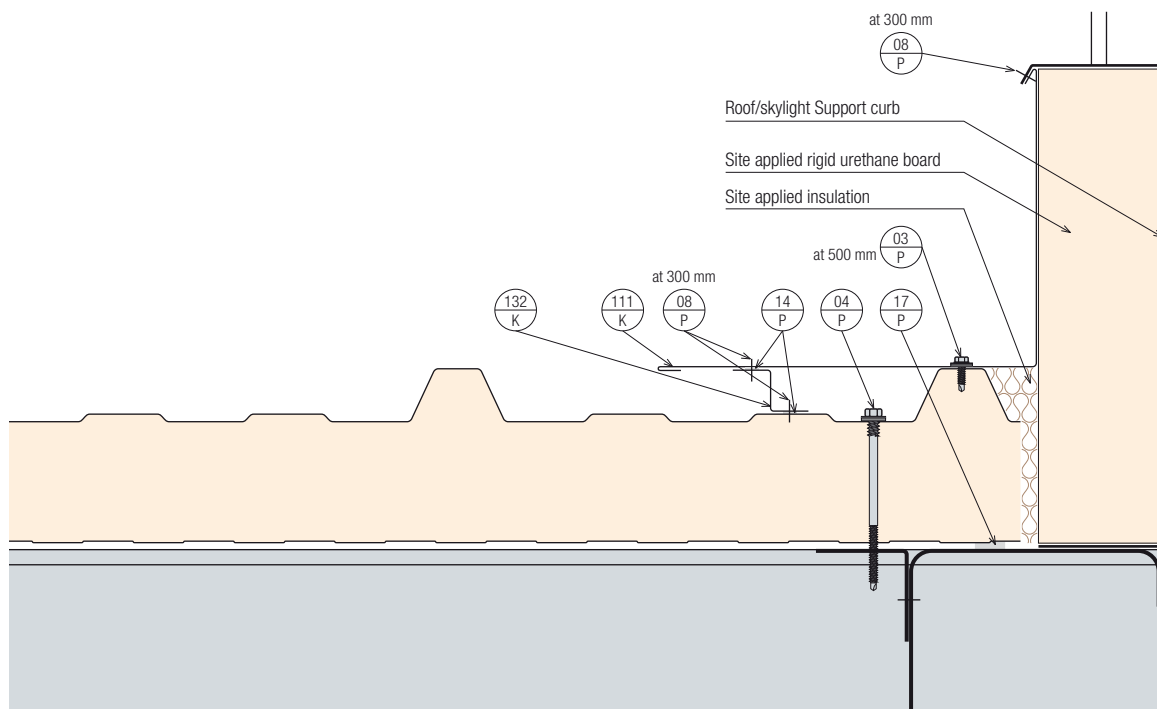


#### Note:

**a** according to structural/ static requirements

**P12** for roof slope  $\leq 10\%$  – 4 pcs/m  
 $> 10\%$  – 2 pcs/m

### Ridge Roof/ Skylight Downslope (RW)



All technical information is subject to alterations. Errors and omissions excepted.

### Dome Type Roof/ Skylight

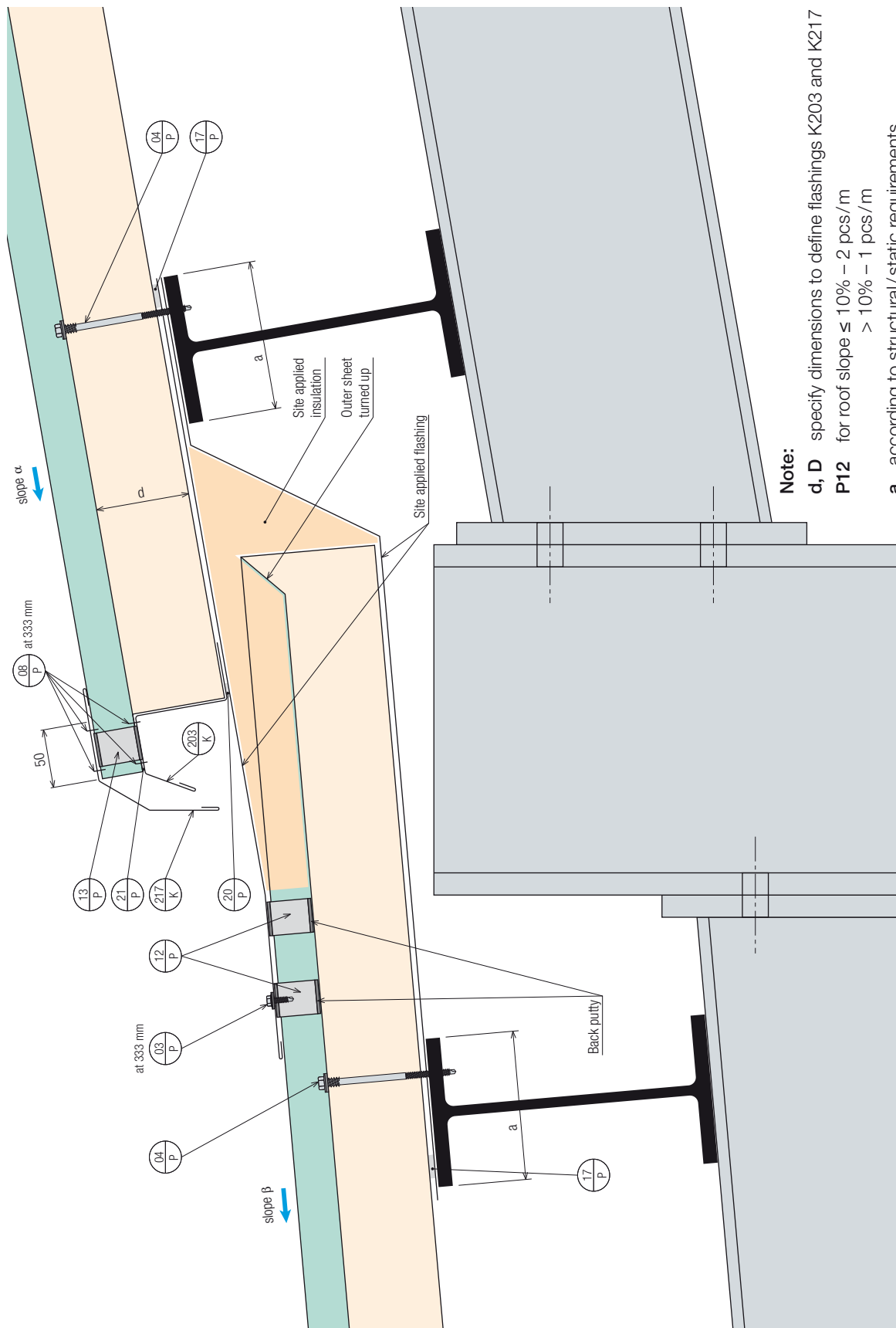


**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Trapezoidal Roof Panels

### Change of Roofslope

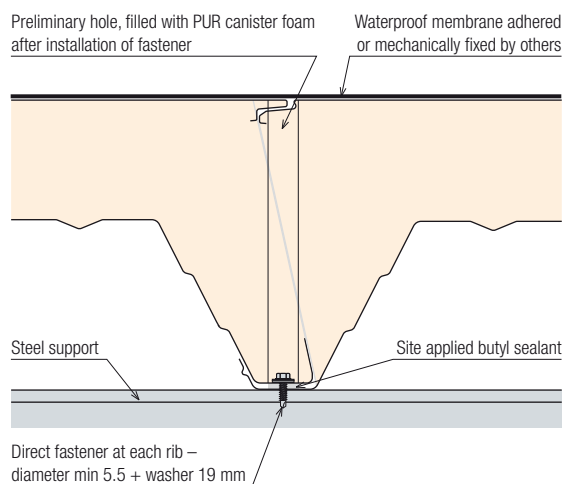


All technical information is subject to alterations. Errors and omissions excepted.

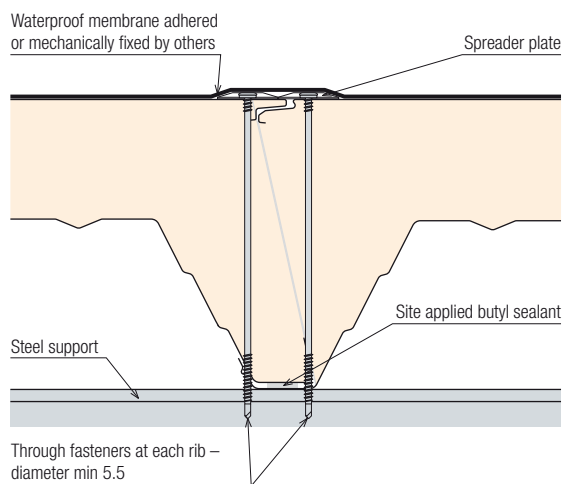
## Flat Roof Panels

### Fixing solution (X-DEK)

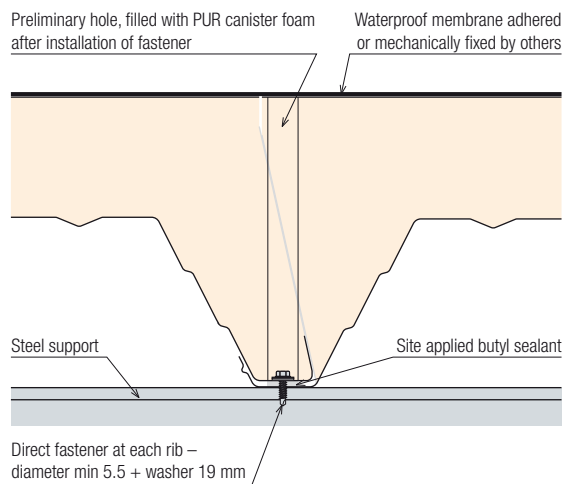
KS1000 XD – option 1



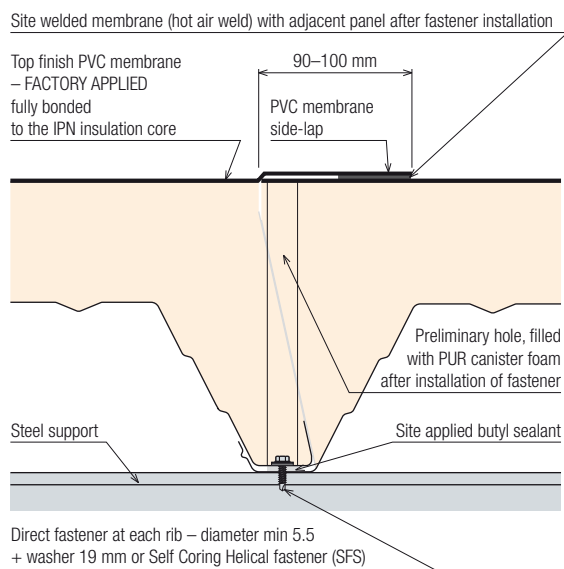
KS1000 XD – option 2



KS1000 XD TR20/TR27

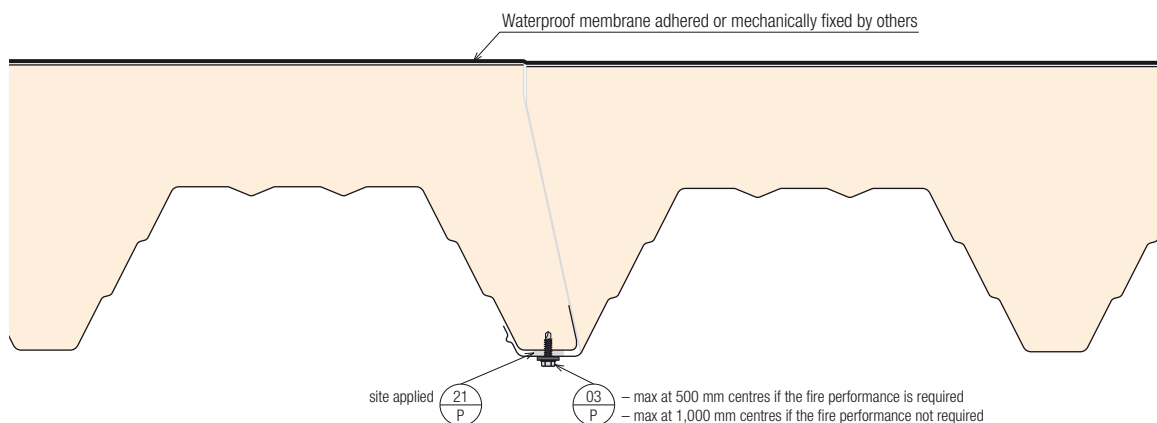


KS1000 XD PVC

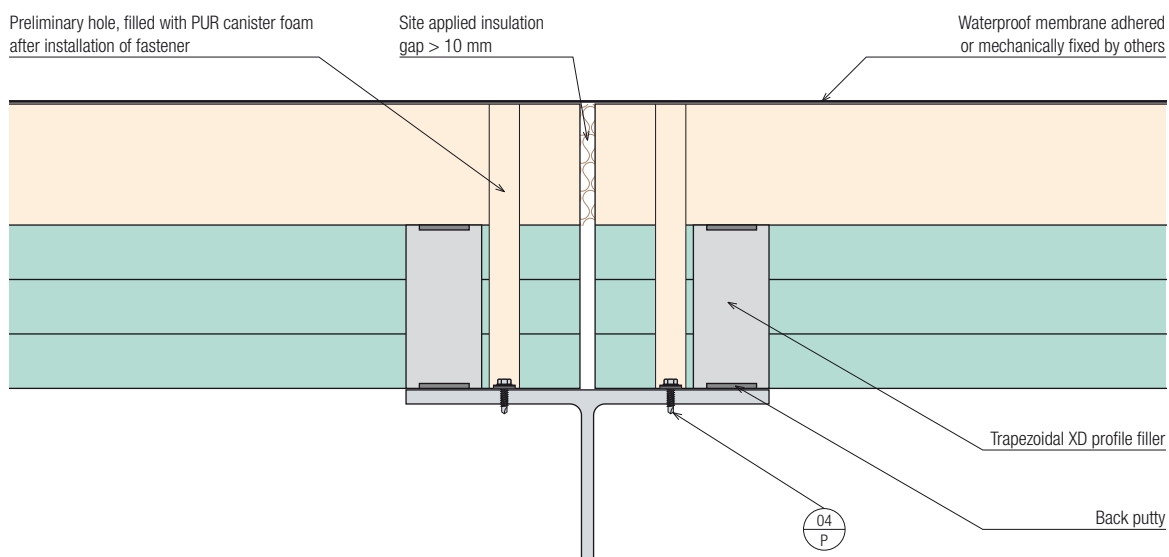


## Flat Roof Panels

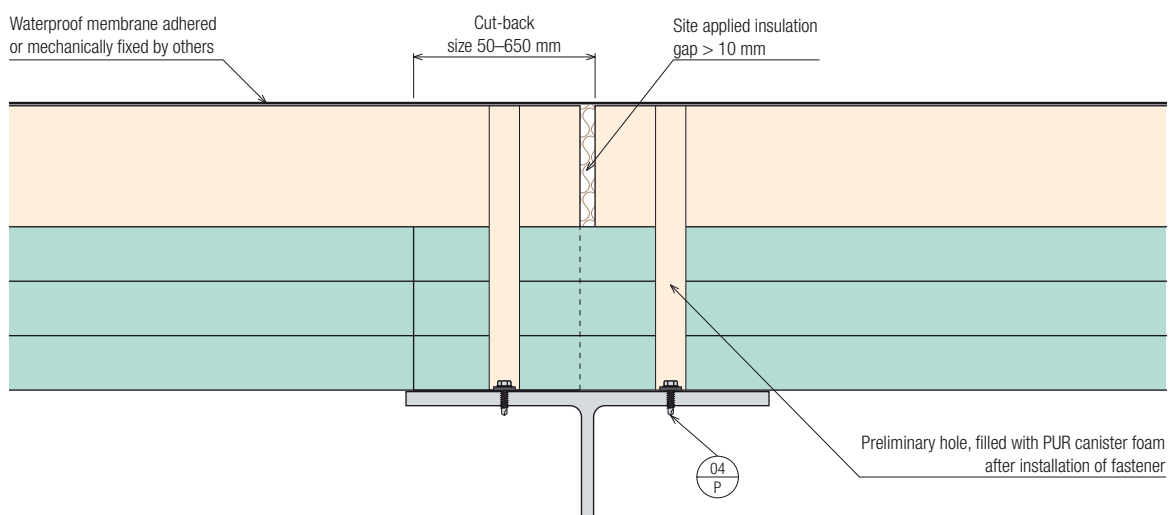
### Side lap Stitching detail (X-DEK)



### Butt joint (X-DEK)



### Panel End Lap (X-DEK)

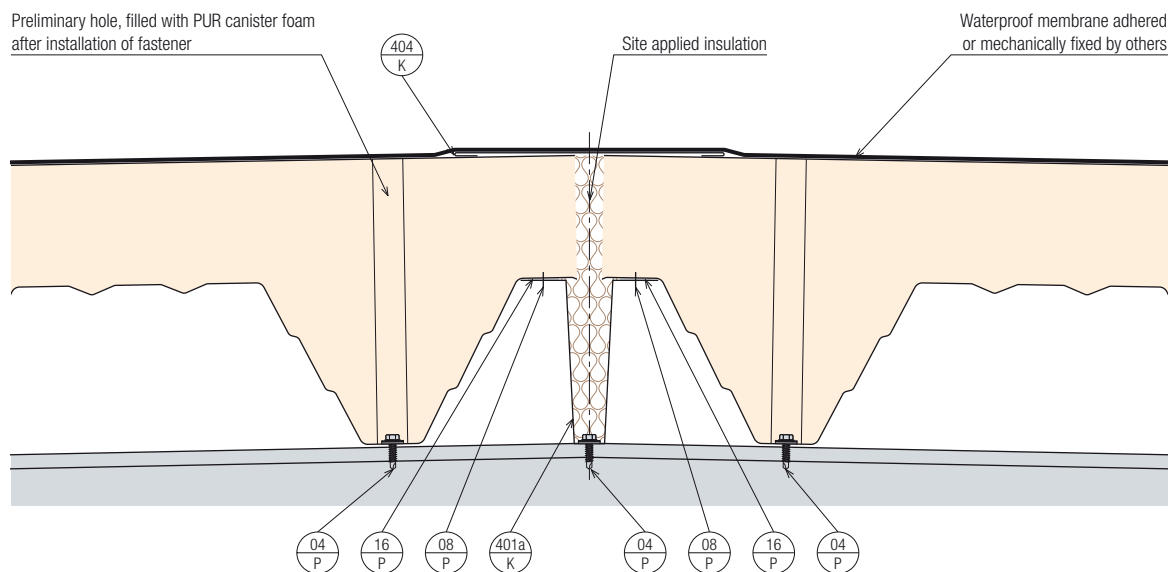


All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

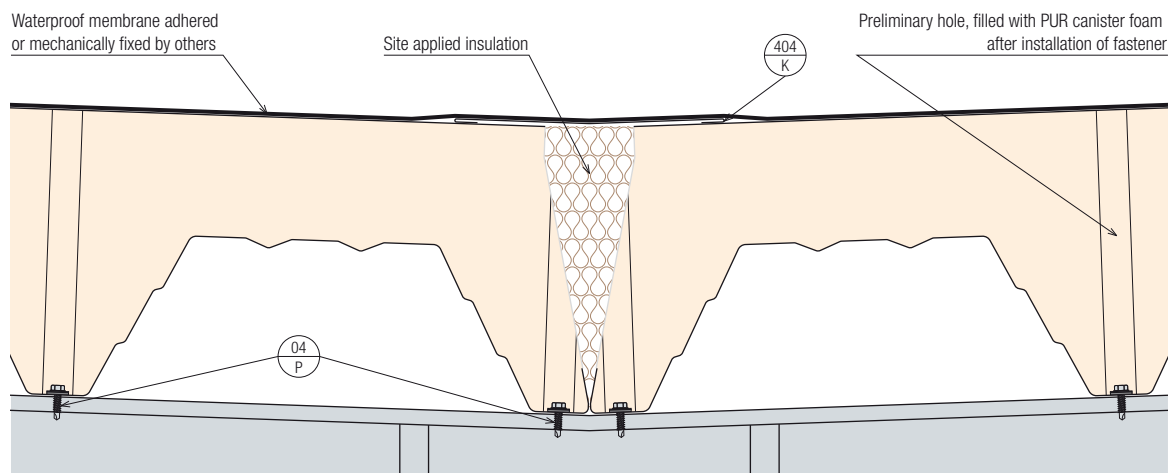
### Ridge (X-DEK)

Preliminary hole, filled with PUR canister foam after installation of fastener



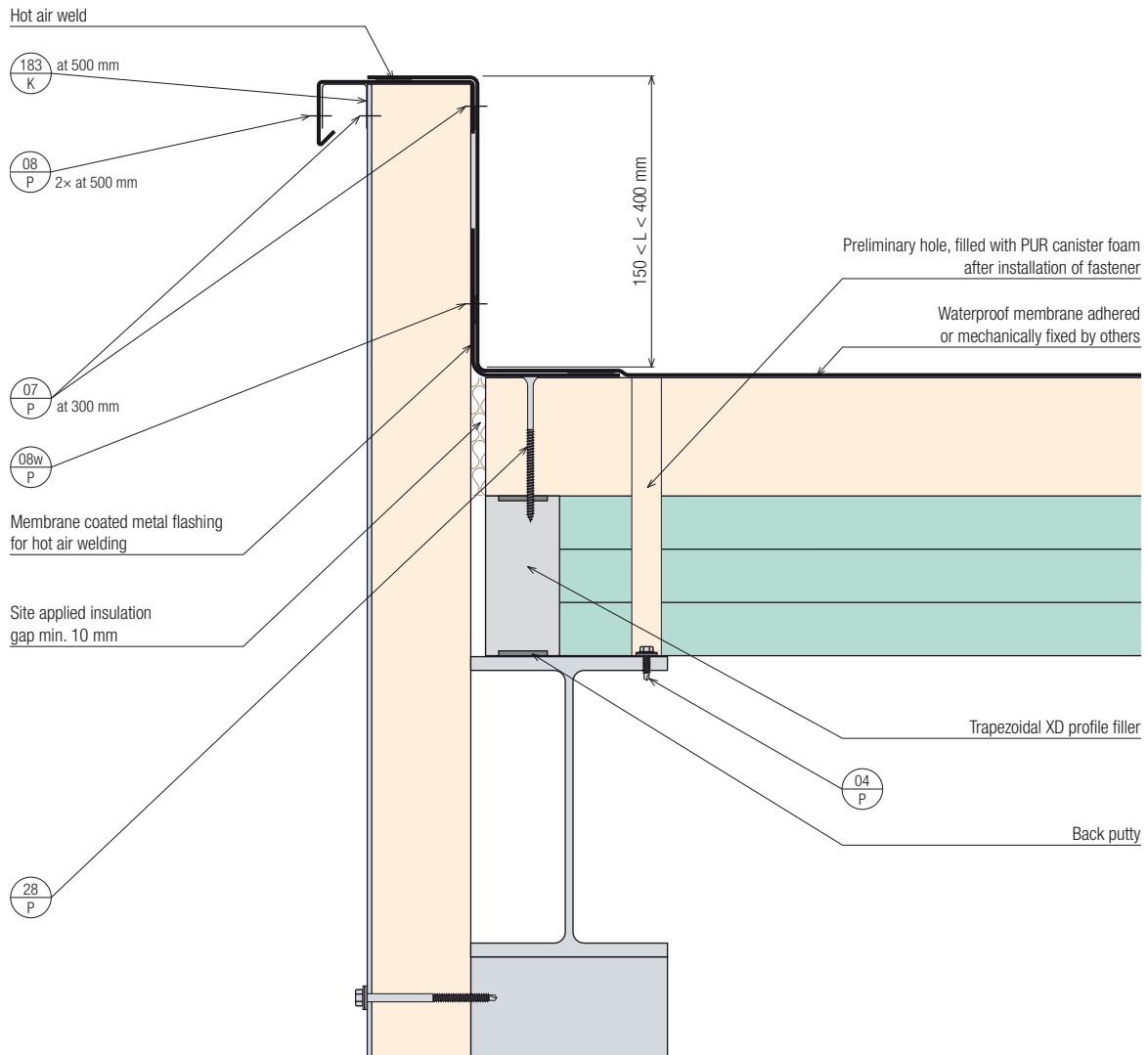
### Valley (X-DEK)

Waterproof membrane adhered or mechanically fixed by others



## Flat Roof Panels

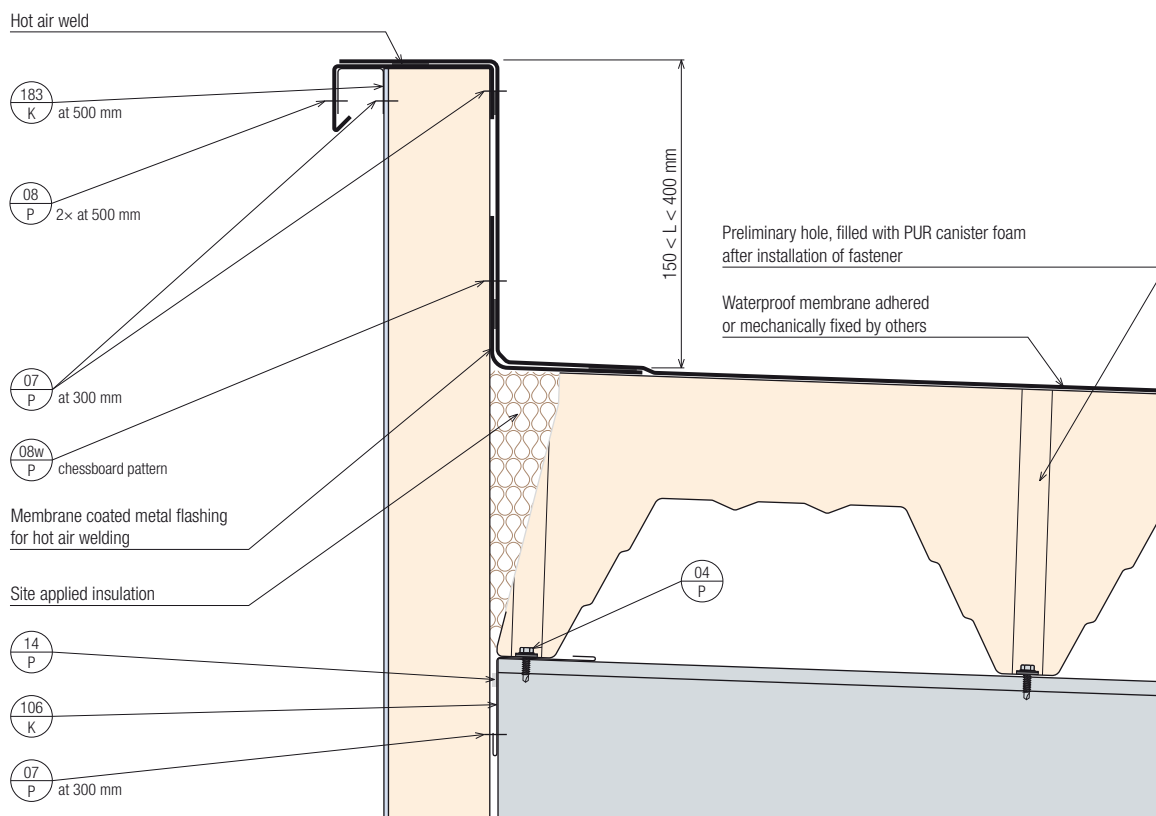
### Gable Wall Parapet (X-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

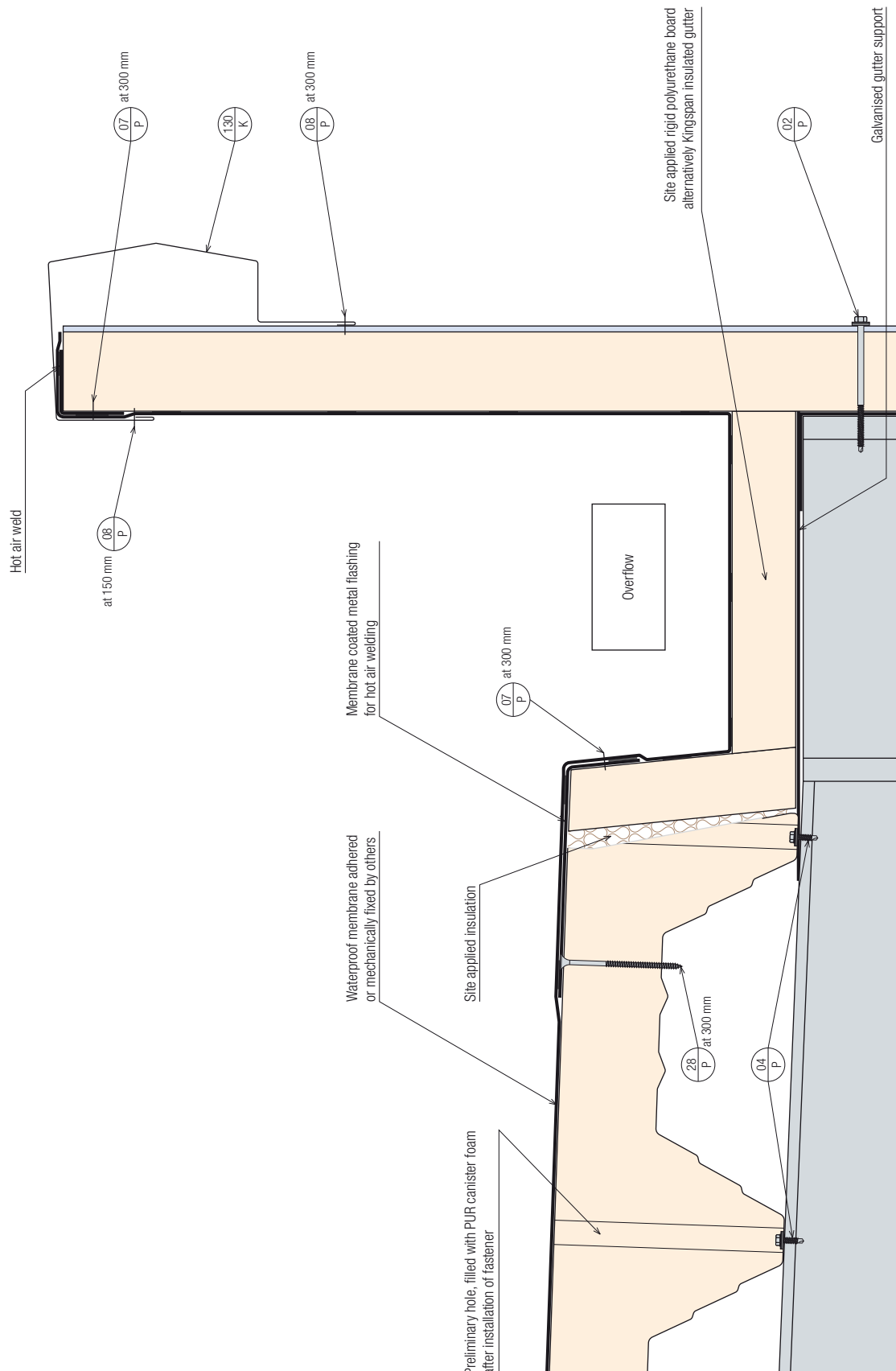
### Gable Wall Parapet (X-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

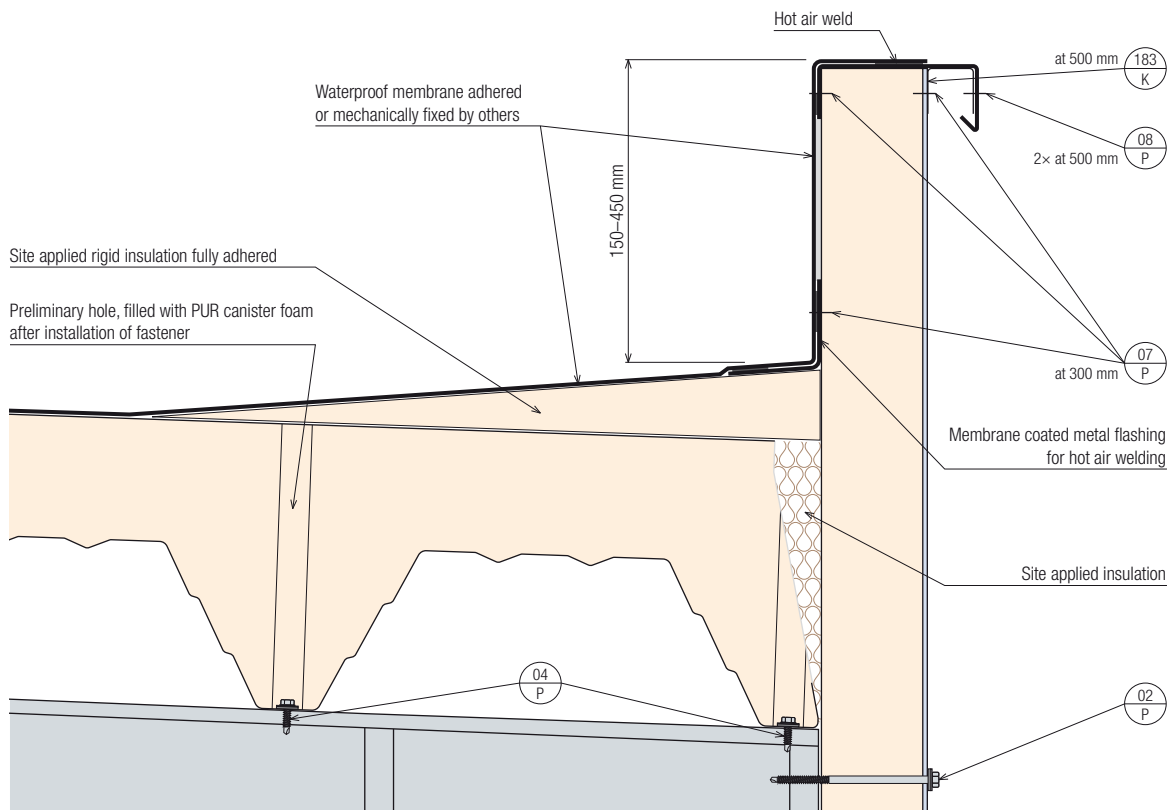
### Eaves Gutter Parapet (X-DEK)



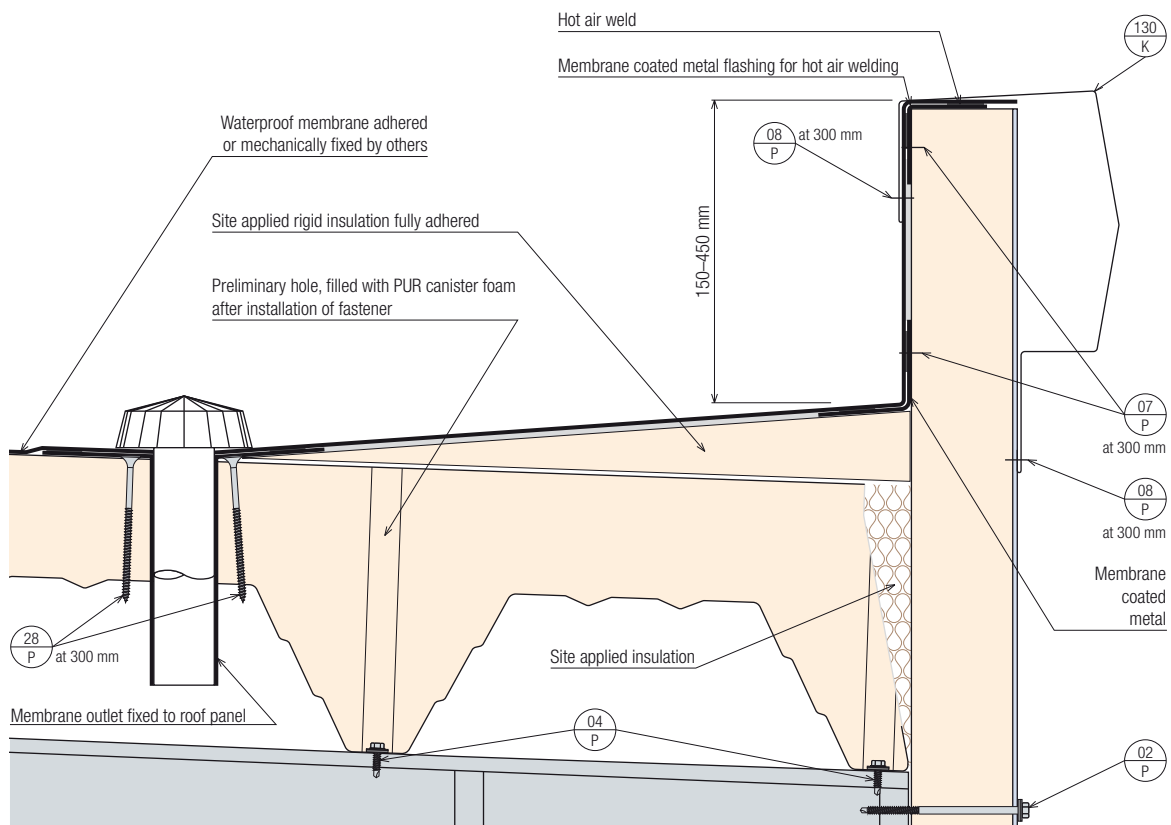
All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

### Eaves Gutter Parapet (X-DEK)



### Eaves Gutter Parapet (with outlet) (X-DEK)



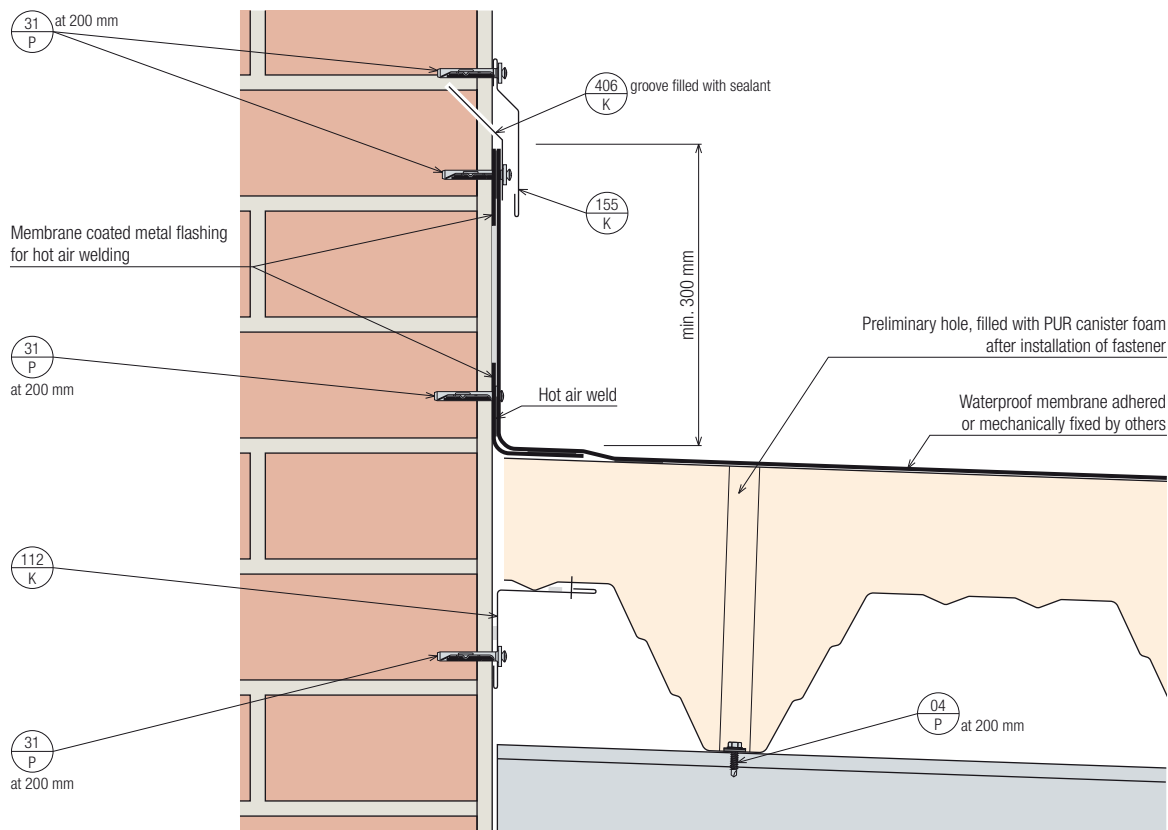
All technical information is subject to alterations. Errors and omissions excepted.

### External Gutter (X-DEK)

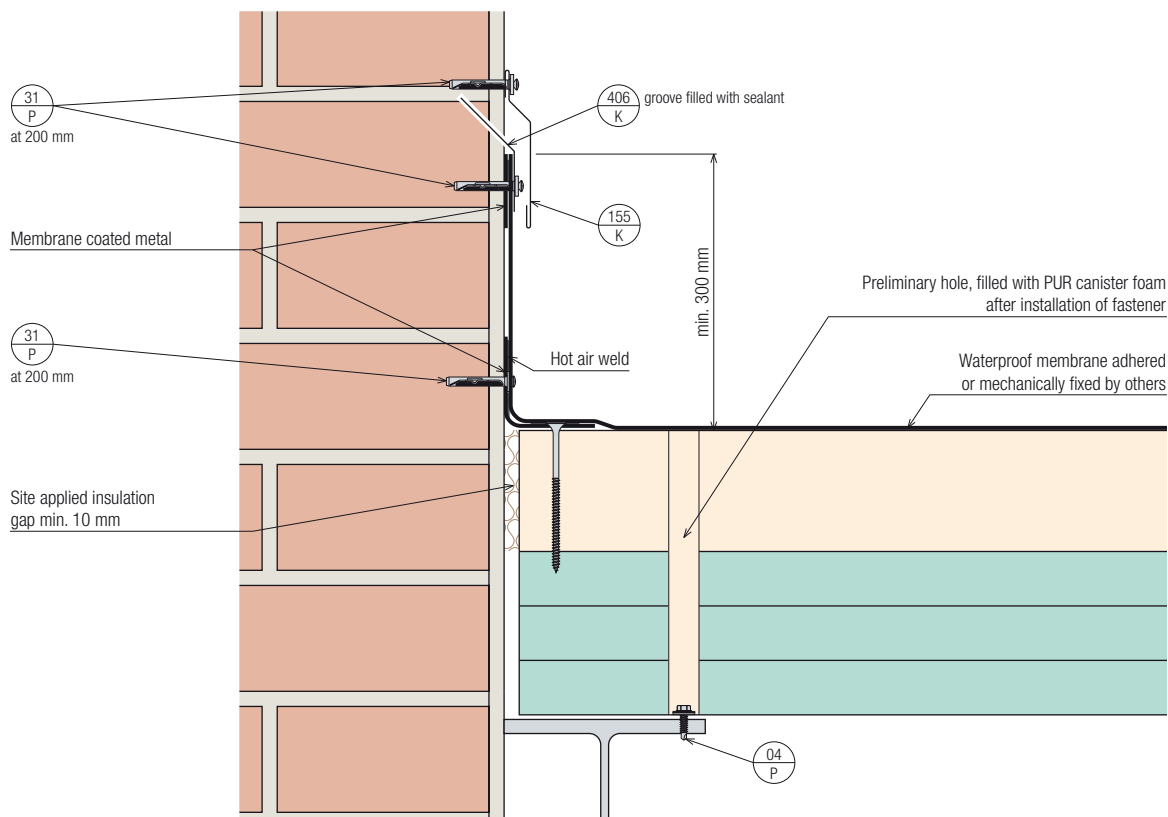


## Flat Roof Panels

### Roof to Brickwork Junction (X-DEK)



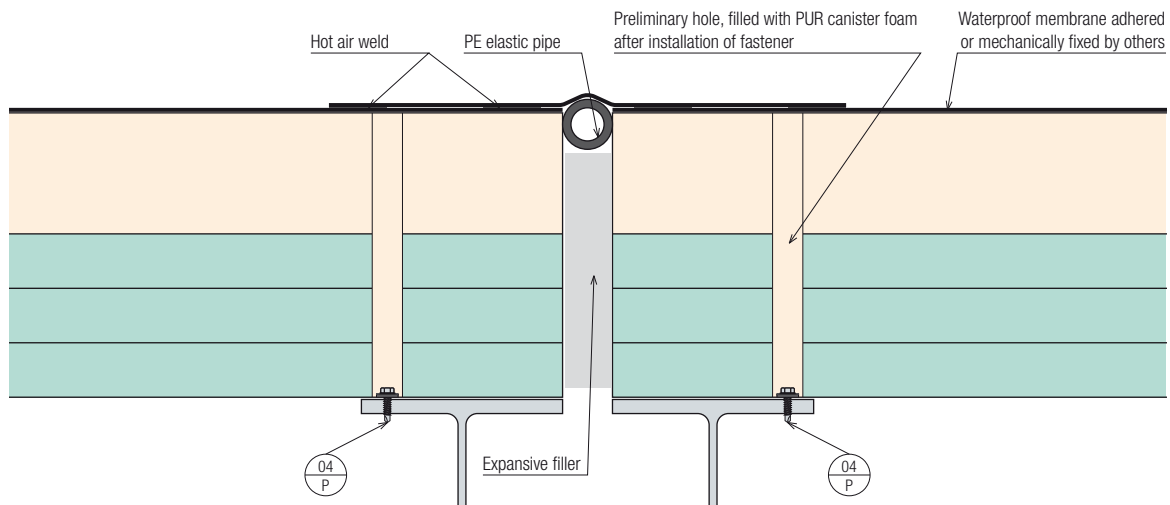
### Roof to Brickwork Junction in Slope (X-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

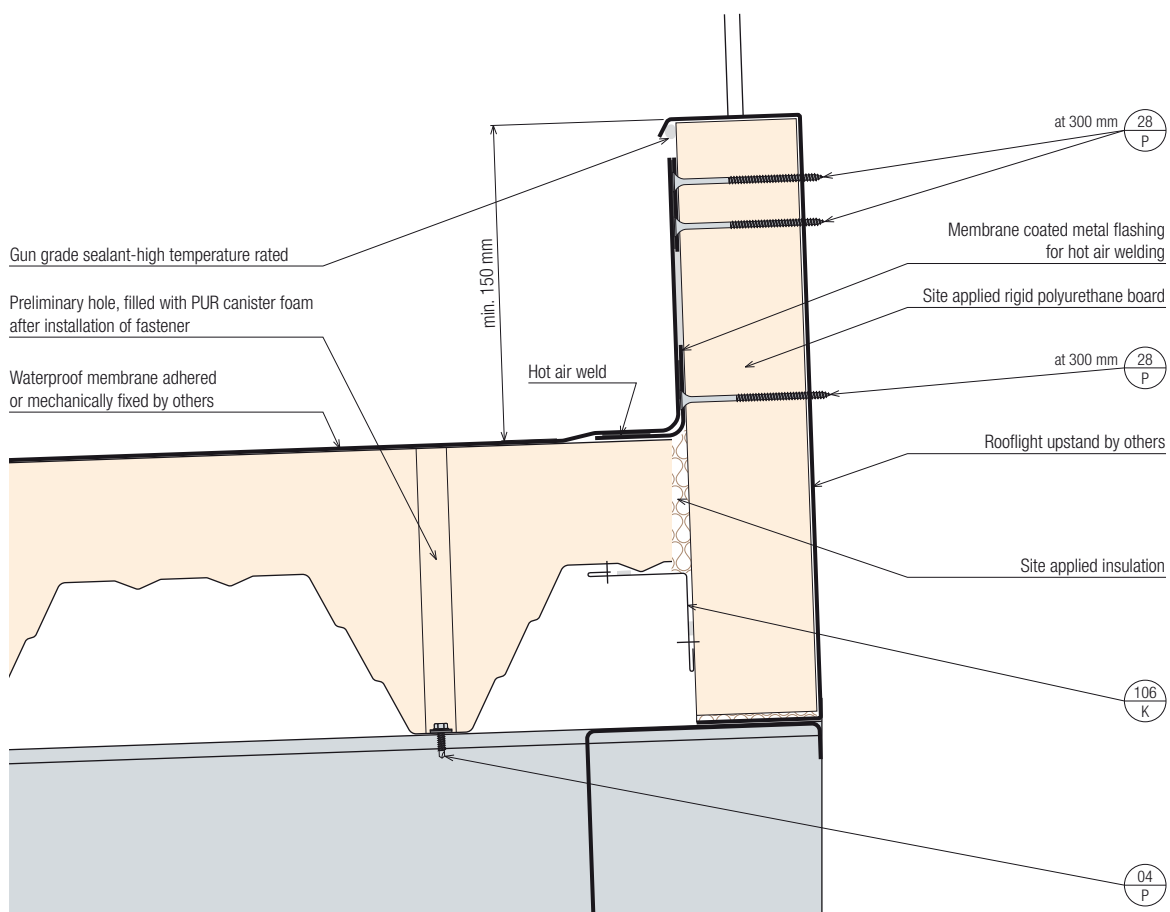
### Expansion Joint (X-DEK)



**Note:**

This joint allows up to 30 mm expansion.

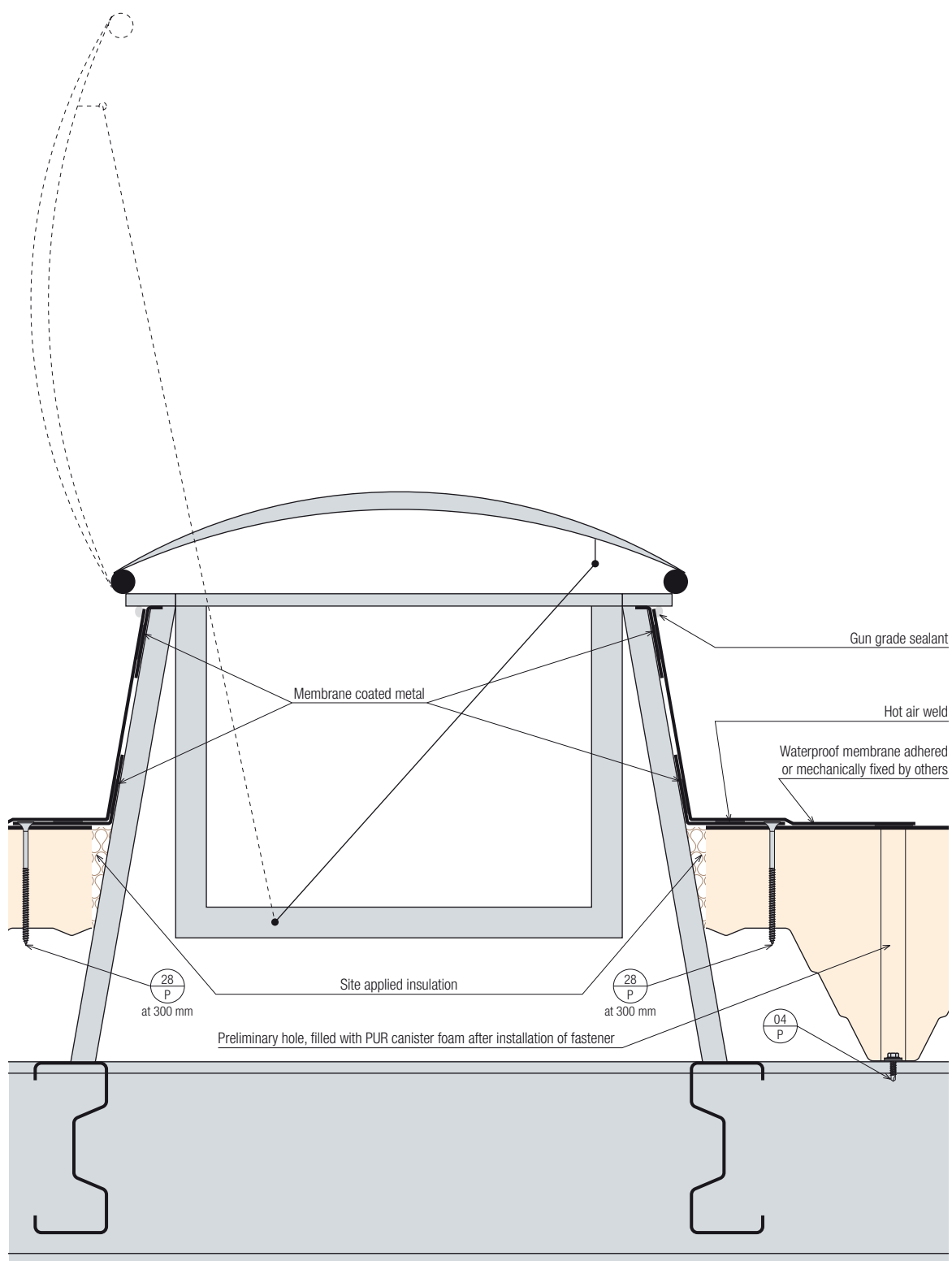
### Roof/ Skylight – Pyramid / Dome Type – Ridge (X-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

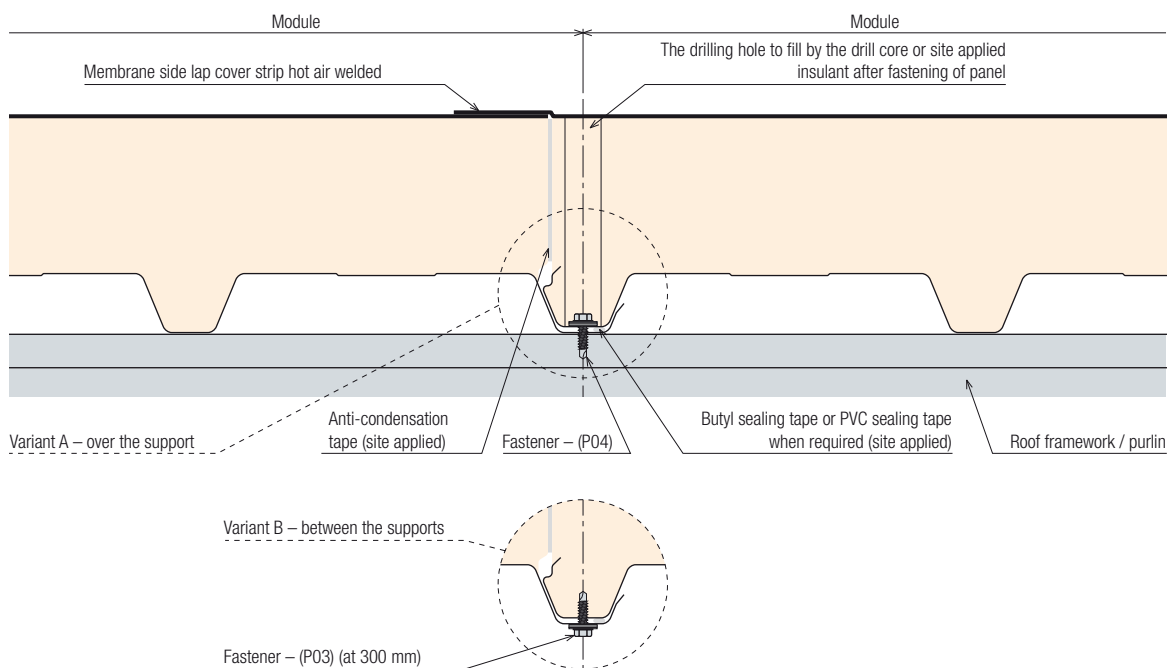
### Smoke Vent (X-DEK)



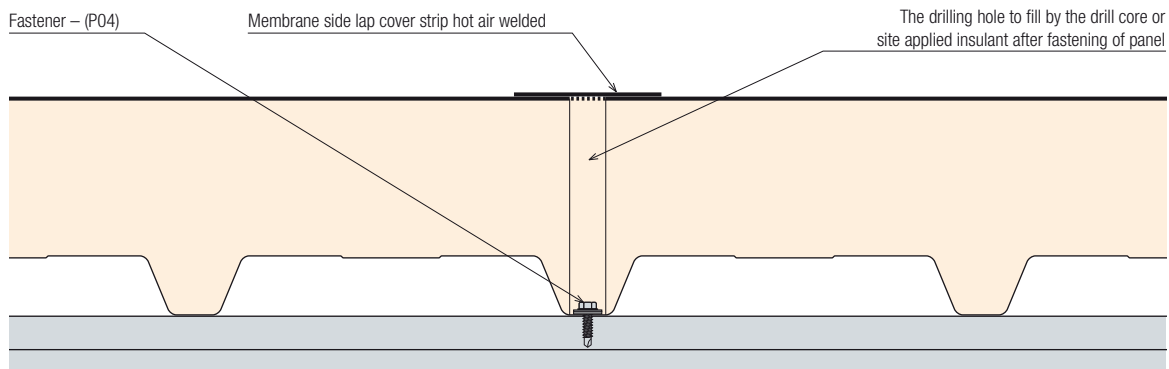
All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

### Panel Side Lap (TOP-DEK)



### Intermediate Fixing (TOP-DEK)



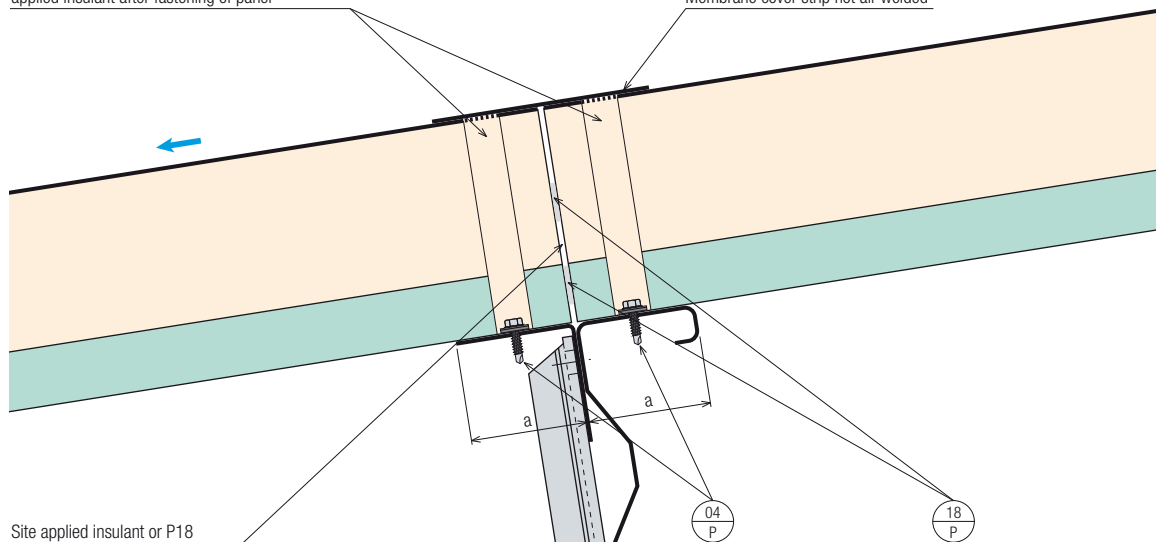
All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

### Panel End Lap (TOP-DEK)

The drilling hole to fill by the drill core or site applied insulant after fastening of panel

Membrane cover strip hot air welded

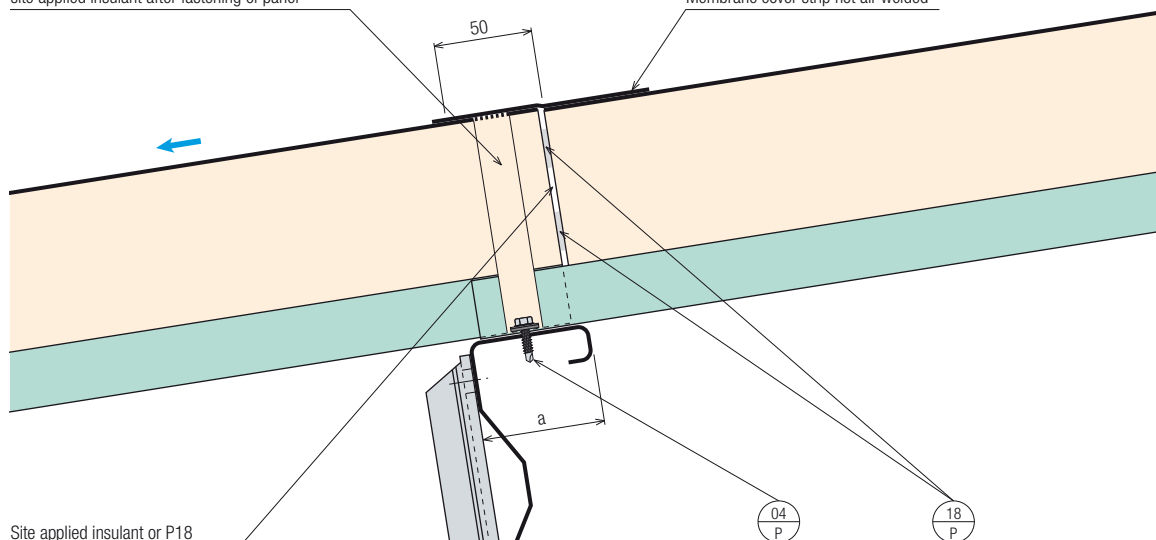


Site applied insulant or P18

### Panel End Lap (TOP-DEK)

The drilling hole to fill by the drill core or site applied insulant after fastening of panel

Membrane cover strip hot air welded



Site applied insulant or P18

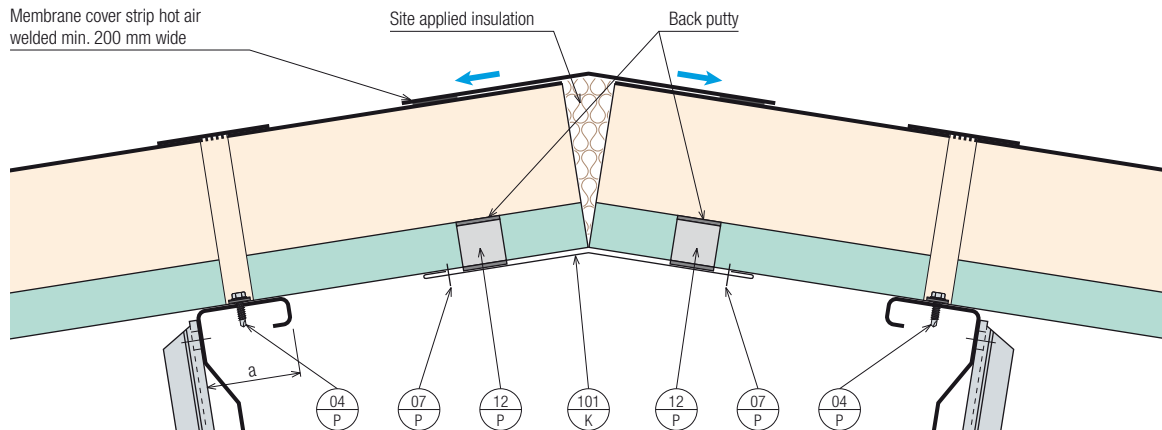
#### Note:

**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Flat Roof Panels

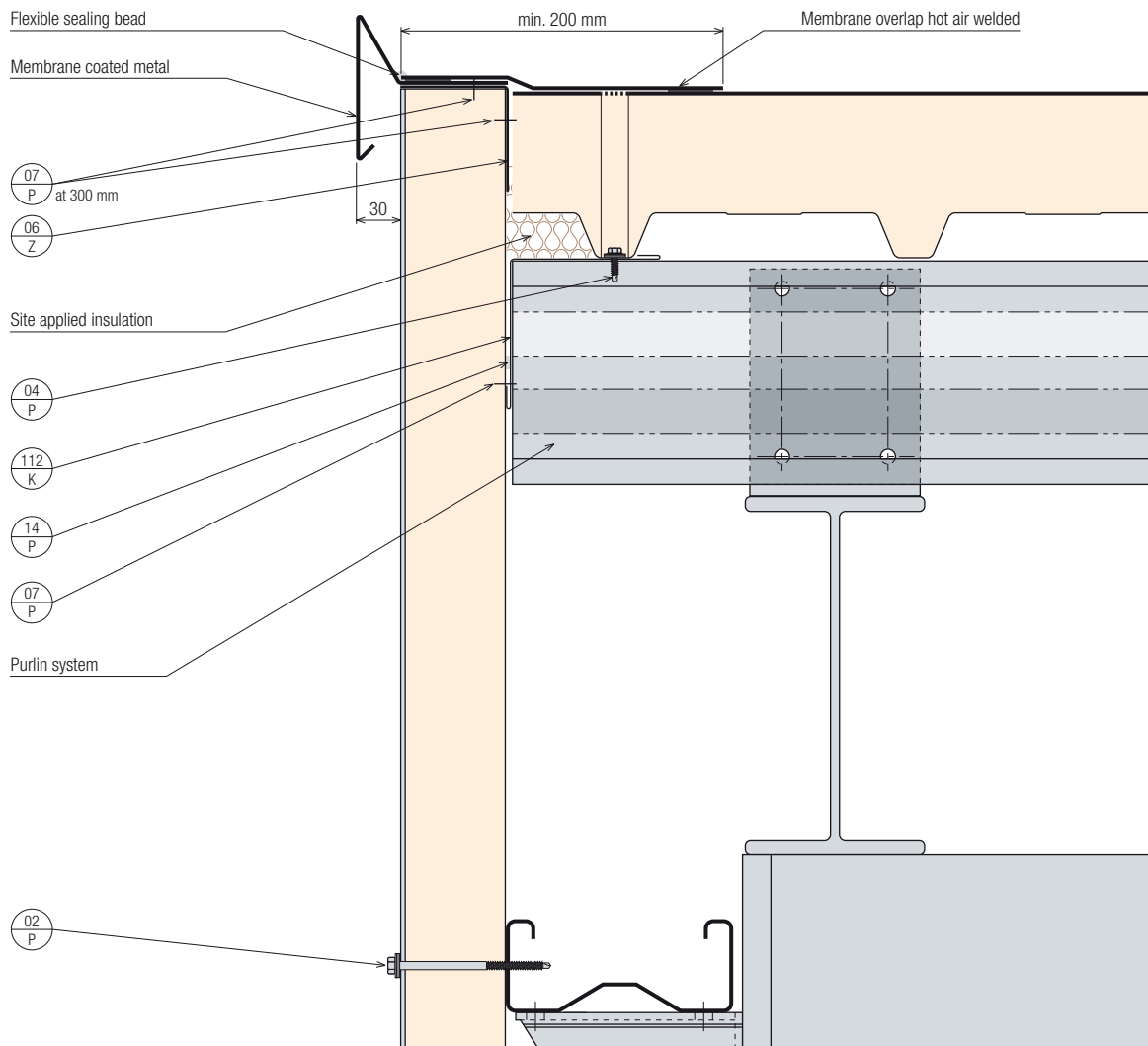
### Ridge (TOP-DEK)



**Note:**

**a** according to structural/static requirements

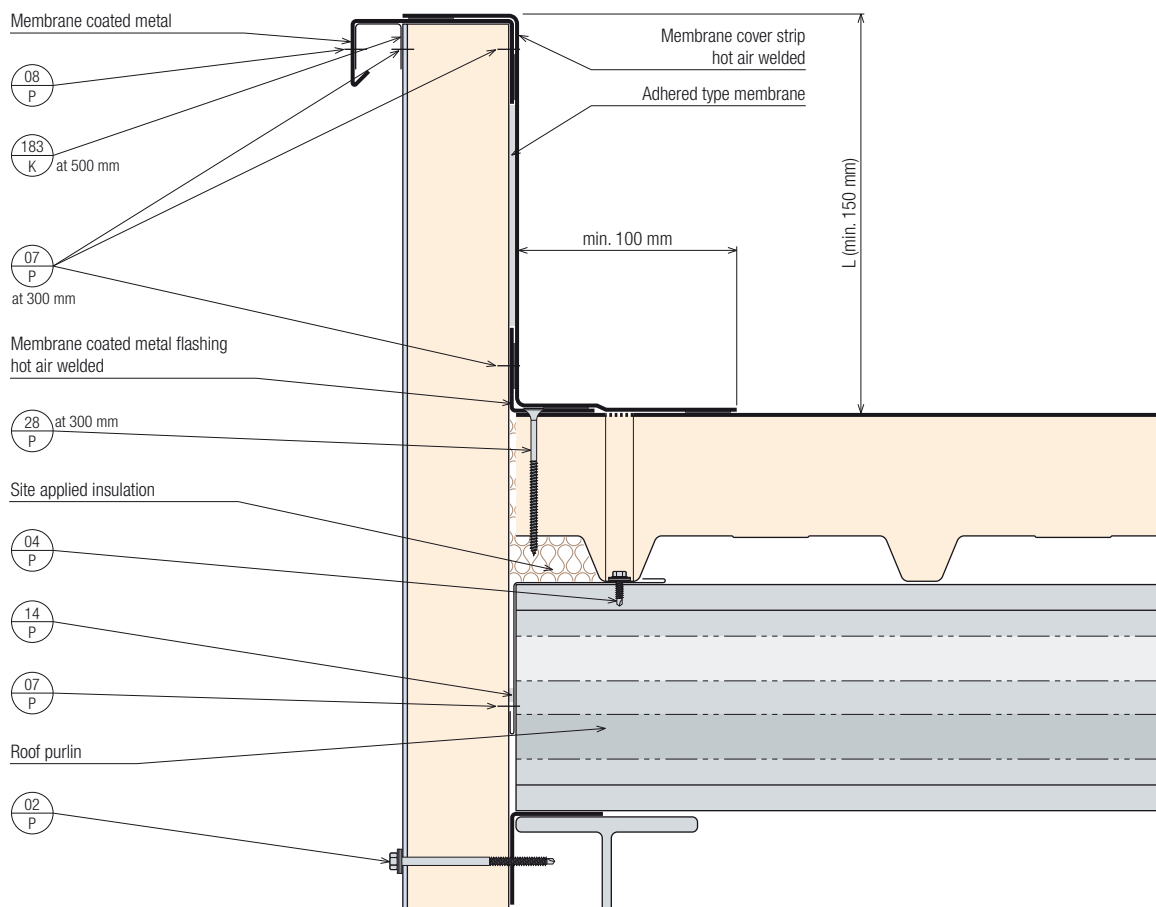
### Gable (TOP-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

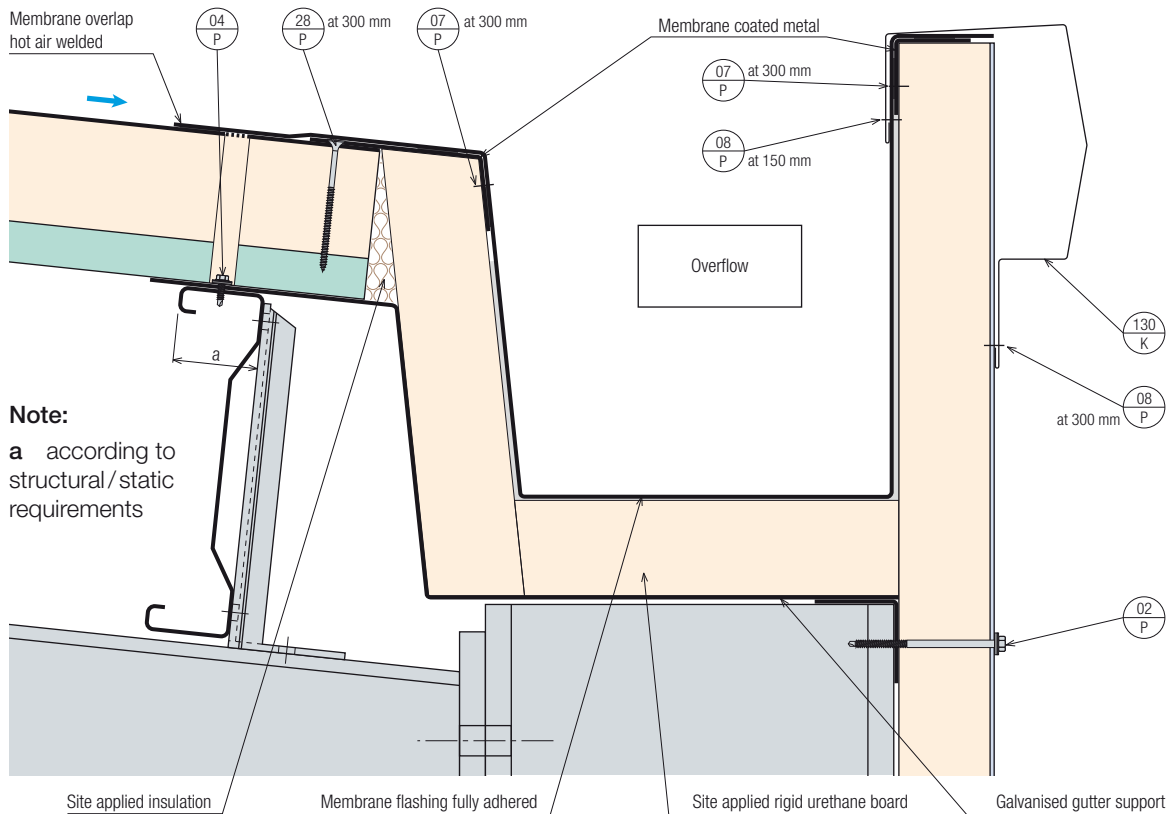
### Gable Wall Parapet (TOP-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

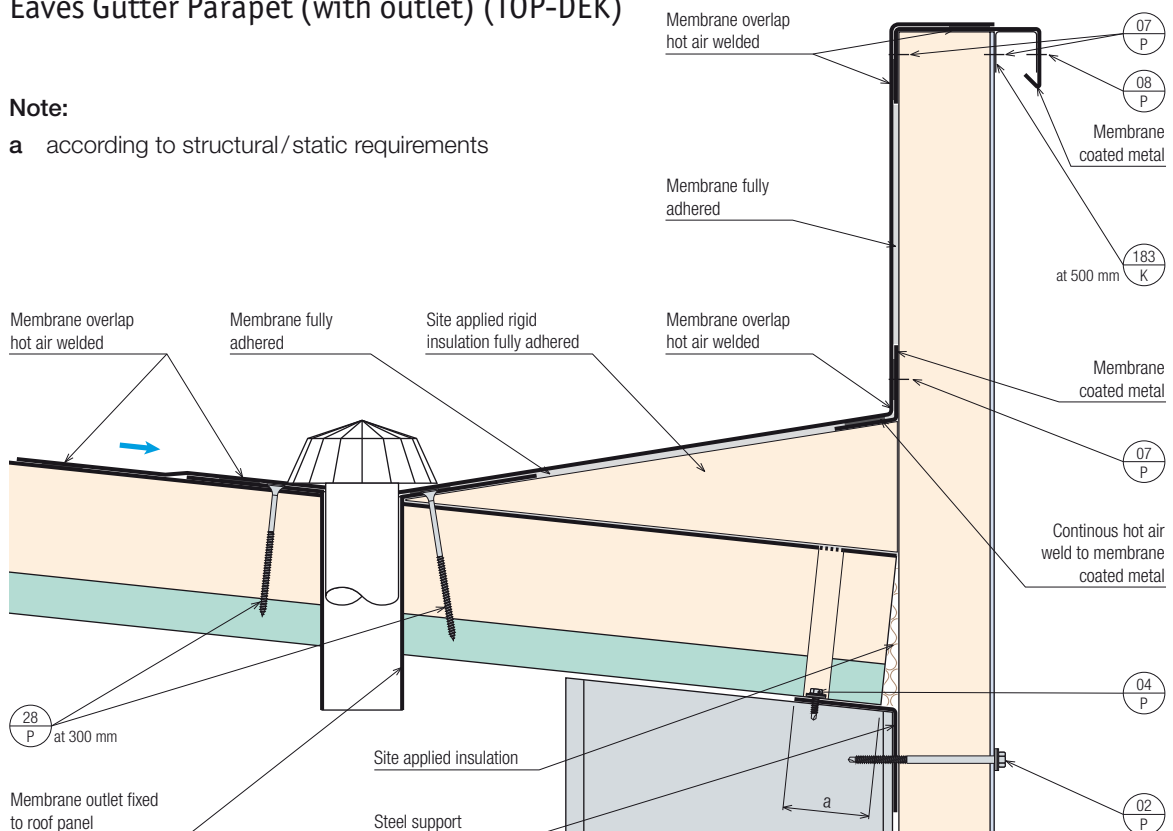
### Eaves Gutter Parapet (TOP-DEK)



### Eaves Gutter Parapet (with outlet) (TOP-DEK)

**Note:**

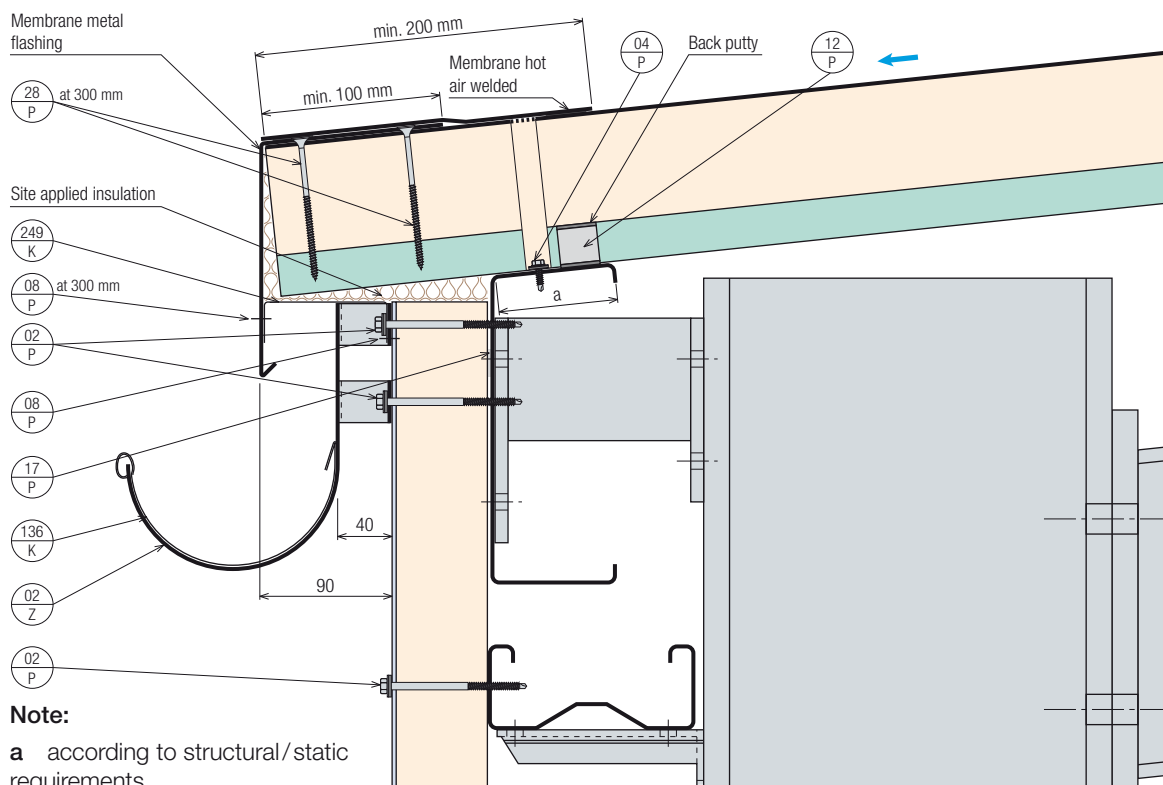
a according to structural/static requirements



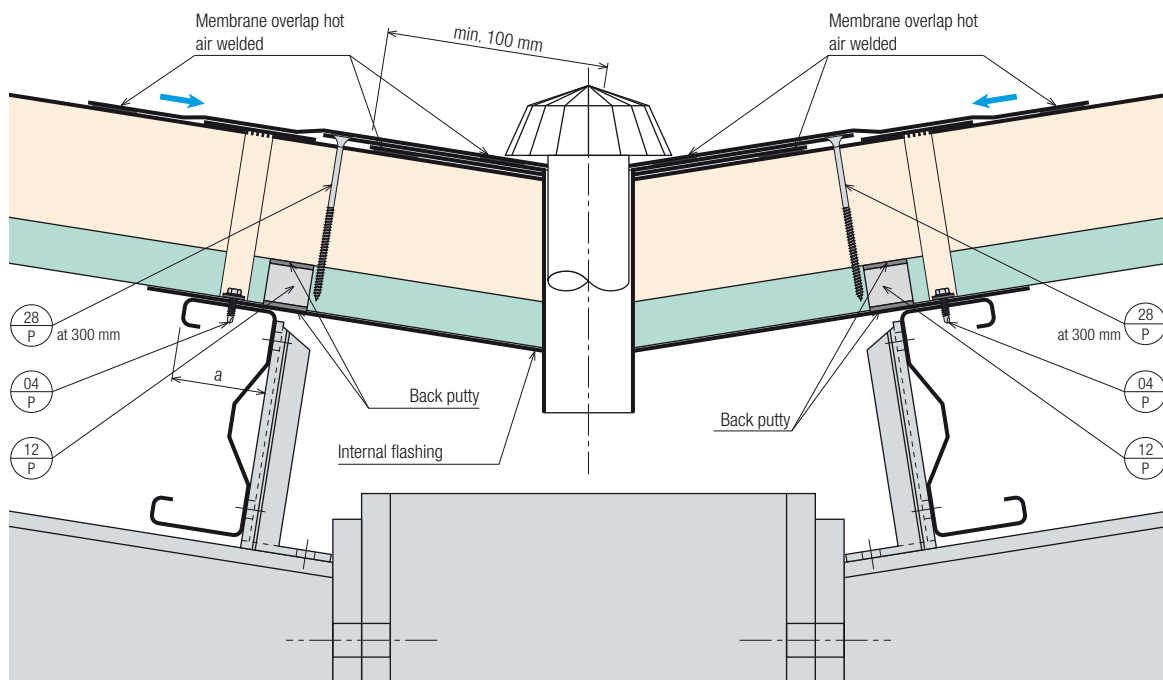
All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

### External Gutter (TOP-DEK)



### Valley Gutter (TOP-DEK)



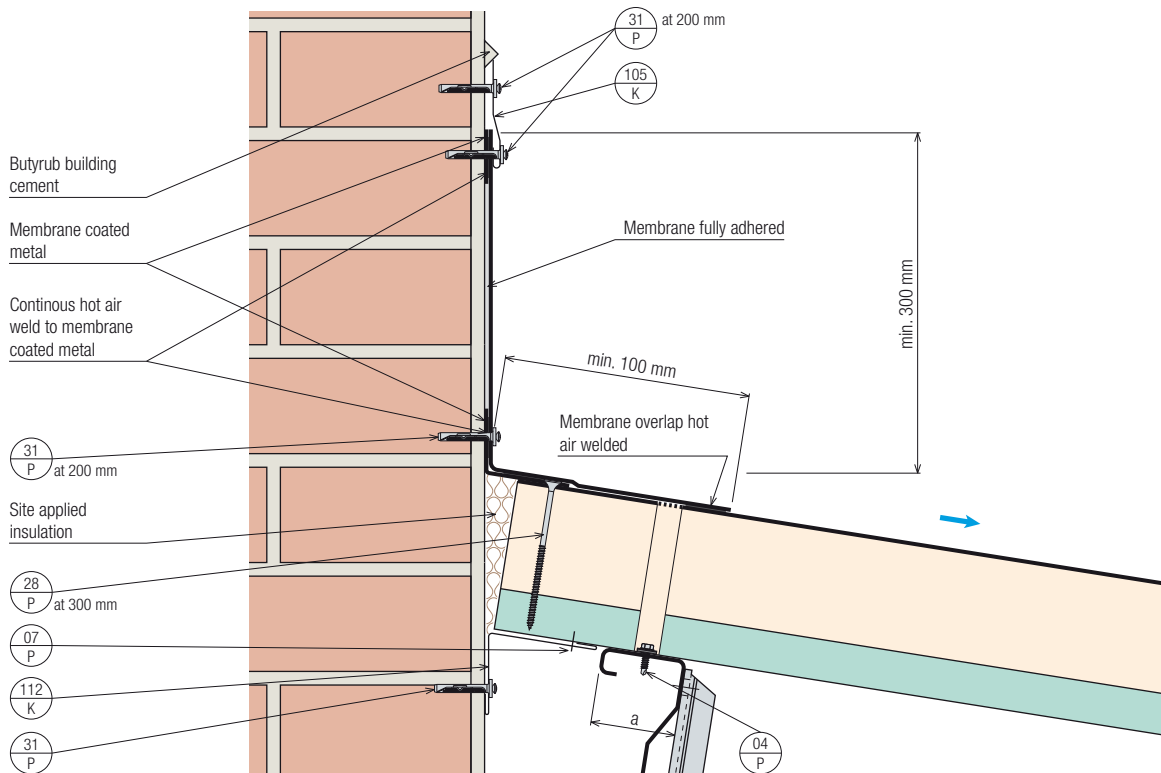
**Note:**

a according to structural/static requirements

All technical information is subject to alterations. Errors and omissions excepted.

## Flat Roof Panels

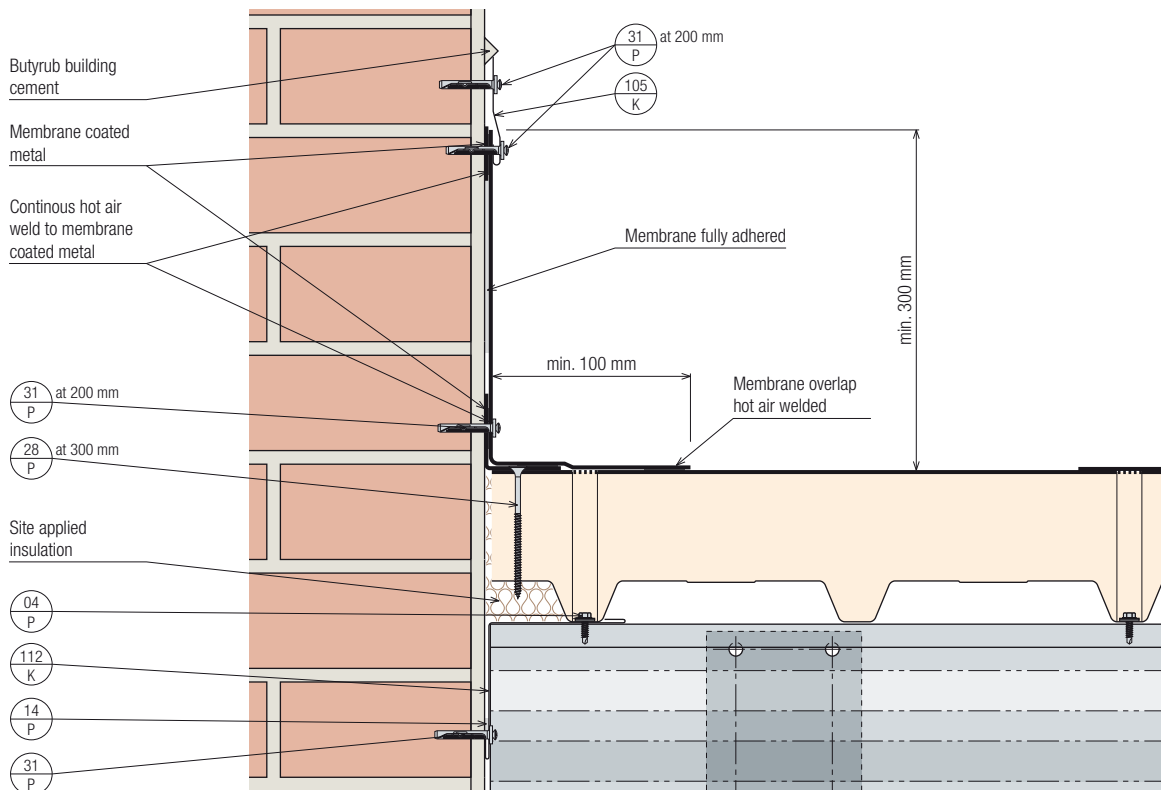
### Roof to Brickwork Junction (TOP-DEK)



**Note:**

a according to structural/static requirements

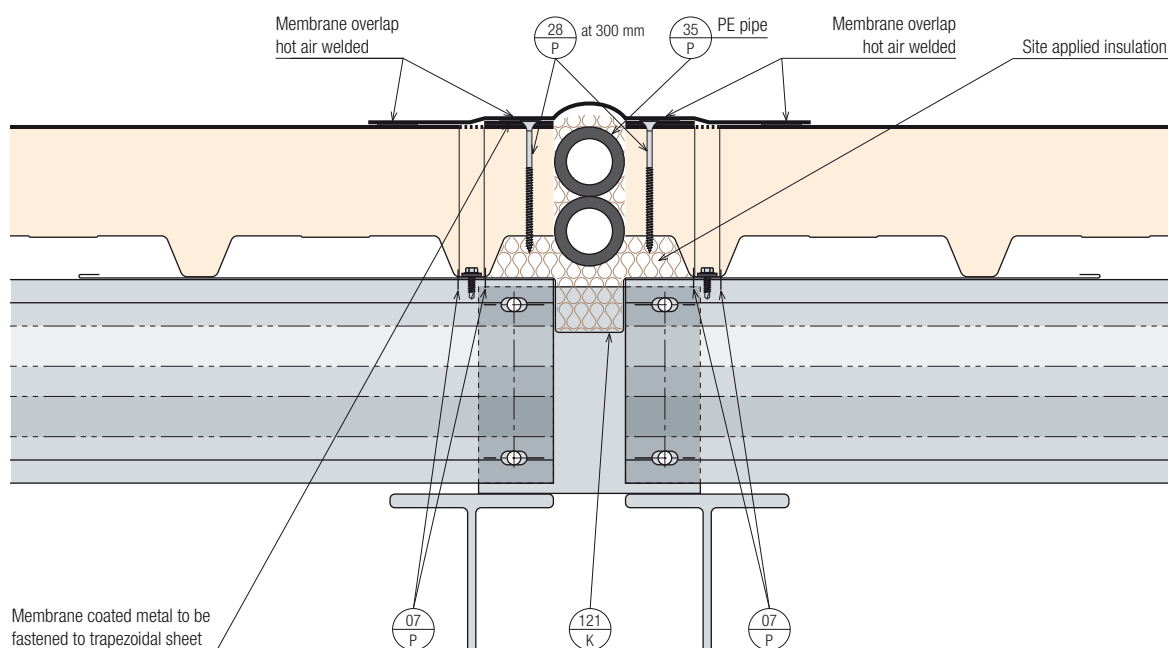
### Roof to Brickwork Junction in Slope (TOP-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

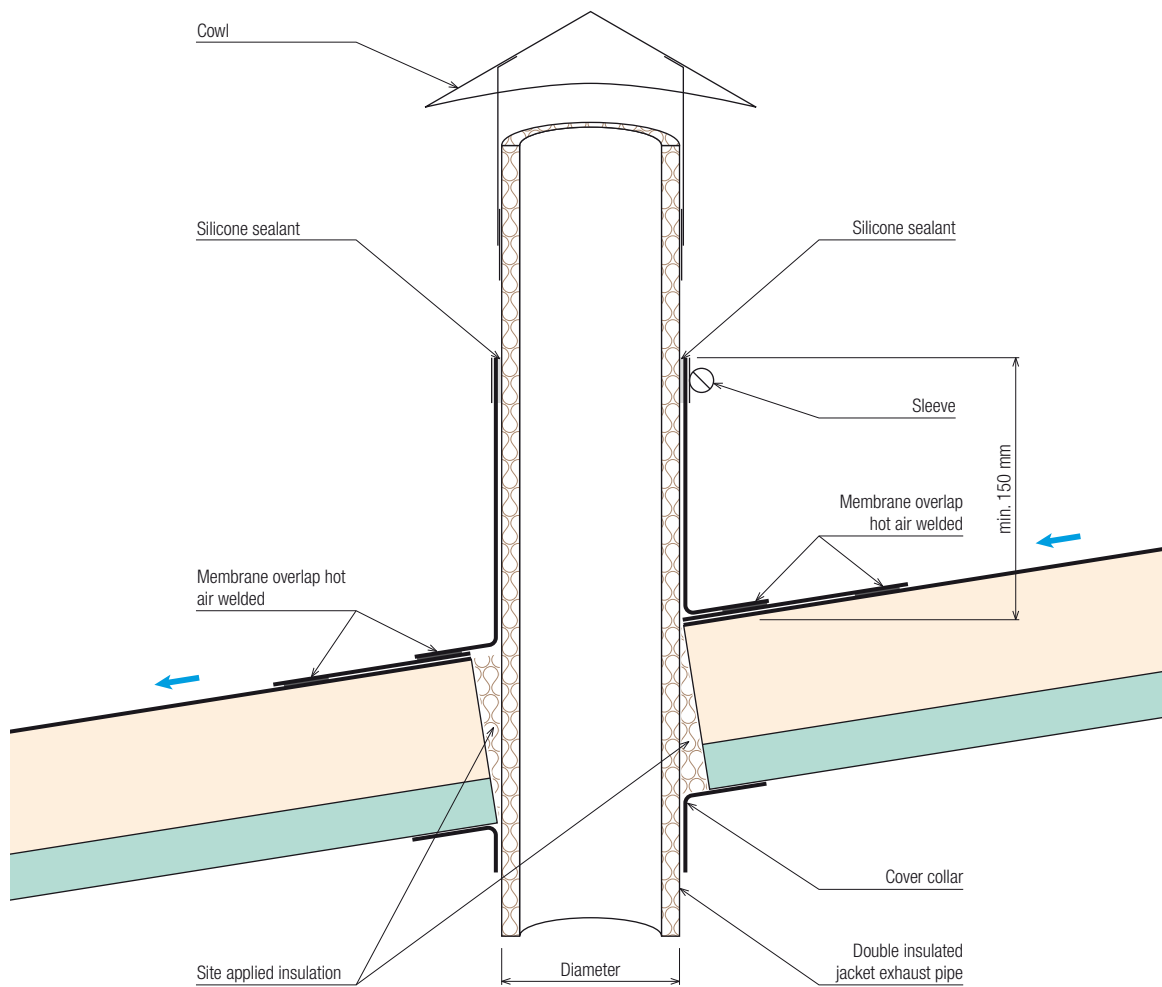
## Flat Roof Panels

### Expansion Joint (TOP-DEK)



## Flat Roof Panels

### Roof Penetration Extractor Flue (TOP-DEK)



All technical information is subject to alterations. Errors and omissions excepted.

### Roof/ Skylight – Pyramid/ Dome Type – Ridge (TOP-DEK)



This technical cross-section diagram illustrates the waterproofing details for a roof-to-wall junction. The diagram shows a horizontal roof slab on the left and a vertical wall on the right. The roof slab is supported by a series of trapezoidal ribs. A waterproofing membrane is applied to the top surface of the roof slab, extending up the wall. The membrane is shown with a 'Membrane overlap hot air welded' joint. A 'Neutral silicone sealant' is applied to the top edge of the membrane where it meets the wall. The wall is constructed of 'Site applied rigid urethane board' and is supported by a 'Roof / skylight support'. A 'Continuous hot air weld to membrane coated metal' is shown at the base of the wall. The diagram includes several dimension lines and labels: 'min. 150 mm' for the vertical height of the membrane overlap, 'min. 100 mm' for the horizontal distance from the wall to the end of the membrane overlap, and 'at 300 mm' for the spacing of the membrane overlap. The diagram also includes a legend with two entries: '28 P' and '04 P'.

at 300 mm 28 P

Membrane coated metal

Site applied rigid urethane board

Roof / skylight support

at 300 mm 28 P

Continuous hot air weld to membrane coated metal

Site applied insulation

at 300 mm 28 P

at 300 mm 04 P

Neutral silicone sealant

Membrane overlap hot air welded

Membrane fully adhered

Membrane overlap hot air welded

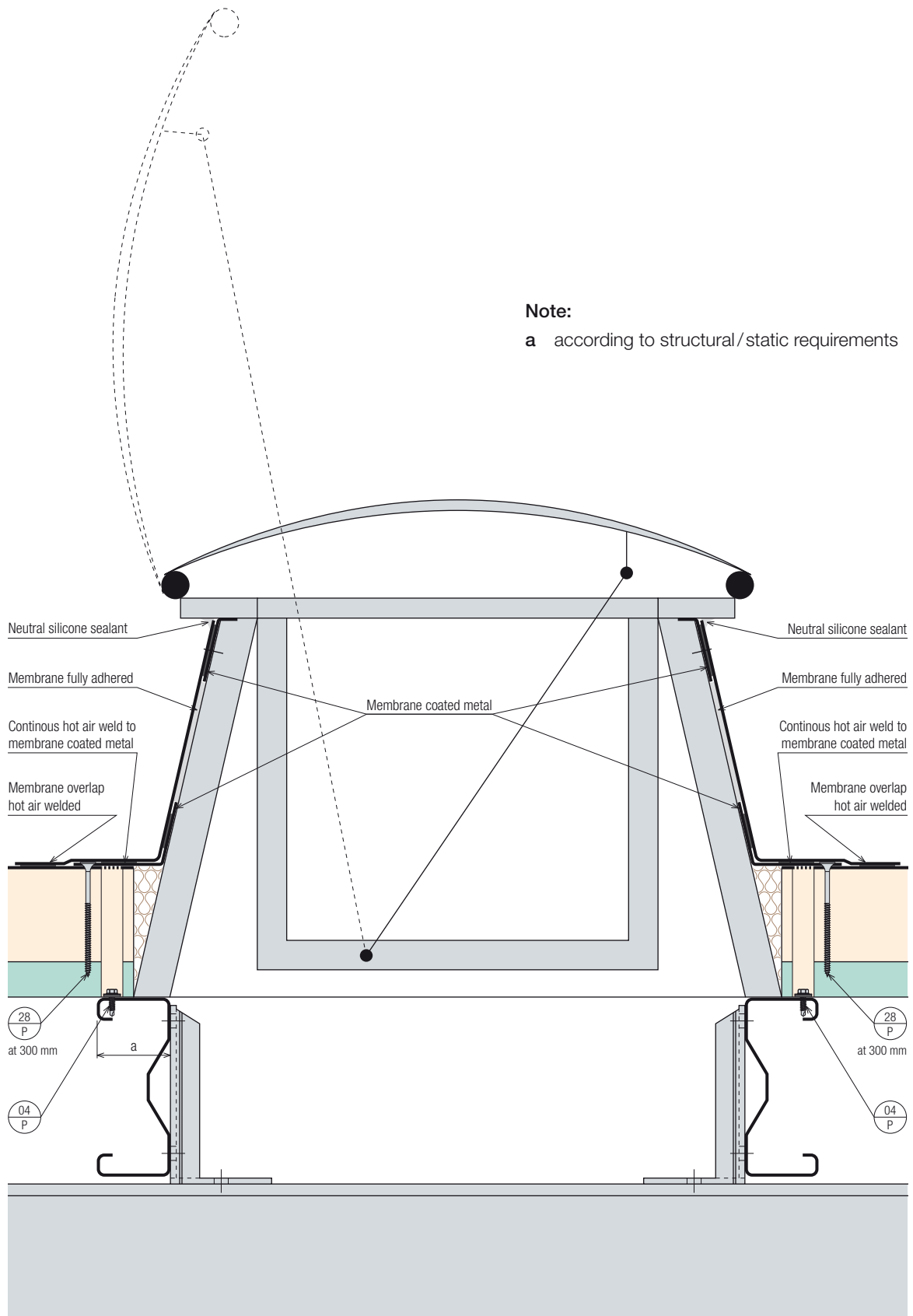
min. 100 mm

min. 150 mm

**7.2.38**

## Flat Roof Panels

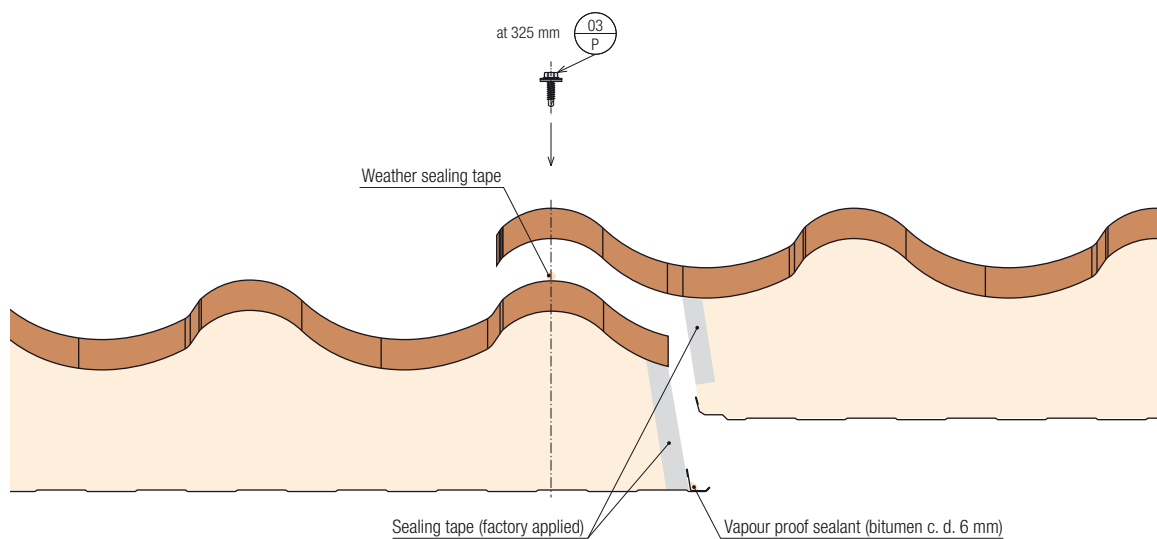
### Smoke Vent (TOP-DEK)



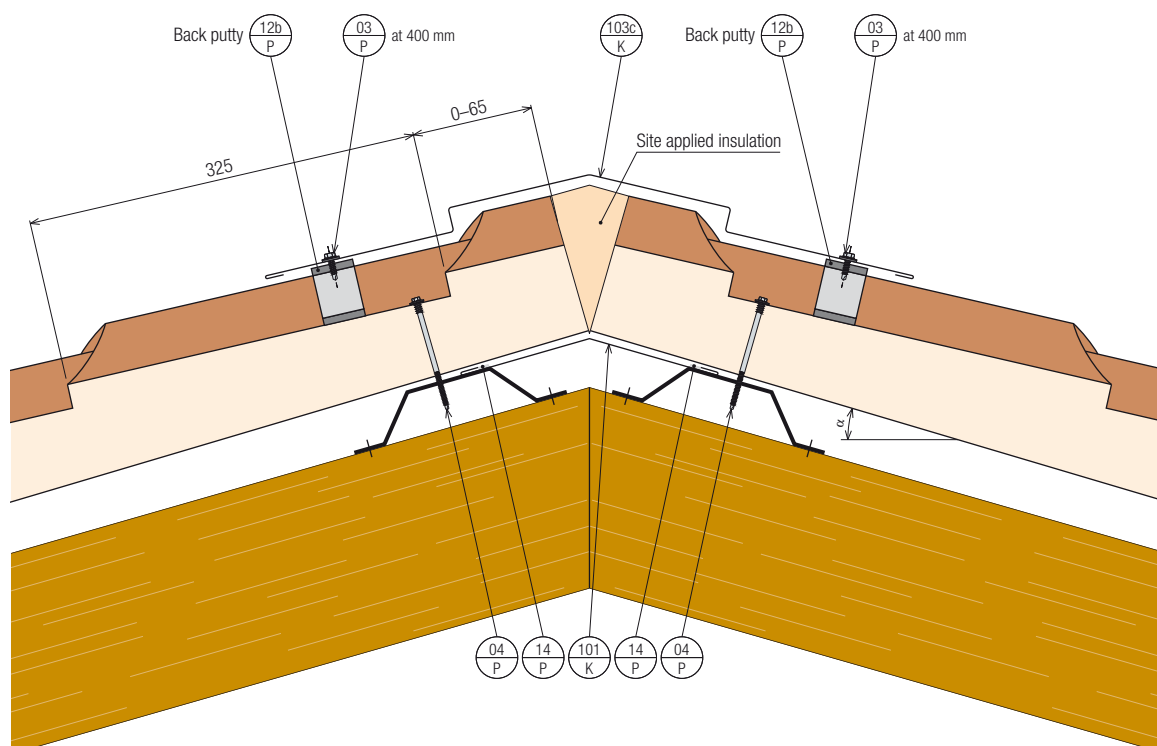
All technical information is subject to alterations. Errors and omissions excepted.

## Rooftile

### Panel Side Lap



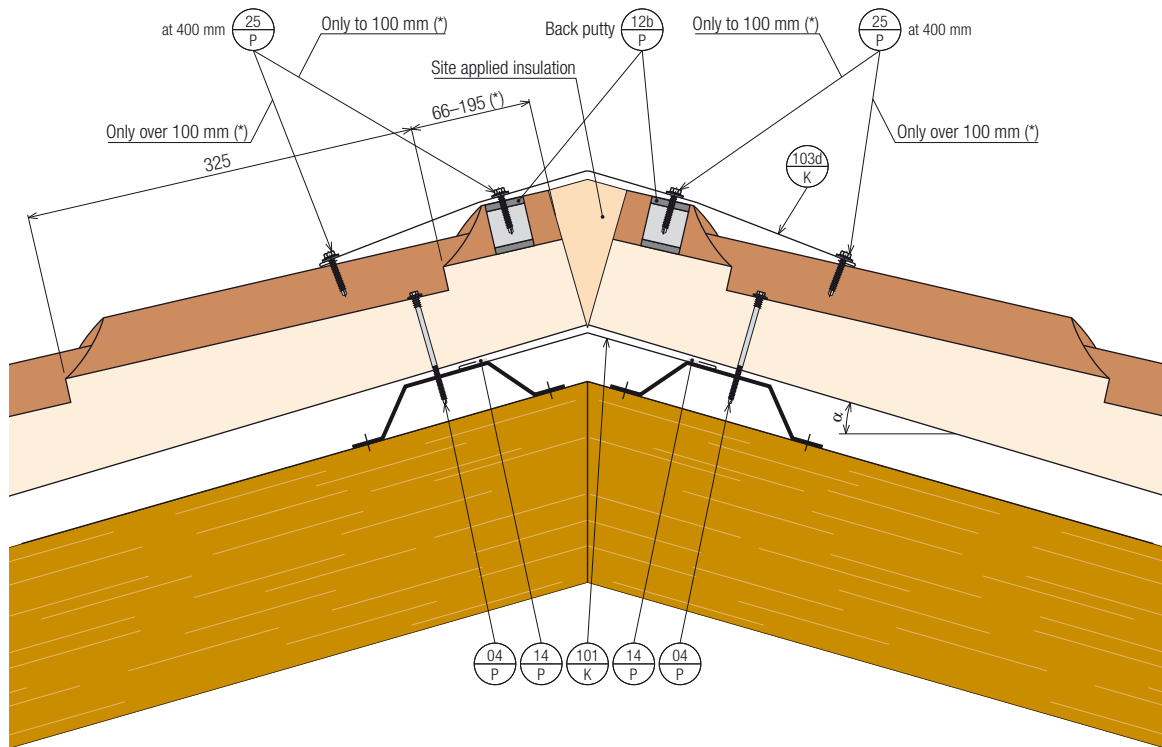
### Ridge



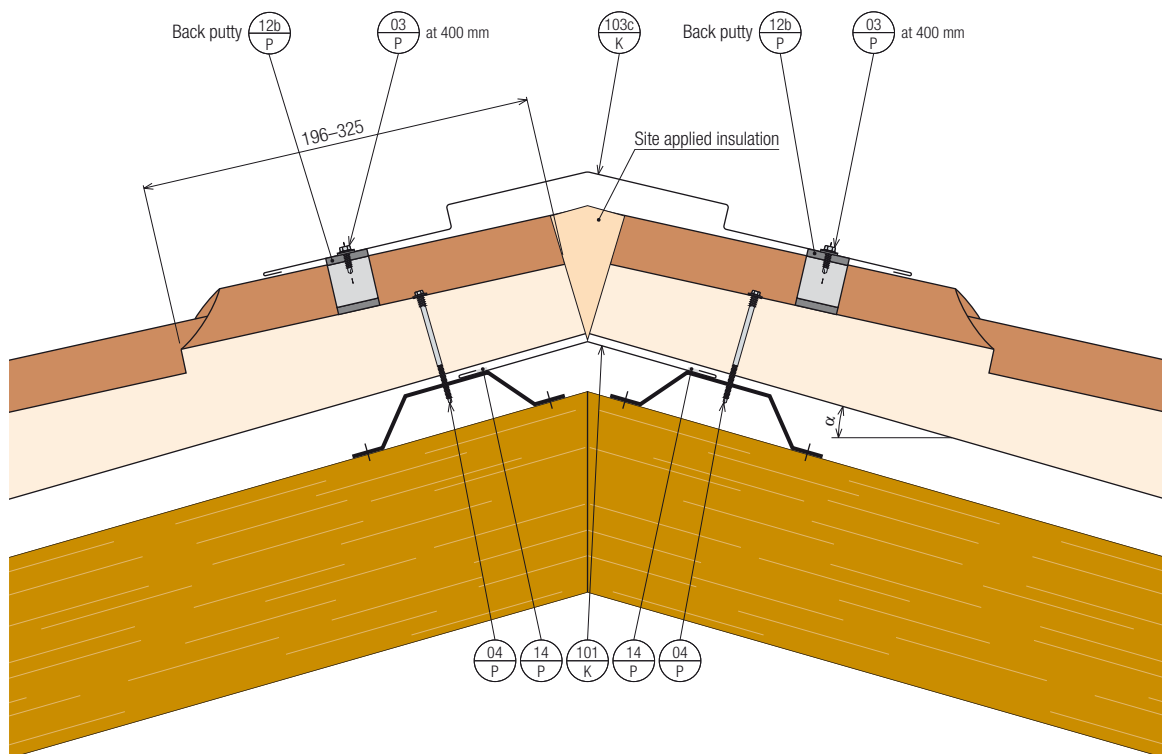
All technical information is subject to alterations. Errors and omissions excepted.

## Rooftile

### Ridge



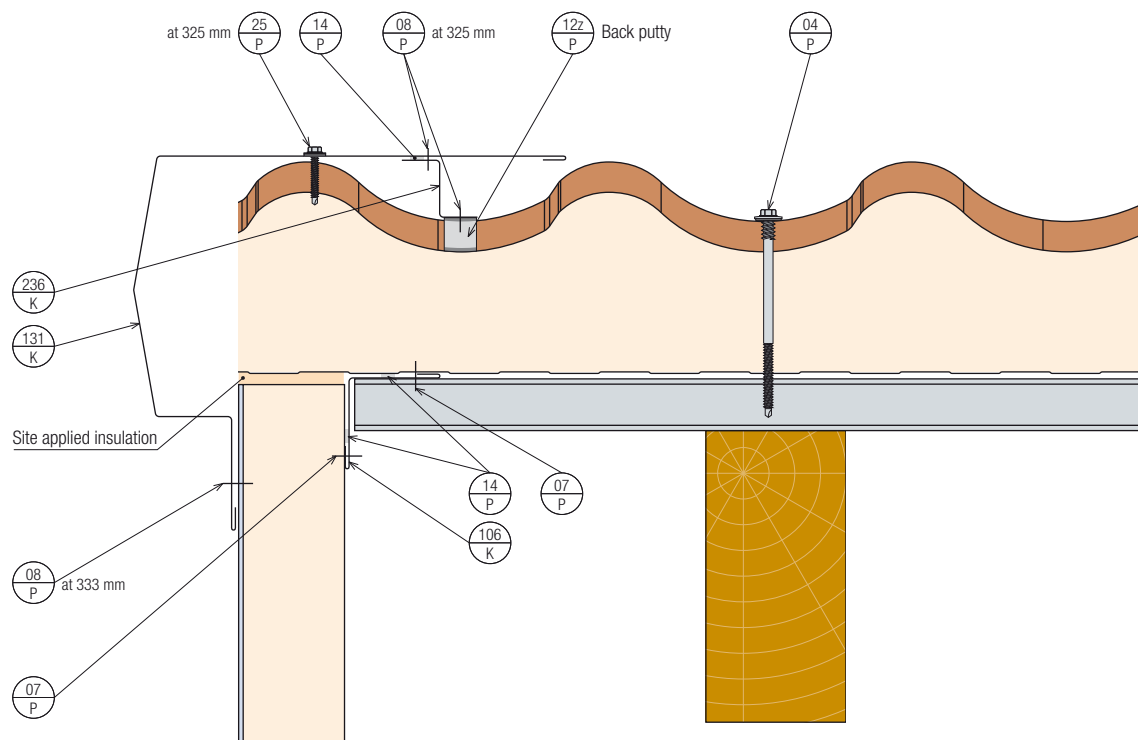
### Ridge



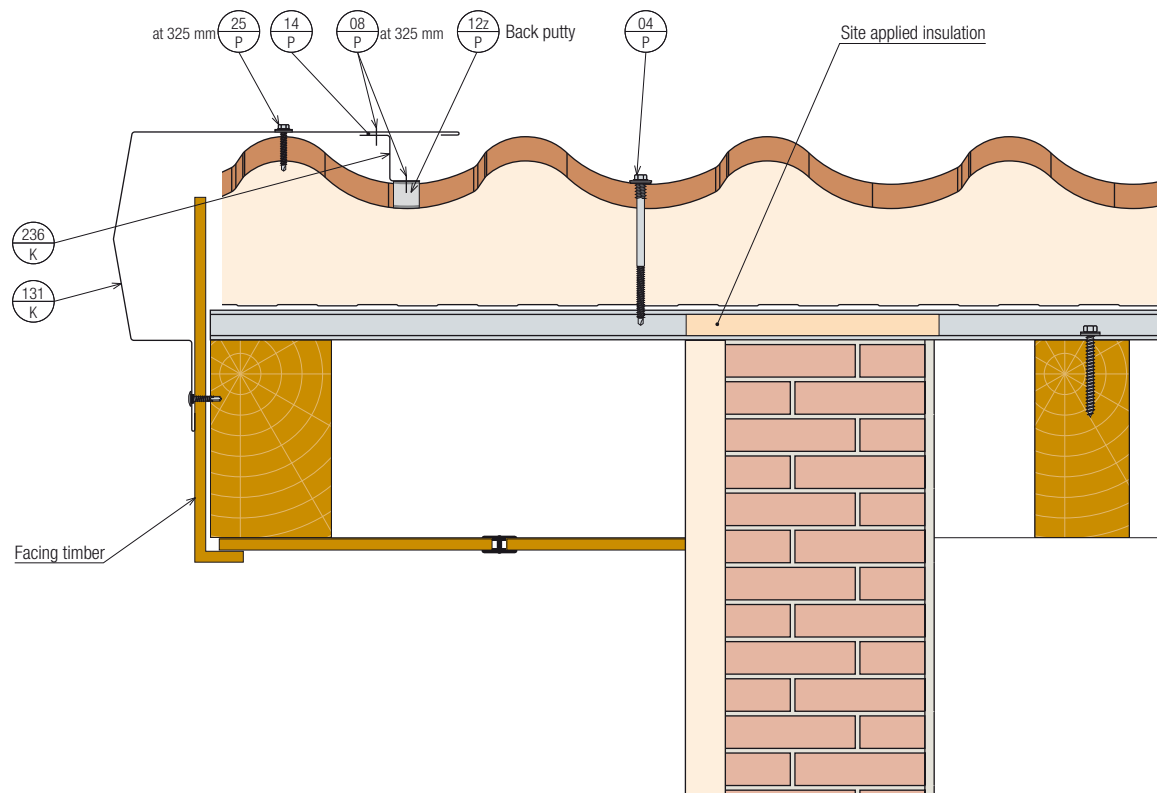
All technical information is subject to alterations. Errors and omissions excepted.

## Rooftile

### Gable



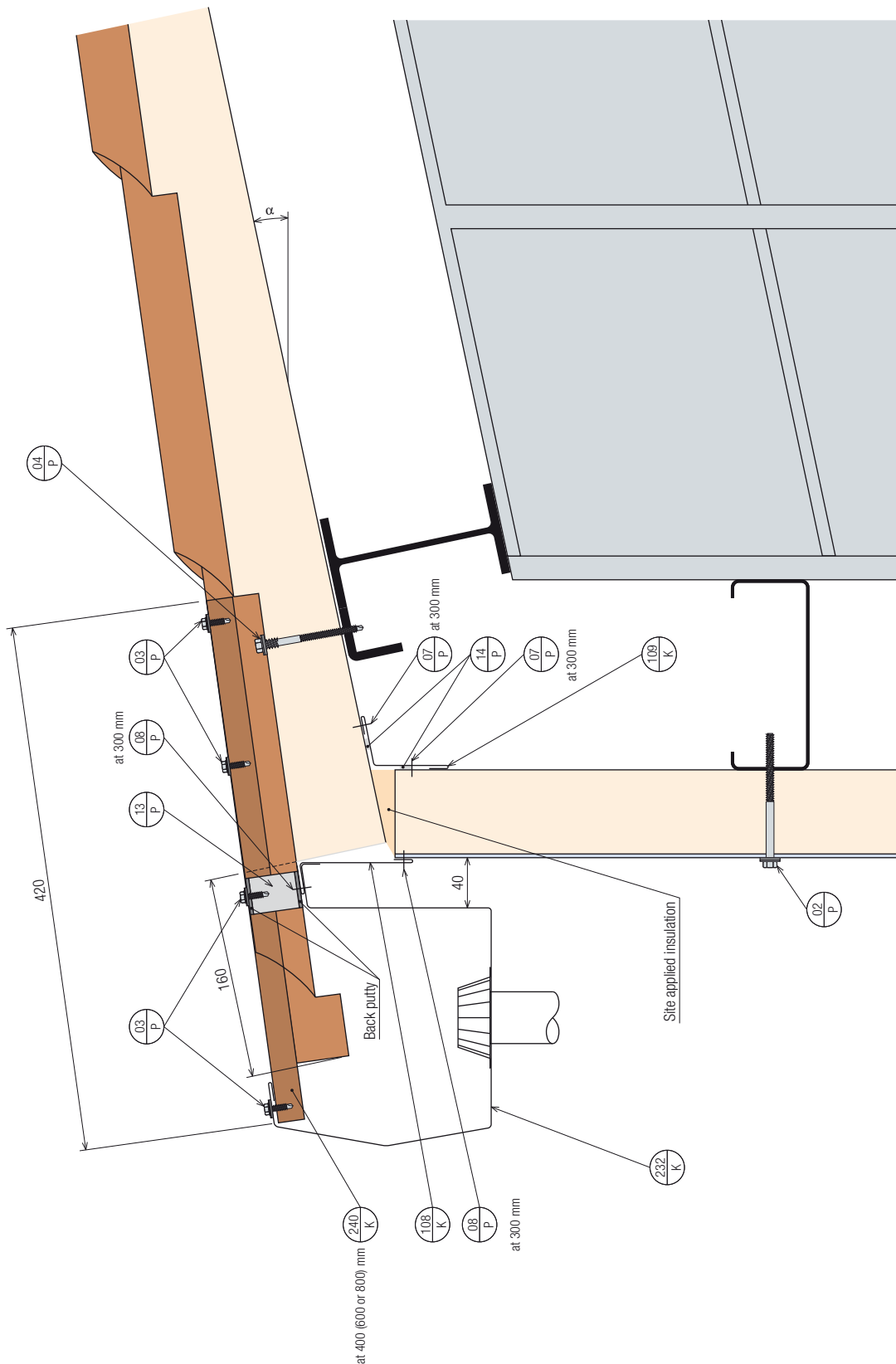
### Gable



All technical information is subject to alterations. Errors and omissions excepted.

## Rooftile

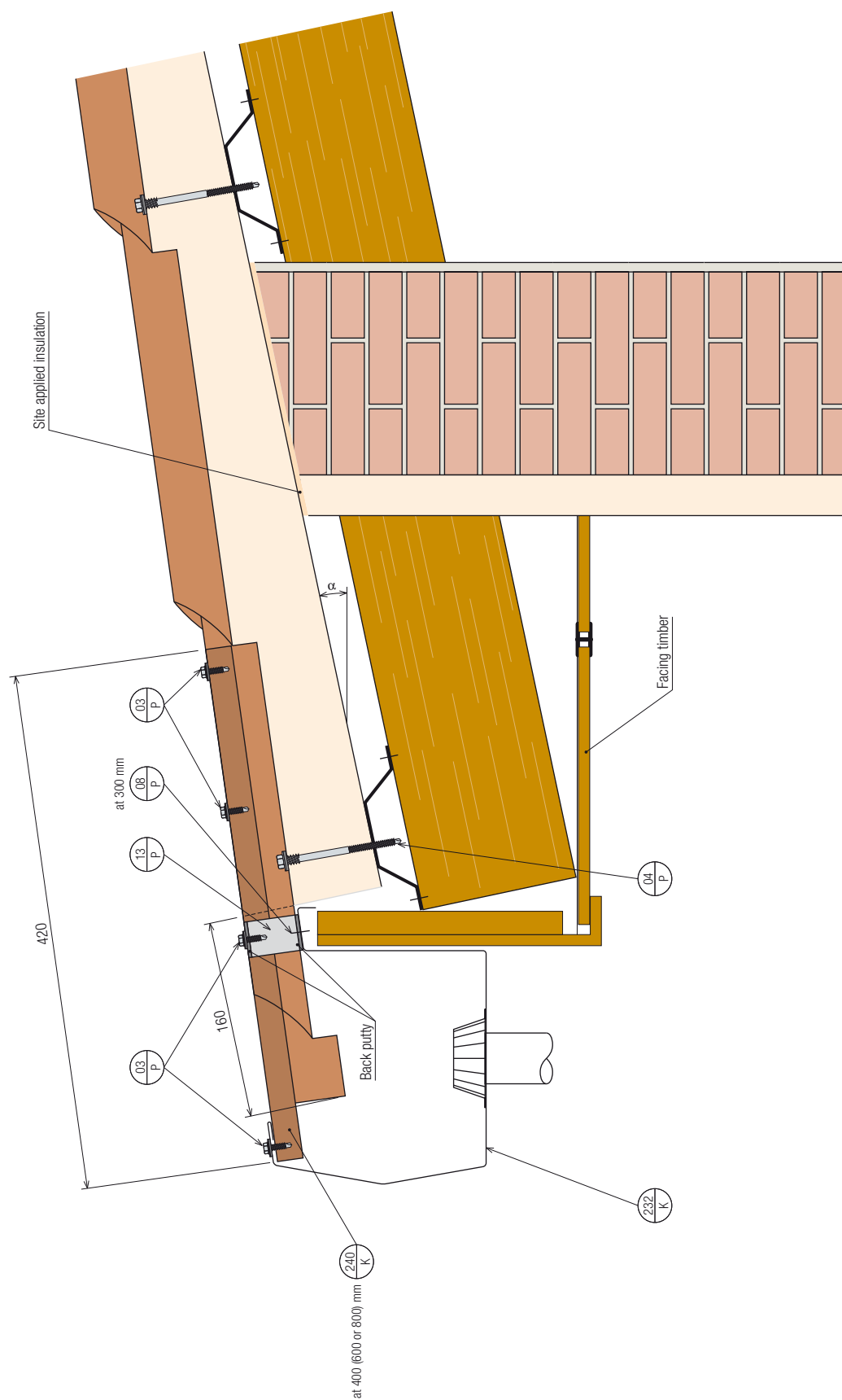
### External Gutter



All technical information is subject to alterations. Errors and omissions excepted.

## Rooftile

### External Gutter

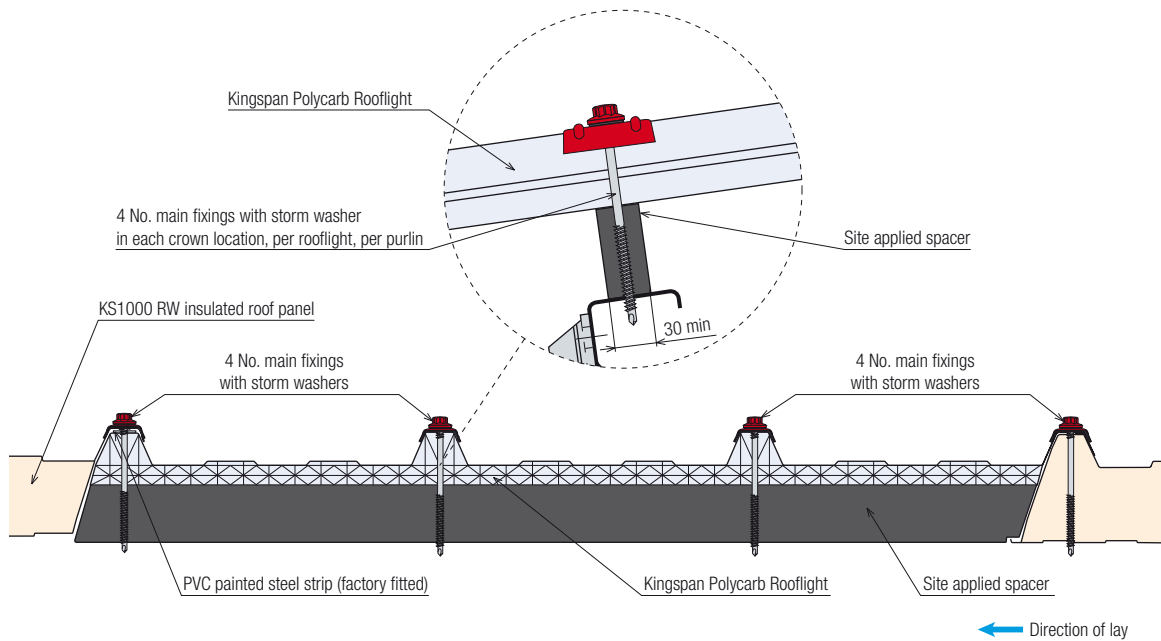


All technical information is subject to alterations. Errors and omissions excepted.

## Rooflights

### Side Lap (KS1000 PC)

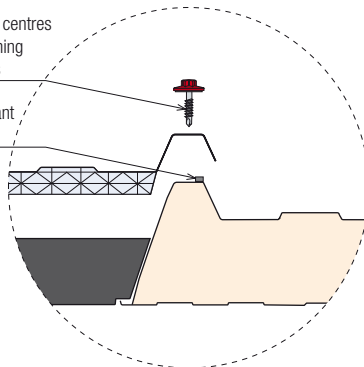
#### Primary and Side Lap Fasteners



#### Kingspan Polycarb Rooflight to Panel

Side lap stitched at 300 mm centres with 6.3 mm × 25 mm stitching screws with 19 mm washers

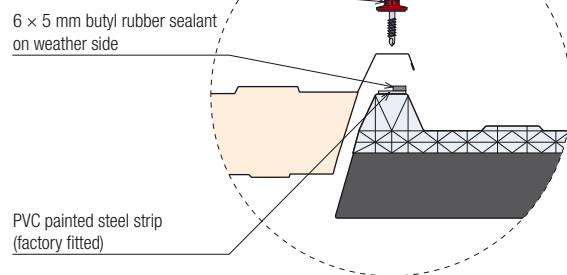
6 × 5 mm butyl rubber sealant on weather side



#### Panel to Kingspan Polycarb Rooflight

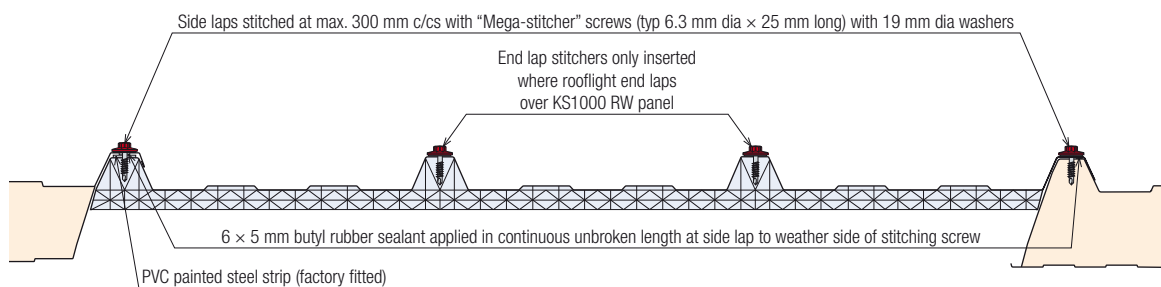
Side lap stitched at 300 mm centres with 6.3 mm × 25 mm stitching screws with 19 mm washers

6 × 5 mm butyl rubber sealant on weather side



### End Lap (KS1000 PC)

#### Tail Stitcher Locations

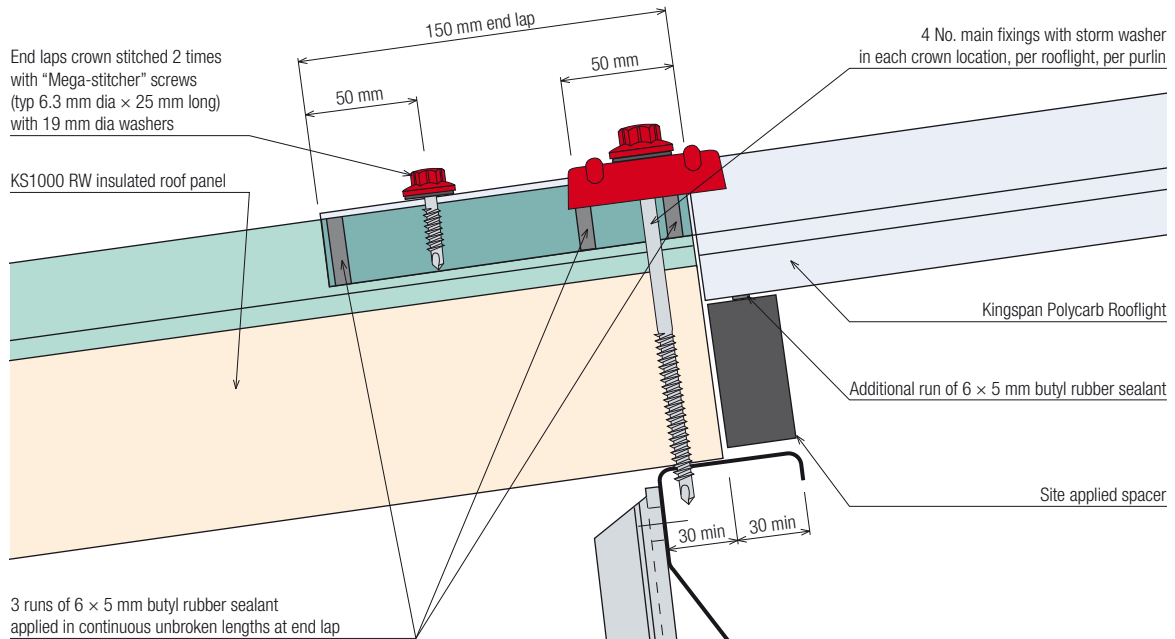


All technical information is subject to alterations. Errors and omissions excepted.

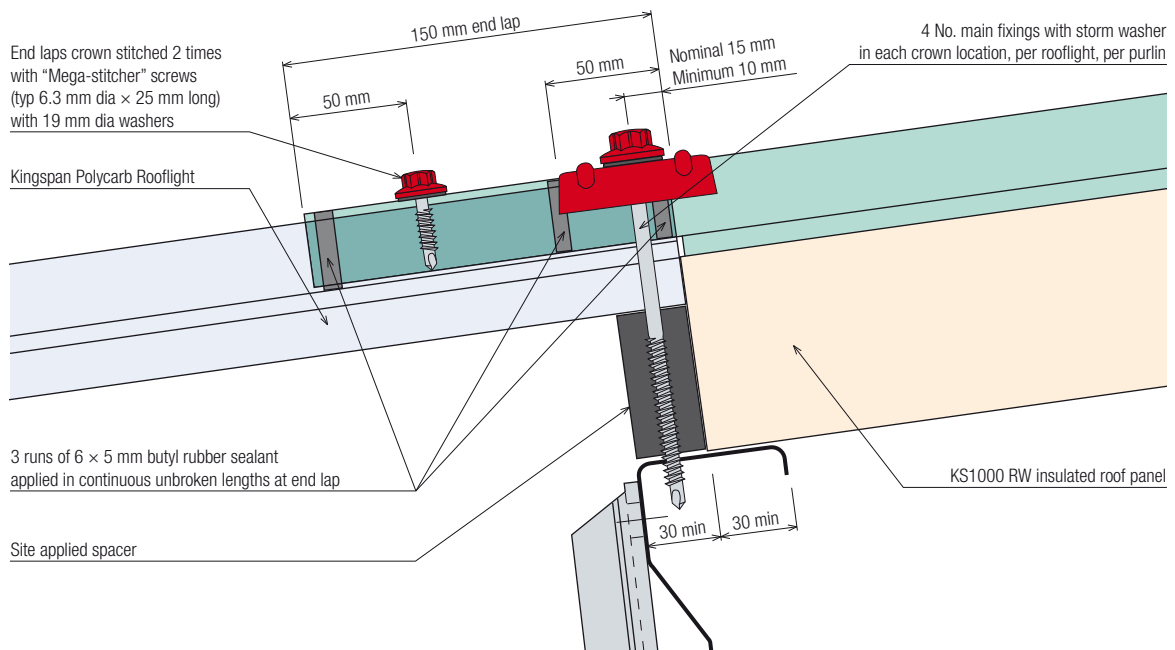
## Rooflights

### End Lap (KS1000 PC)

#### Kingspan Polycarb Rooflight to KS1000 RW



#### KS1000 RW to Kingspan Polycarb Rooflight

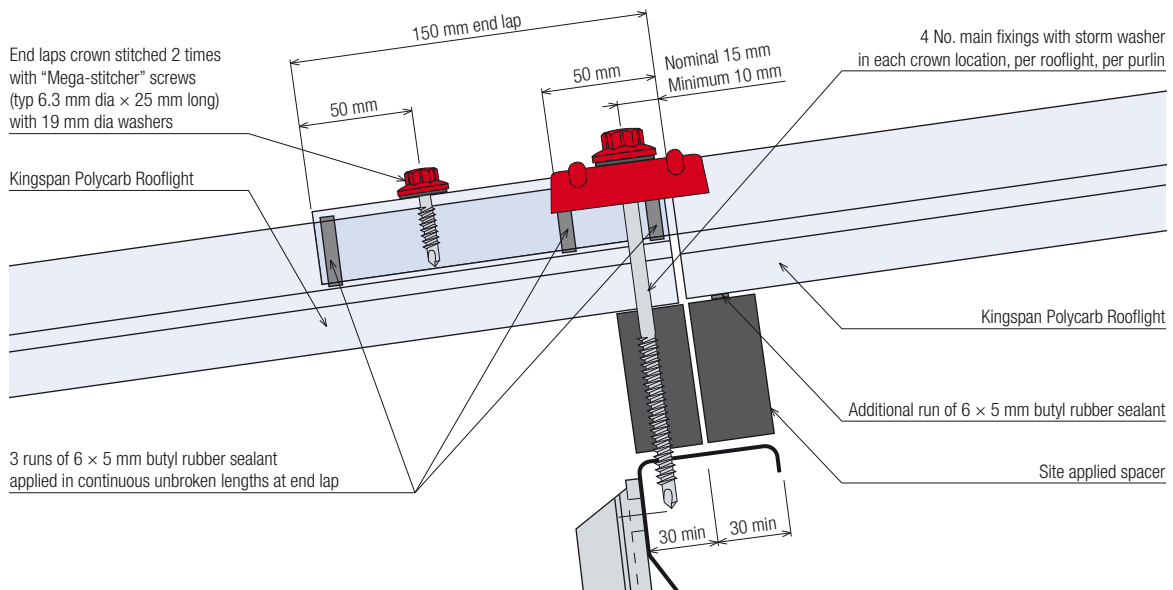


All technical information is subject to alterations. Errors and omissions excepted.

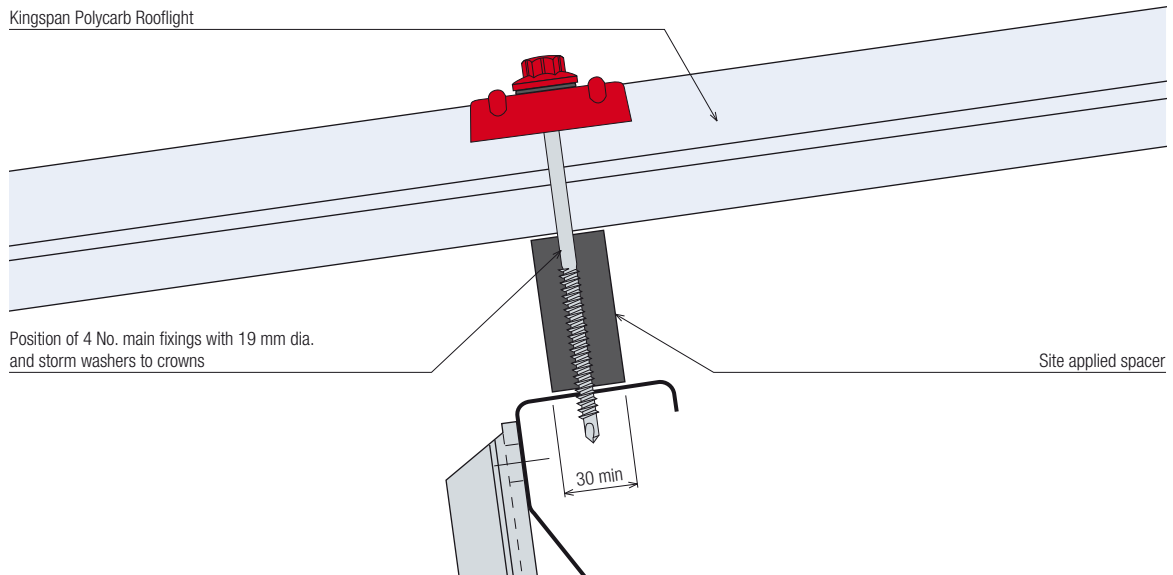
## Rooflights

### End Lap (KS1000 PC)

#### Kingspan Polycarb Rooflight to Kingspan Polycarb Rooflight



### Intermediate Purlin Fasteners (KS1000 PC)

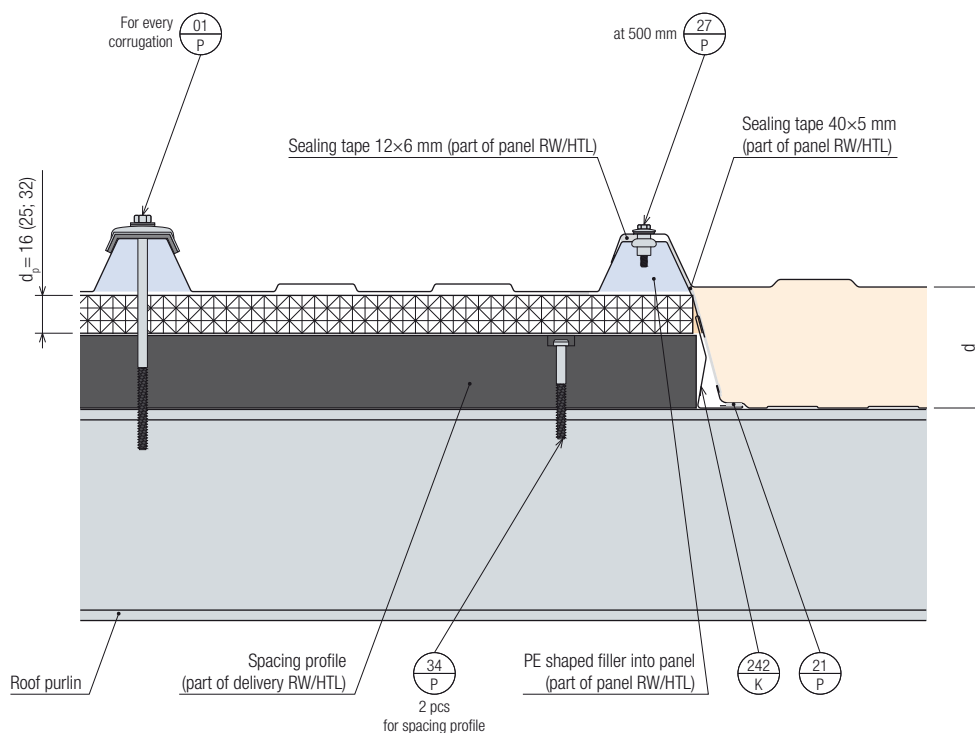


All technical information is subject to alterations. Errors and omissions excepted.

## Rooflights

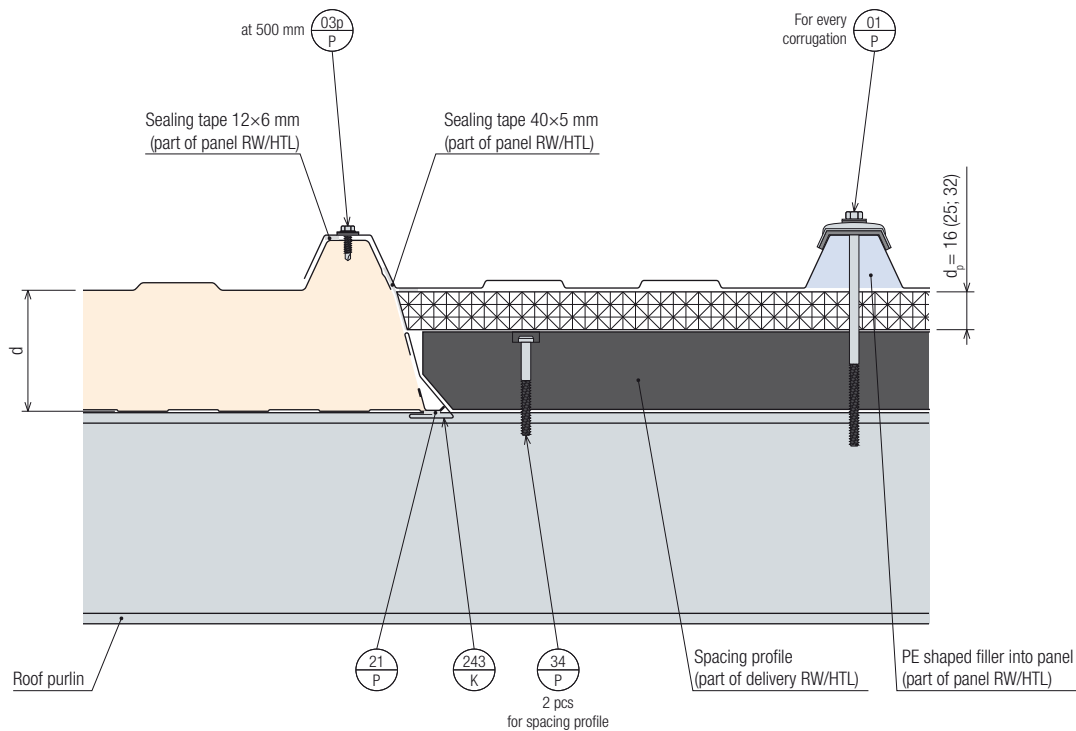
### Side Lap (KS1000 RW/HTL)

RW/HTL–RW



### Side Lap (KS1000 RW/HTL)

RW–RW/HTL

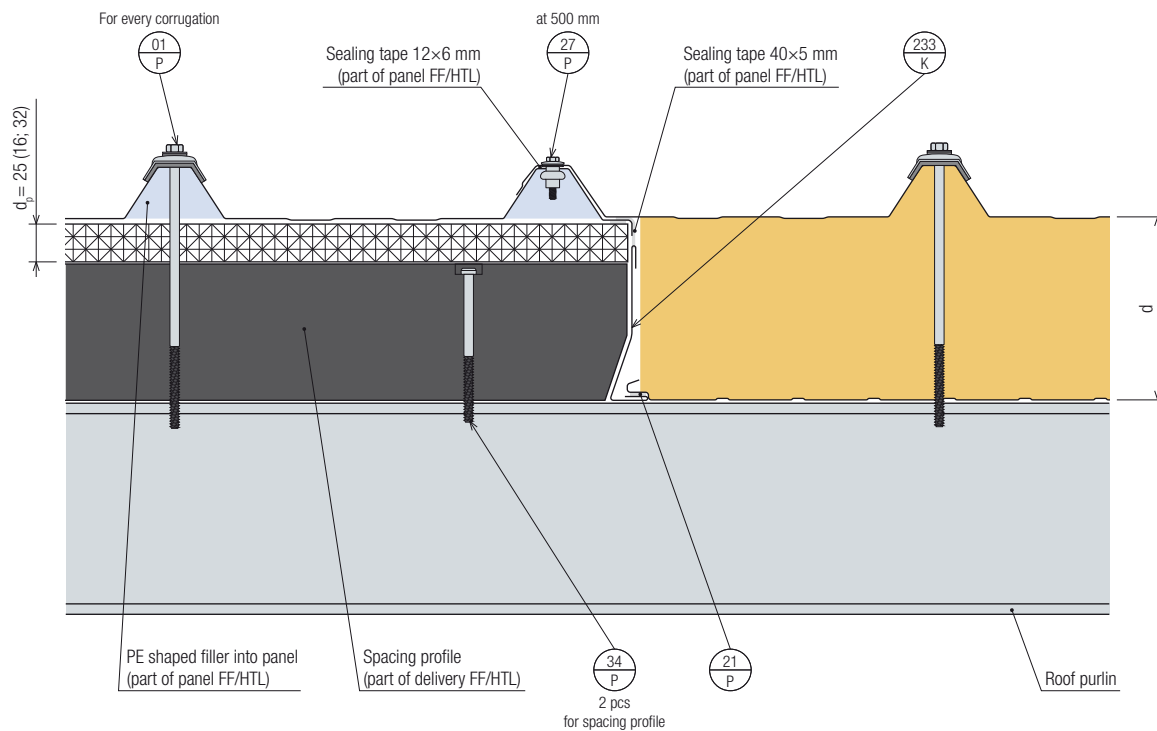


All technical information is subject to alterations. Errors and omissions excepted.

## Rooflights

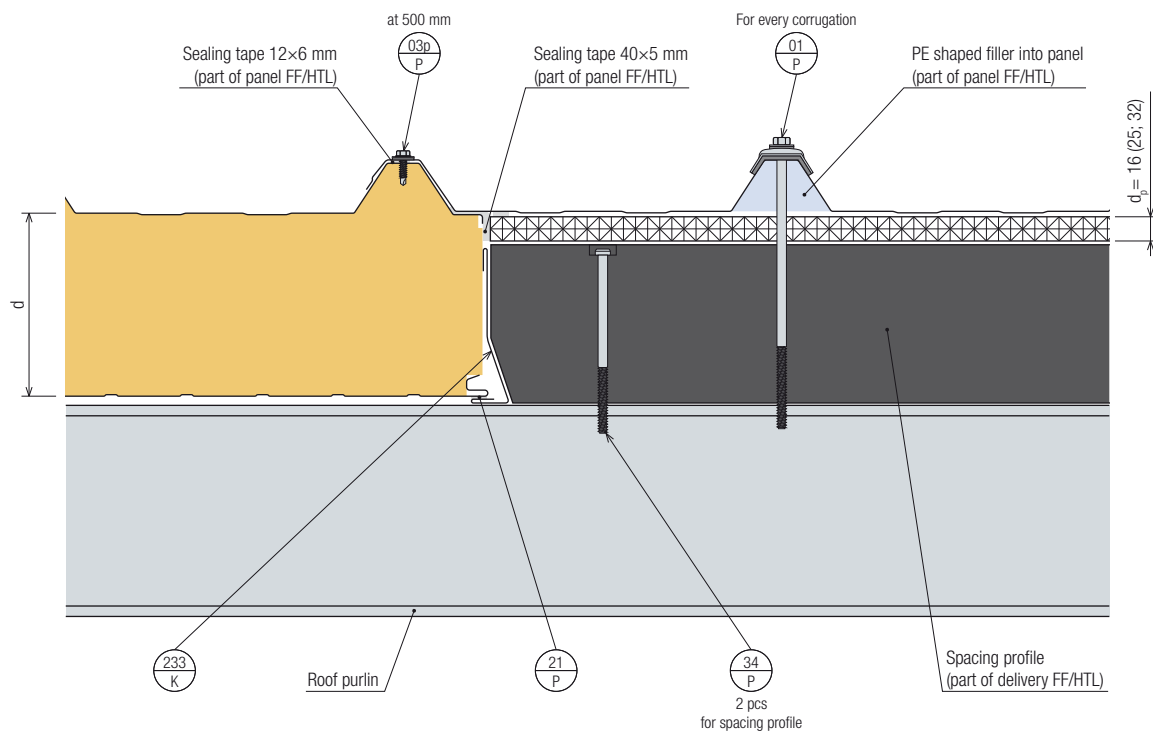
### Side Lap (KS1000 FF/HTL)

#### FF/HTL-FF



### Side Lap (KS1000 FF/HTL)

#### FF-FF/HTL



All technical information is subject to alterations. Errors and omissions excepted.

## Panel End Lap – Upslope (KS1000 RW/HTL)



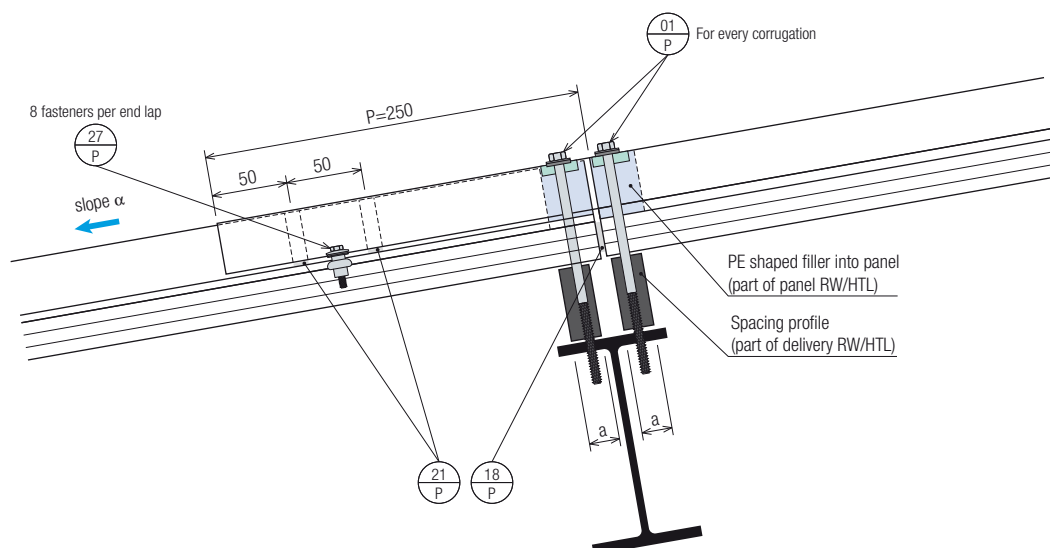
Panel End Lap – Down slope (KS1000 RW/HTL)



*All technical information is subject to alterations. Errors and omissions excepted.*

## Rooflights

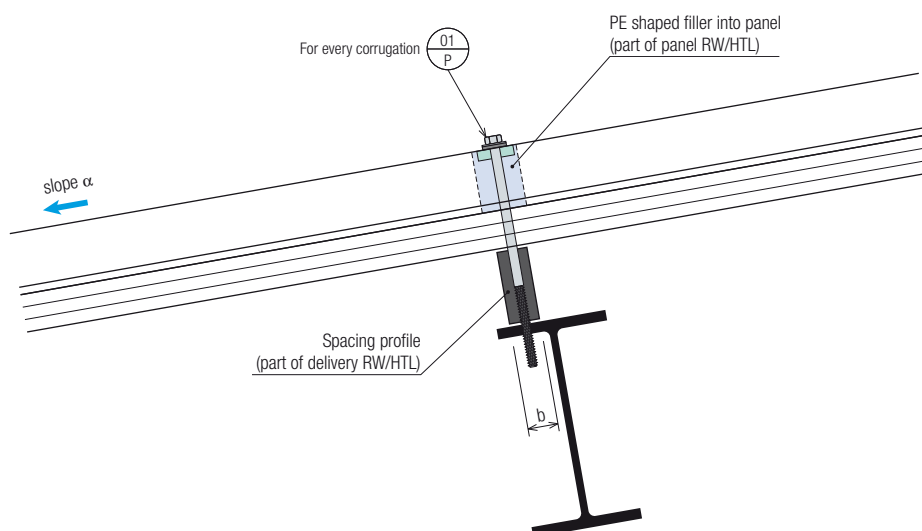
### Panel End Lap – Intermediate (KS1000 RW/HTL)



**Note:**

**a** according to structural/static requirements

### Intermediate Fixing (KS1000 RW/HTL)



**Note:**

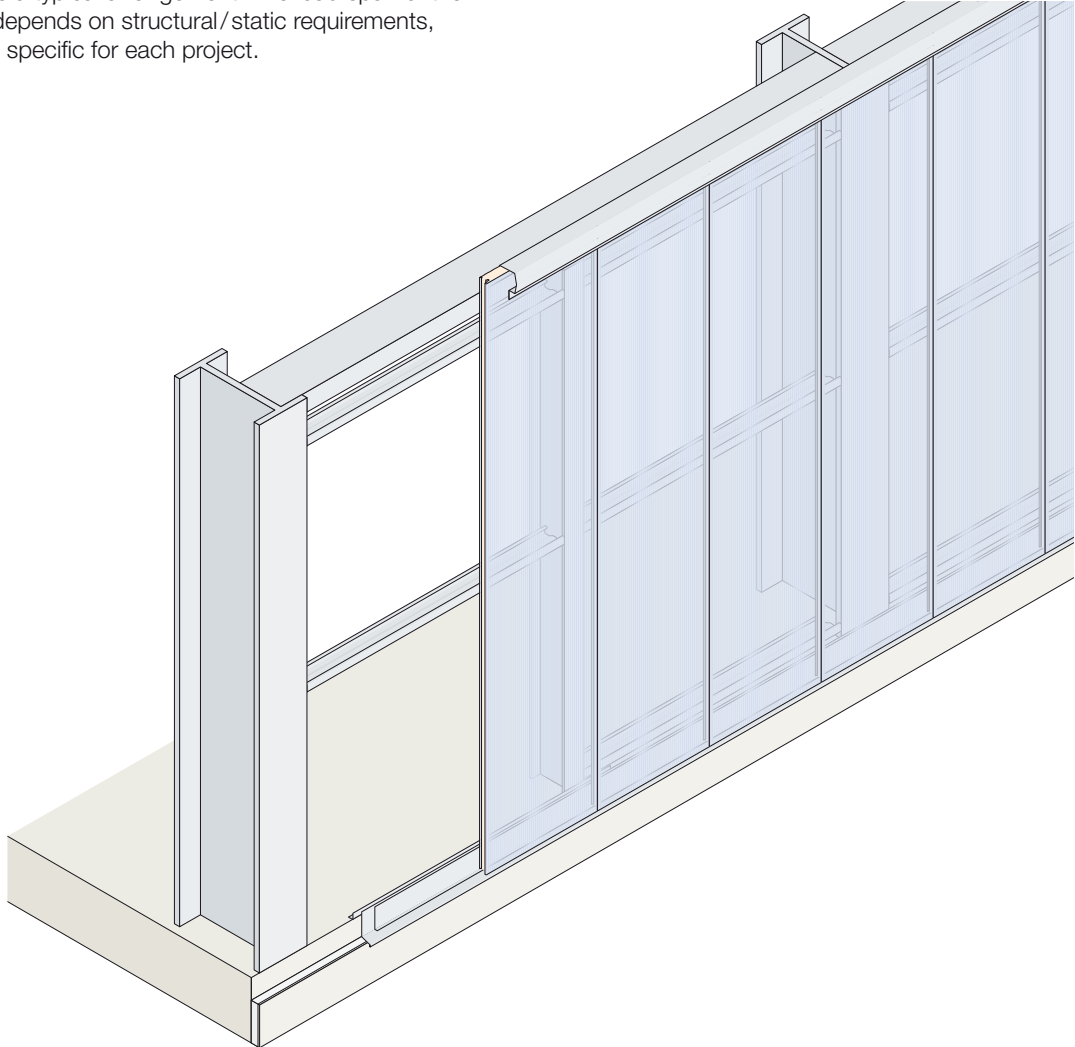
**b** according to structural/static requirements

All technical information is subject to alterations. Errors and omissions excepted.

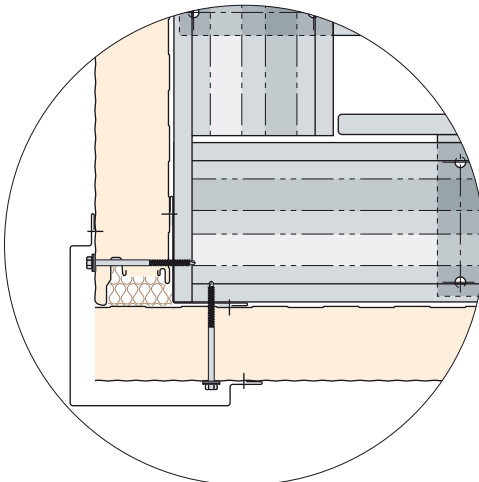
## Wall Panels

### Construction Method – Vertically Laid Panels

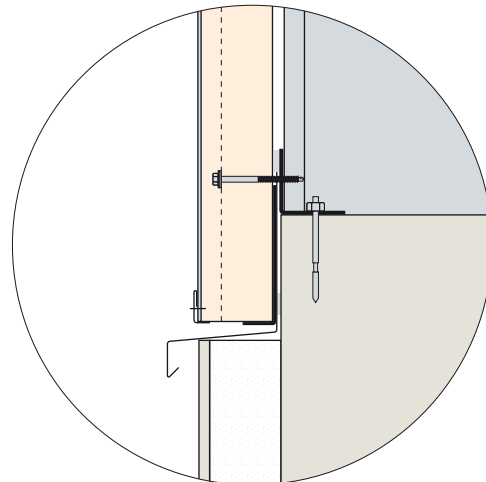
Vertically laid panels require a structure to provide support for the panel self weight and also resist wind pressure and suction loads. The main frame structure shown is a typical arrangement. The load span of the panels depends on structural/static requirements, which is specific for each project.



External Corner Detail



Cill Drip Detail

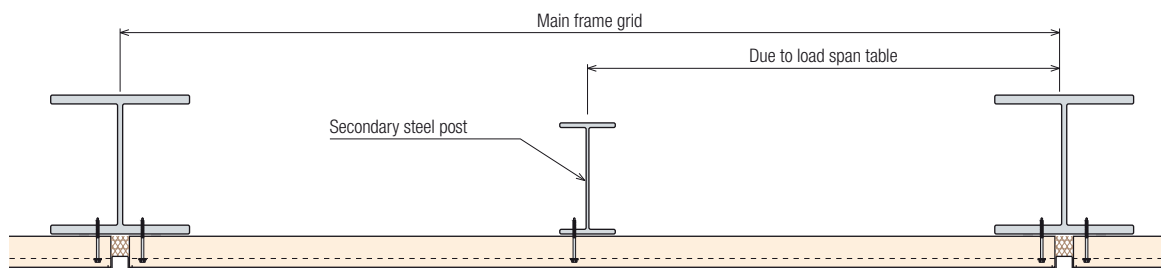
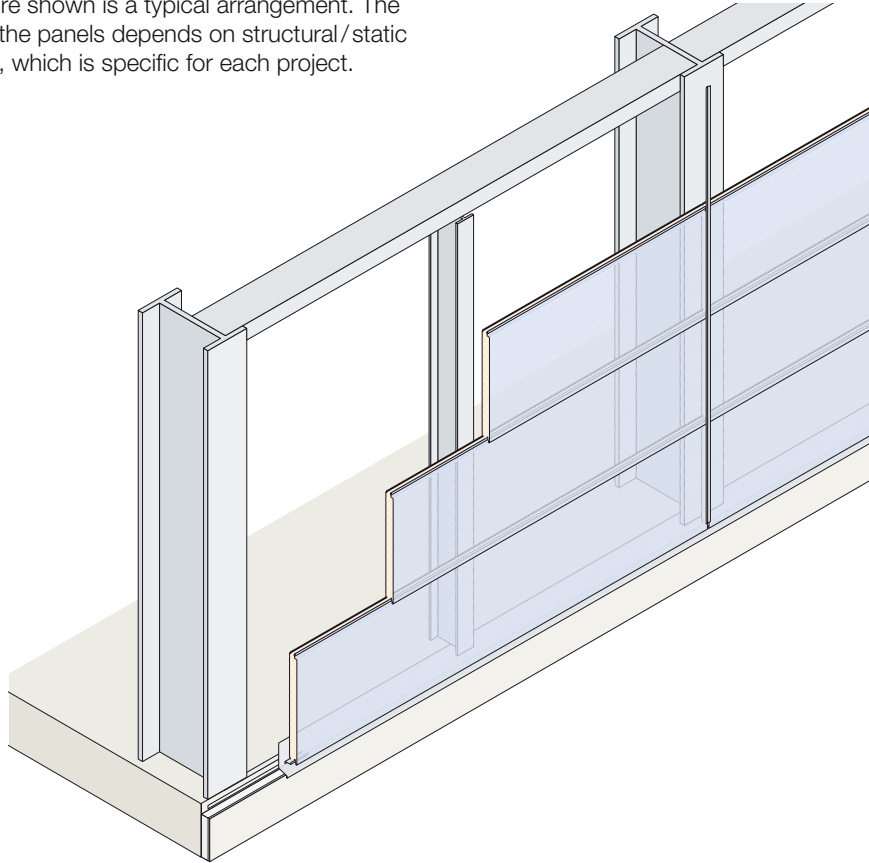


*All technical information is subject to alterations. Errors and omissions excepted.*

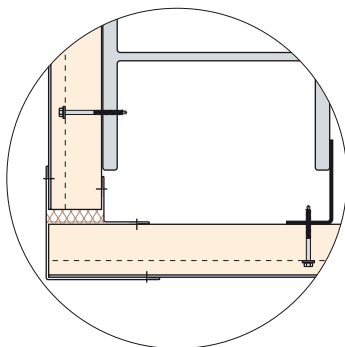
## Wall Panels

### Construction Method – Horizontally Laid Panels

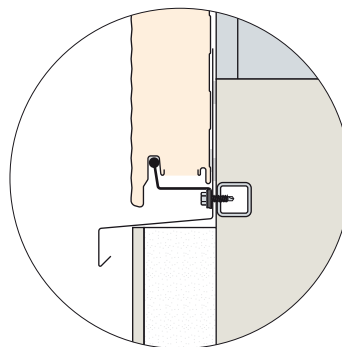
Horizontally laid panels require a structure to provide support for the panel self weight and also resist wind pressure and suction loads. The main frame structure shown is a typical arrangement. The load span of the panels depends on structural/static requirements, which is specific for each project.



External Corner Detail



Cill Drip Detail

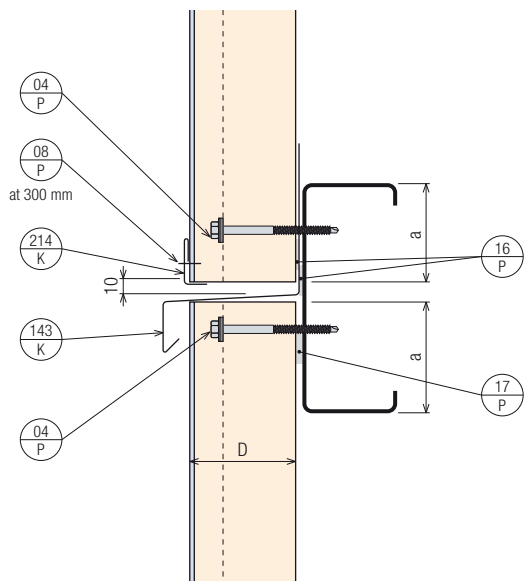


All technical information is subject to alterations. Errors and omissions excepted.

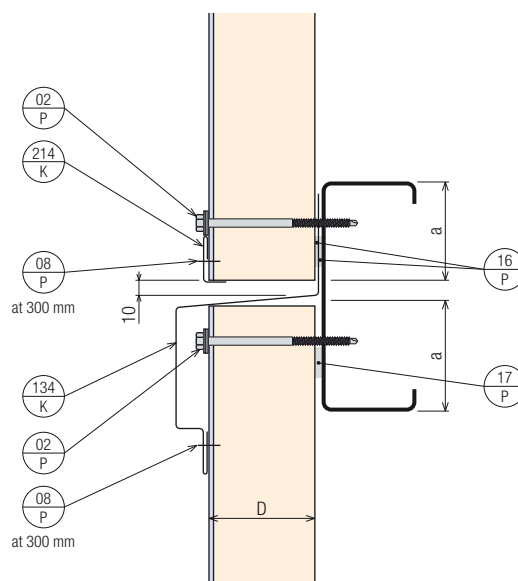
## Wall Panels

### Panel to Panel Junction (vertical)

#### Secret fixed option



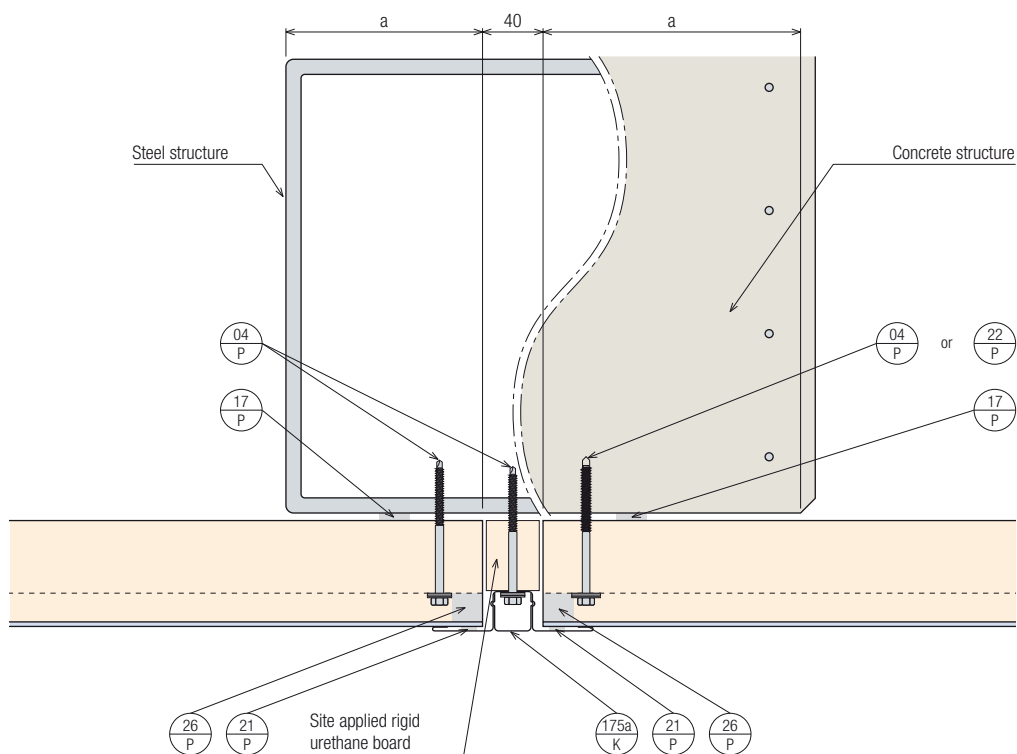
#### Through fixed option



**Note:**

**a** according to structural/static requirements

### Panel to Panel Junction Top hat (horizontal)



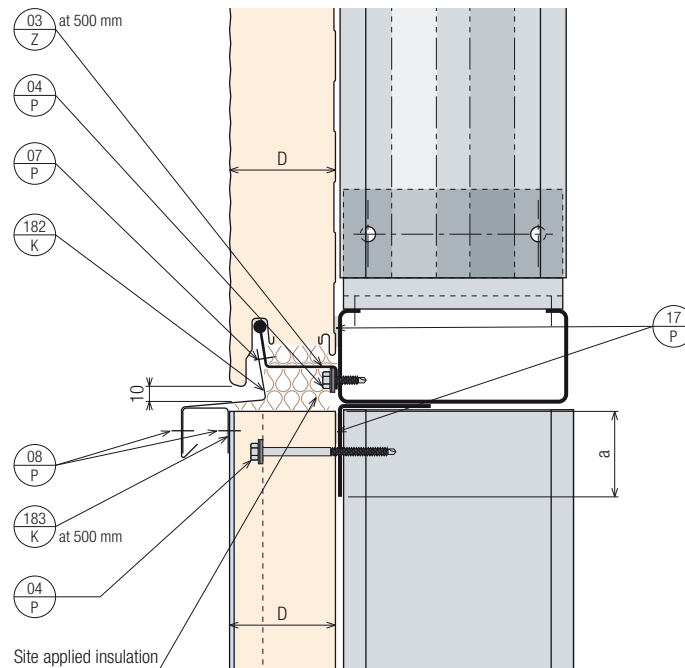
**Note:**

**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

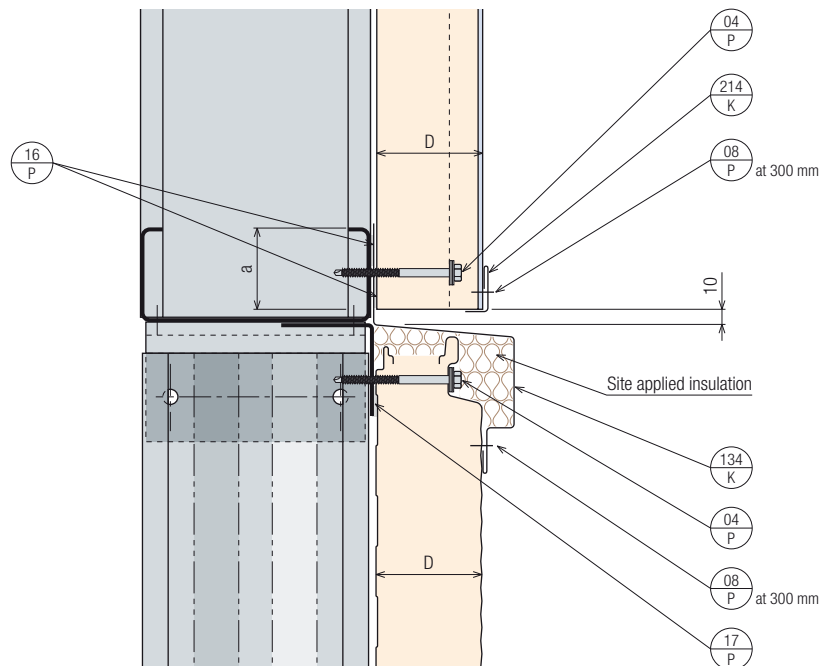
### Horizontal Panel to Vertical Panel Junction



**Note:**

**a** according to structural/static requirements

### Vertical Panel to Horizontal Panel Junction



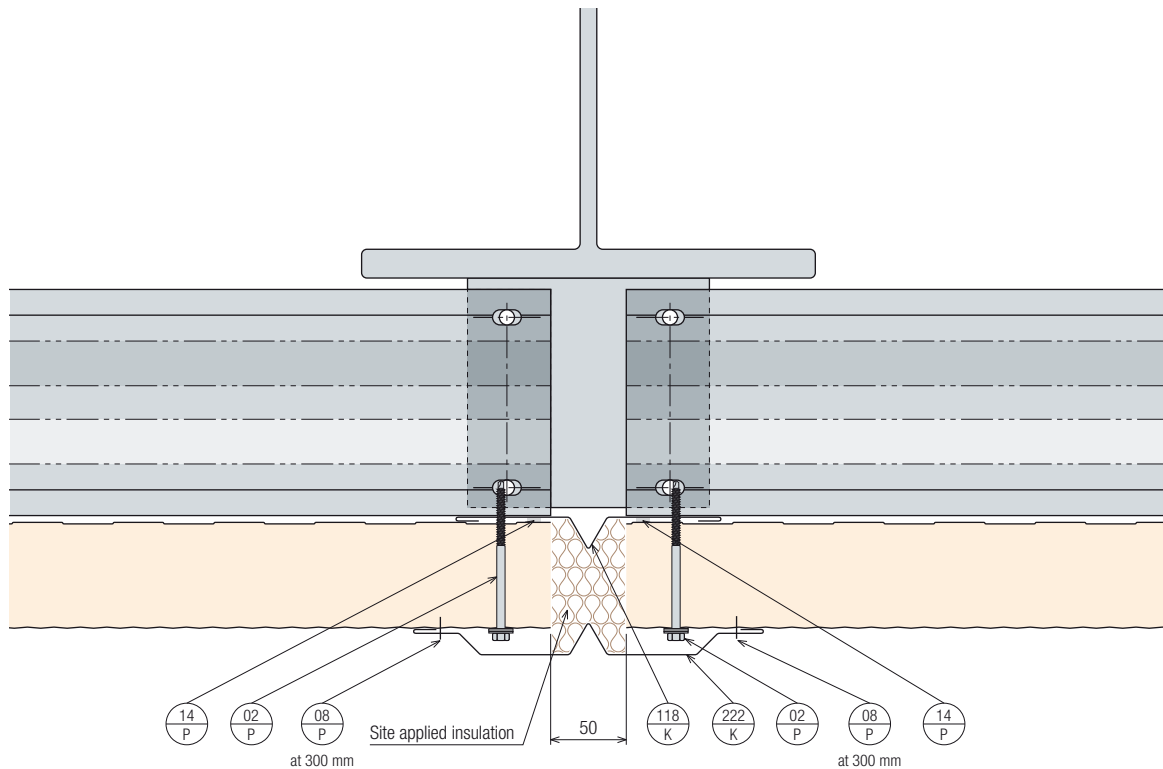
**Note:**

**a** according to structural/static requirements

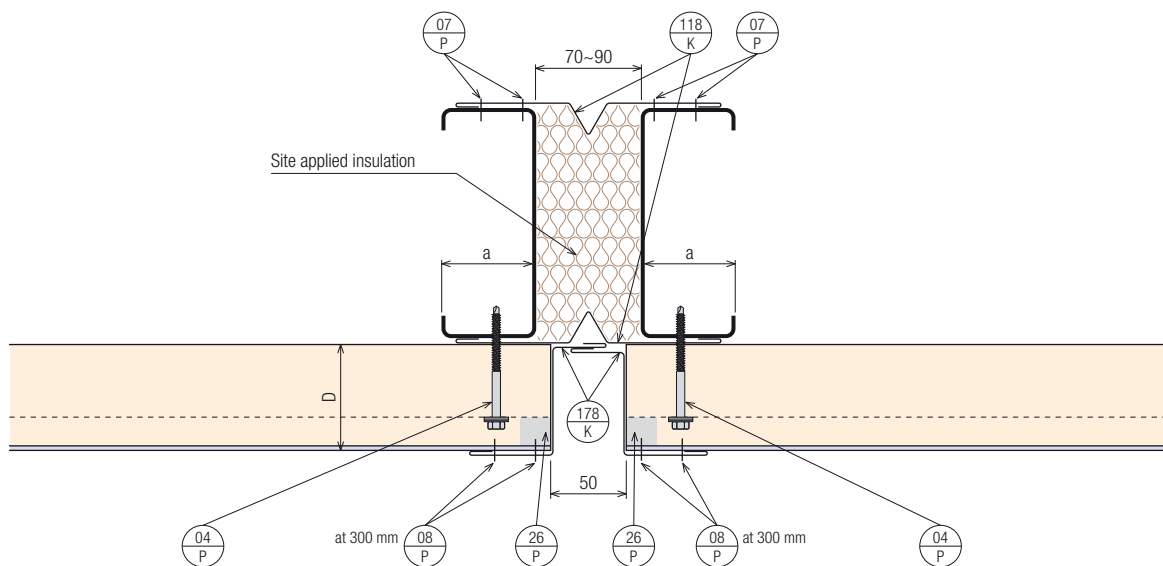
*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### Expansion Joint (vertical)



### Expansion Joint (horizontal)



**Note:**

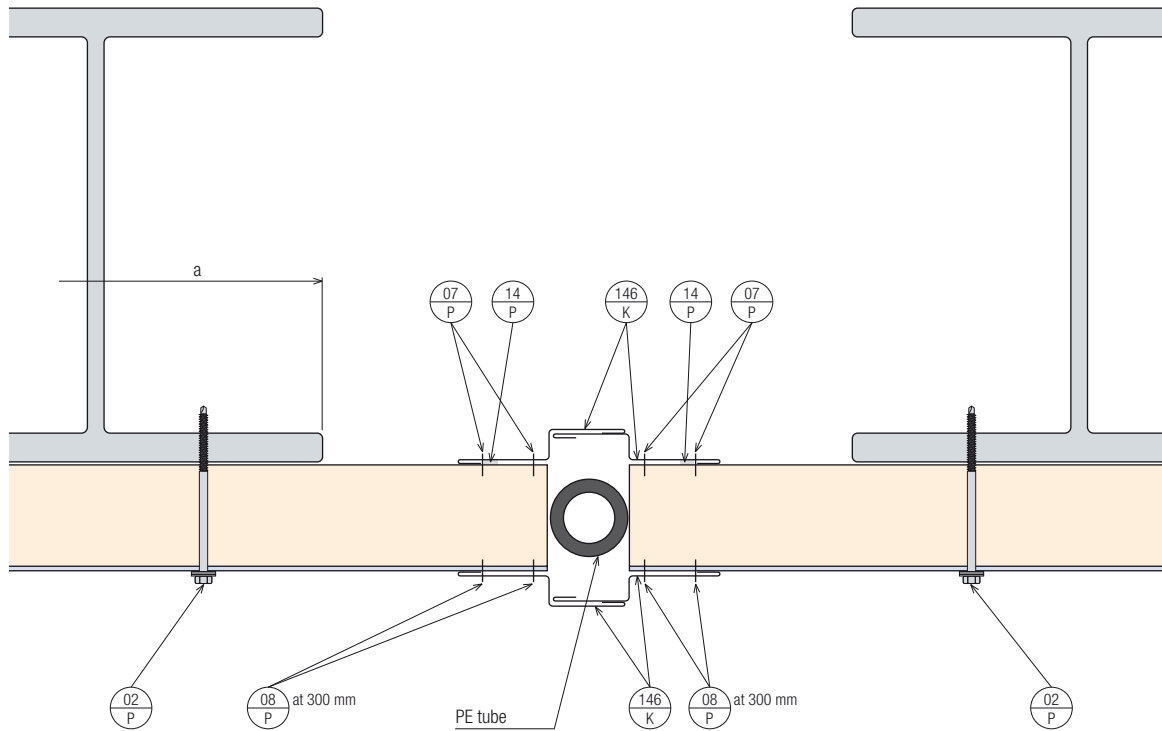
**a** according to structural/static requirements

This joint allows for up to 20 mm expansion. In other cases solve according concrete situation.

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

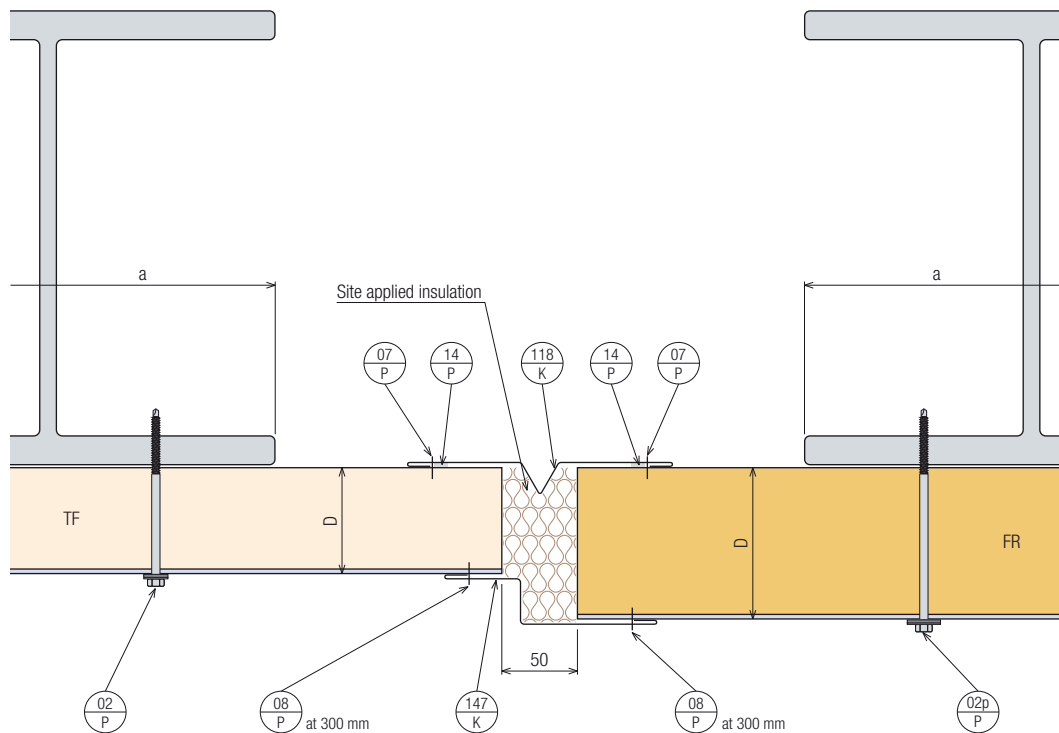
### Expansion Joint



**Note:**

**a** according to structural/static requirements

### Transition Between Types of Panel (TF/FR)



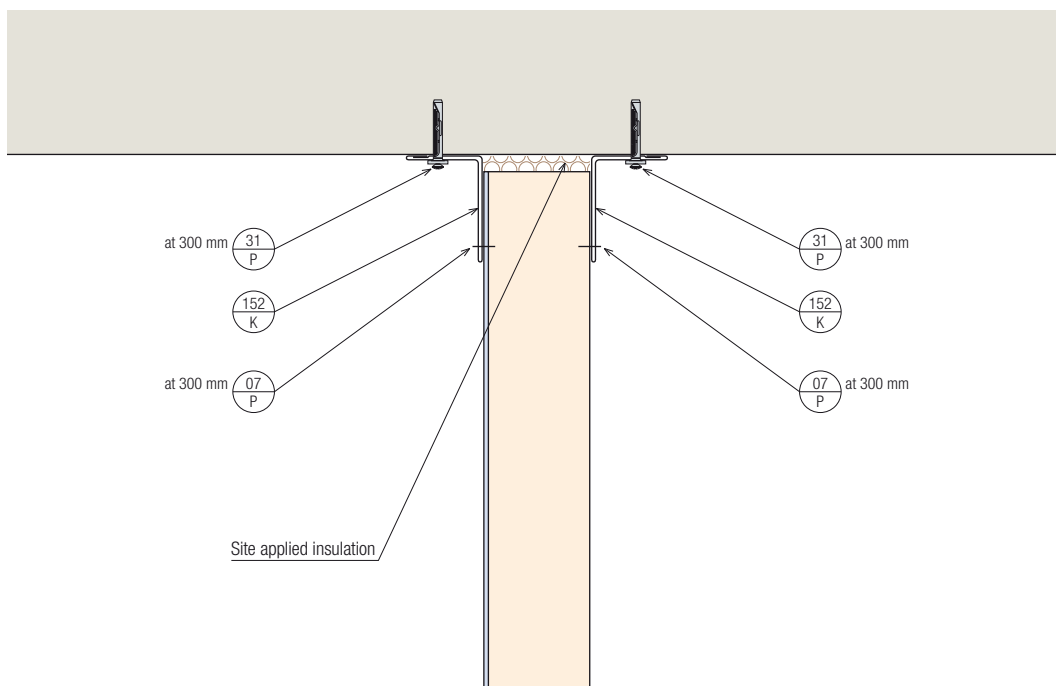
**Note:**

**a** according to structural/static requirements

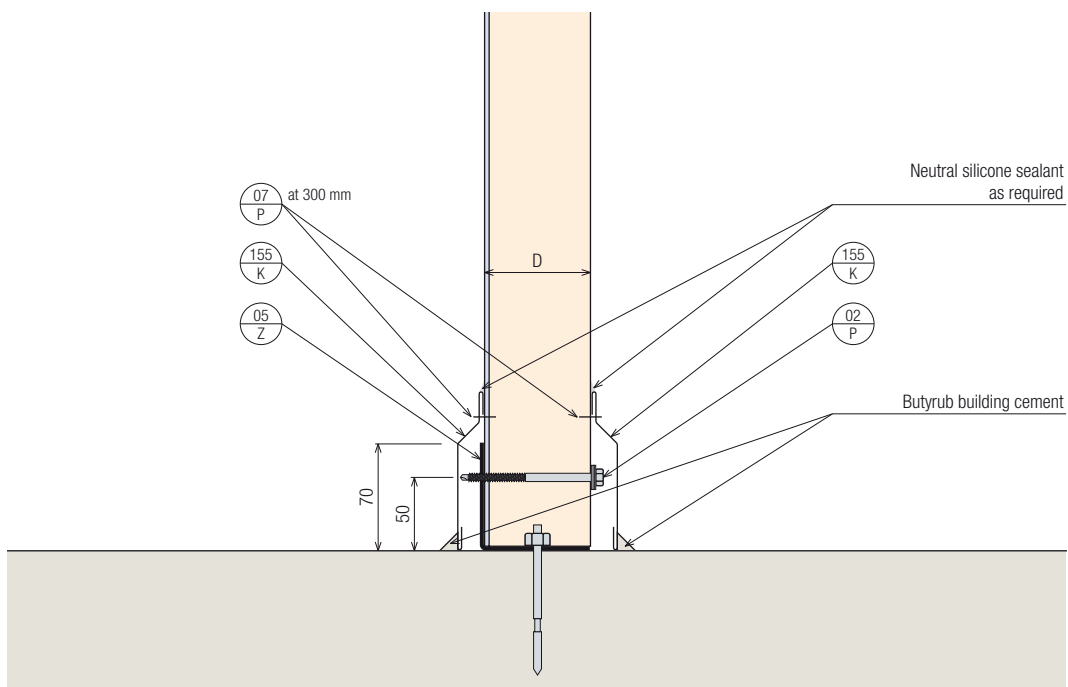
*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### Panel Head Junction (Vertically Laid Panels)



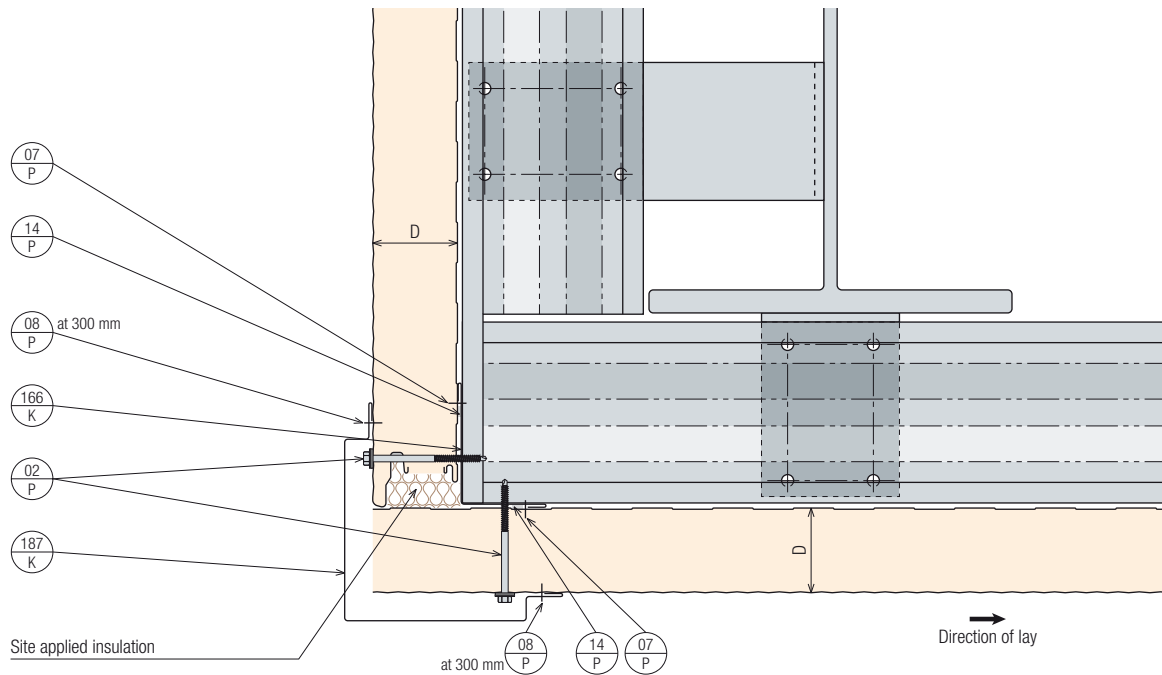
### Floor Slab Junction (Vertically Laid Panels)



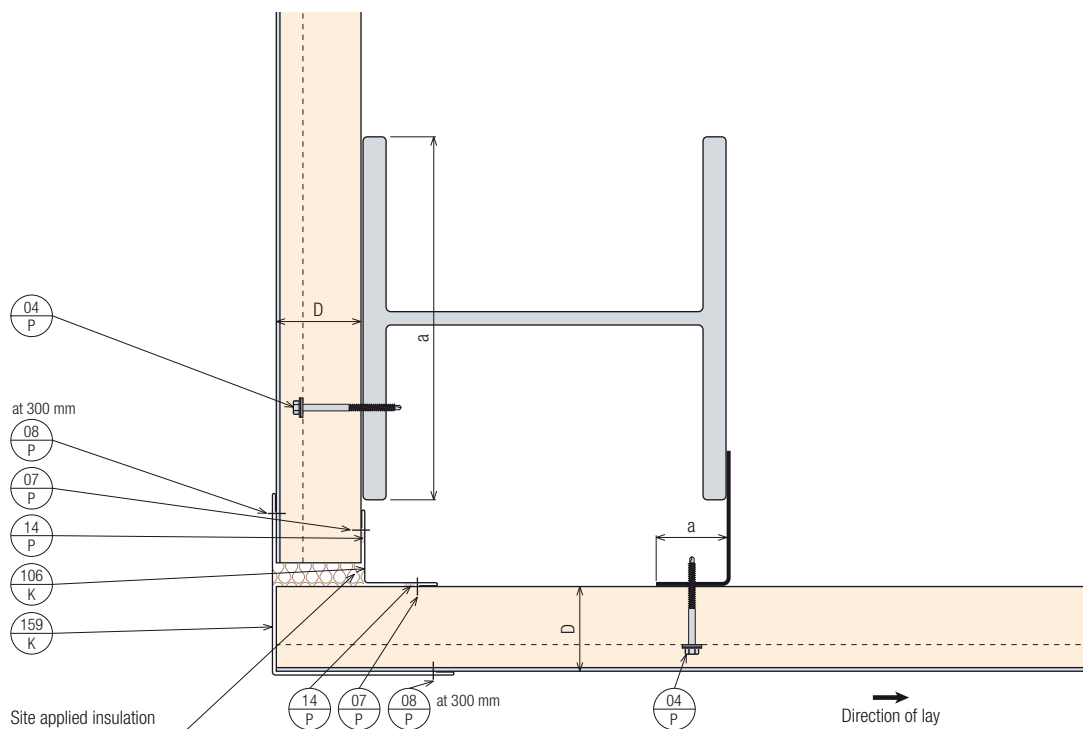
All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### External Corner (vertical)



### External Corner (horizontal)



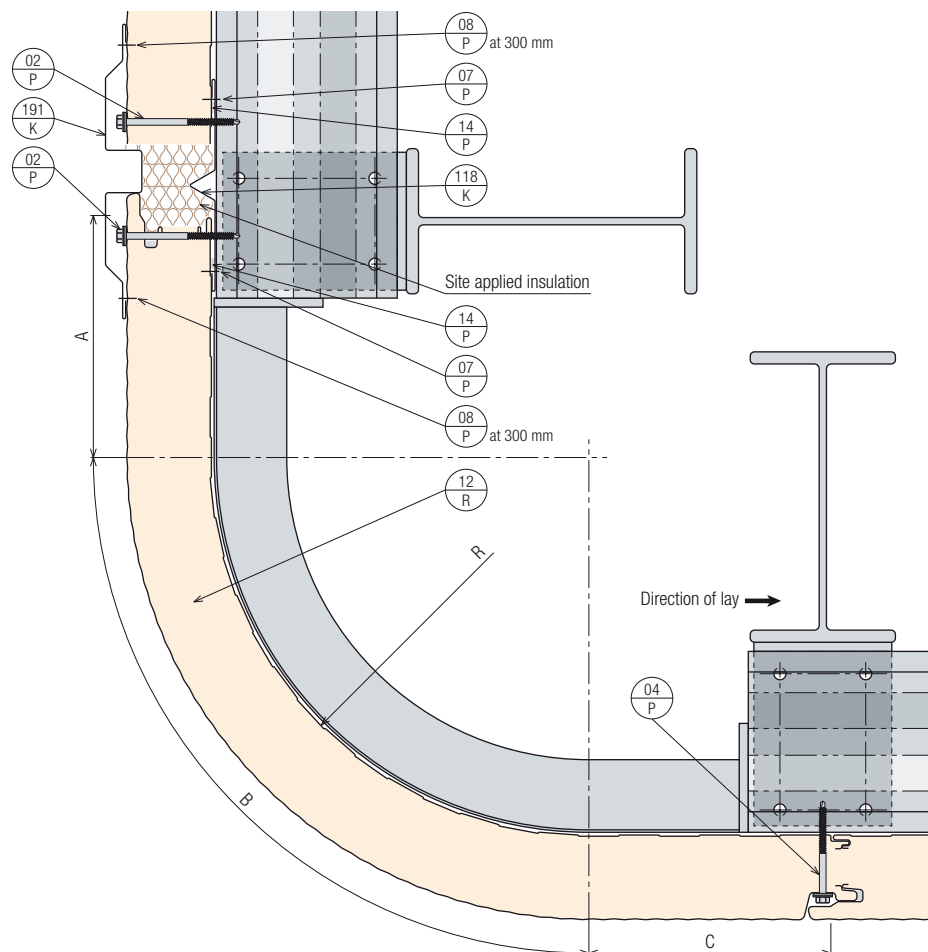
#### Note:

**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### External Curved Corner (vertical)



**Note:**

Panel R12, max. length 8,000 mm

$A_{\min}, C_{\min} = 60 \text{ mm}$

$A+B+C = \text{max. module } 1,000 \text{ mm}$

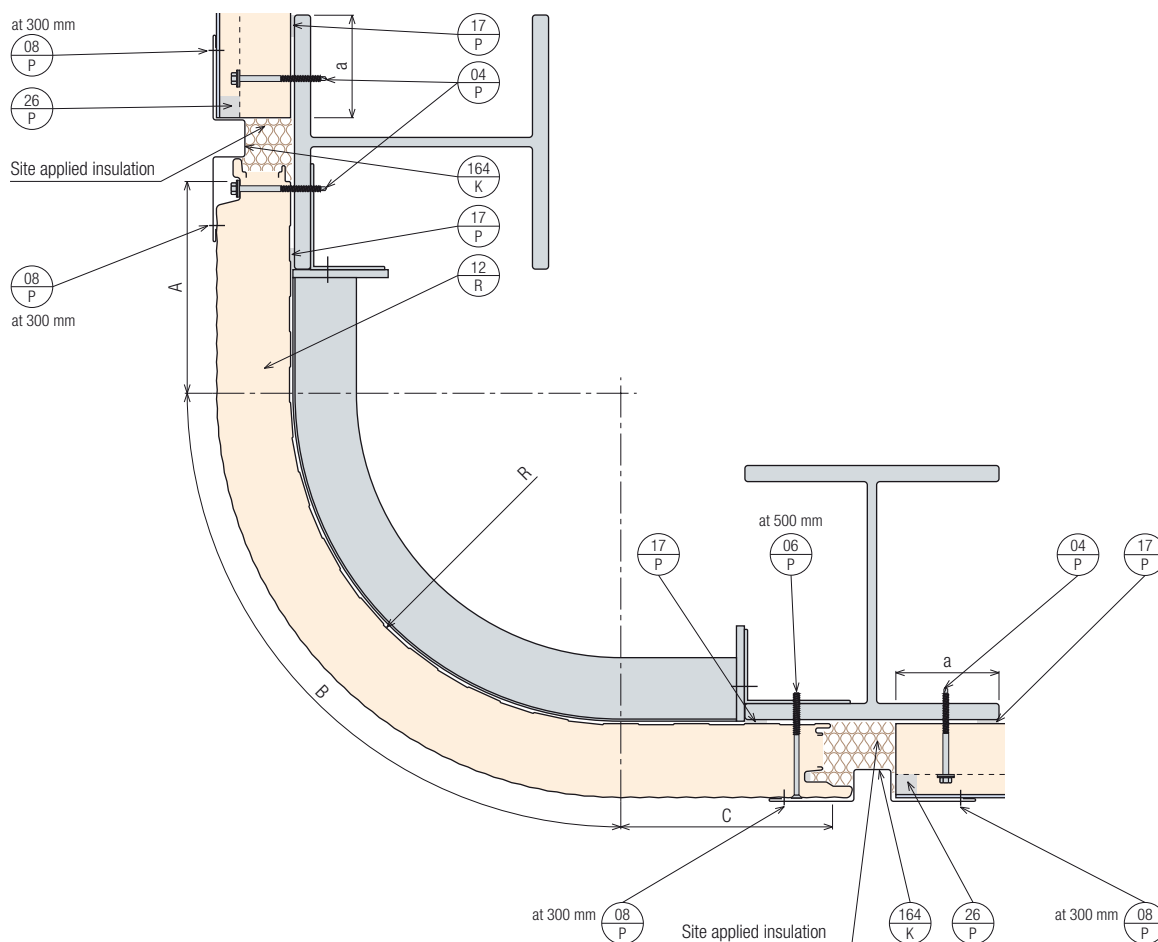
$\alpha = 80^\circ - 175^\circ$

$R_{\min} = D$

profilation to be discussed

## Wall Panels

### External Curved Corner (horizontal)



**Note:**

**a** according to structural/static requirements

Panel R12, max. length 8,000 mm

$A_{\min}, C_{\min} = 60 \text{ mm}$

$A + B + C = \text{max. module } 1,000 \text{ mm}$

$\alpha = 80^\circ - 175^\circ$

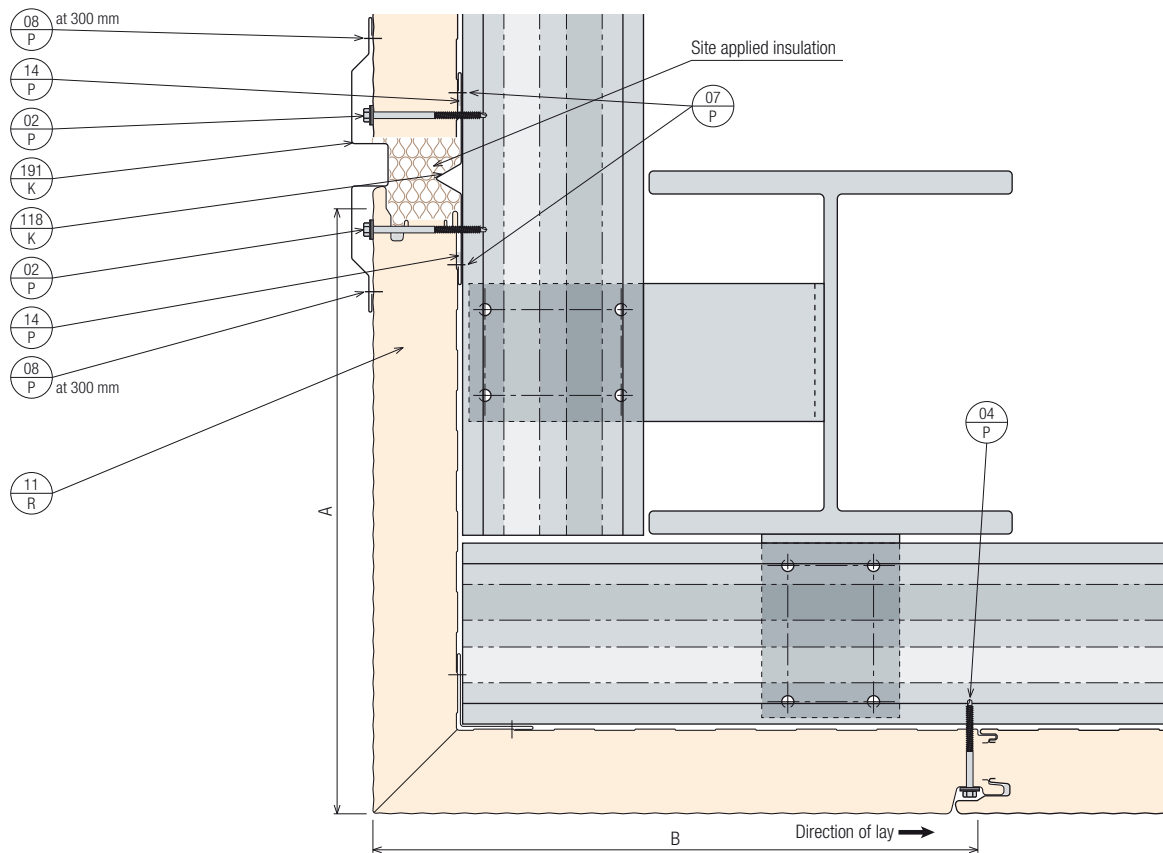
$R_{\min} = D$

profilation to be discussed

All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### External Cranked Corner (vertical)



**Note:**

Panel R11, max. length 8,000 mm

$A_{\min}, B_{\min} = 250 \text{ mm}$

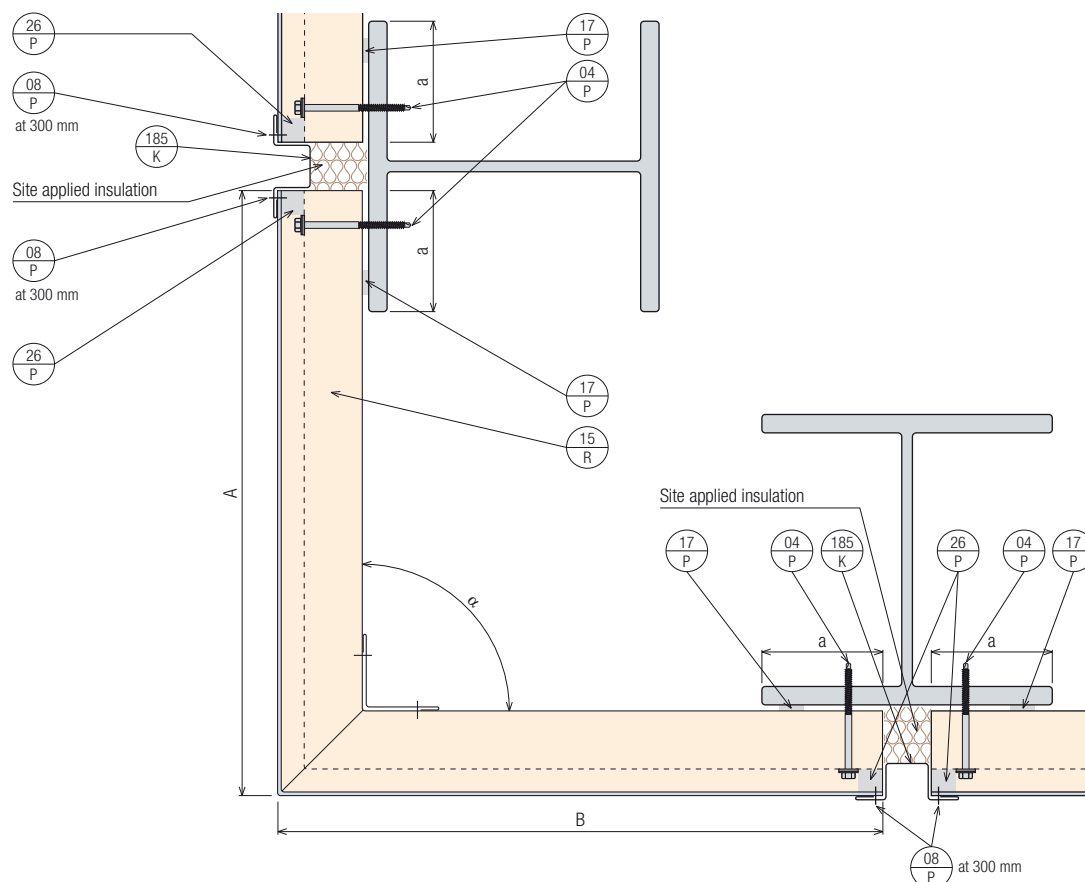
$A + B = \text{module } 1,000 \text{ mm}$

$\alpha = 80^\circ - 175^\circ$

profilation to be discussed

## Wall Panels

### External Cranked Corner (horizontal)



**Note:**

**a** according to structural/static requirements

Panel R15, maximum length of an unsupported arm of single cranked wall panel is 1,000 mm. For longer cranks additional steelwork is required.

$A_{\min}, B_{\min} = 250 \text{ mm}$

$A_{\max} = 1,500 \text{ mm}$

$B_{\max} = 4,500 \text{ mm}$

$\alpha = 90^\circ - 180^\circ$

module 1,000 mm

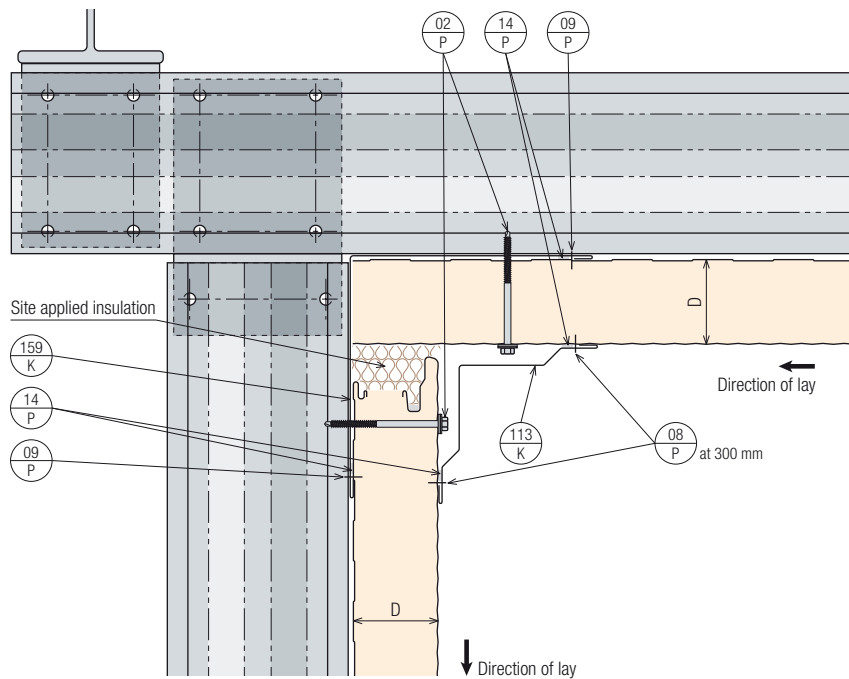
profilation to be discussed

All technical information is subject to alterations. Errors and omissions excepted.

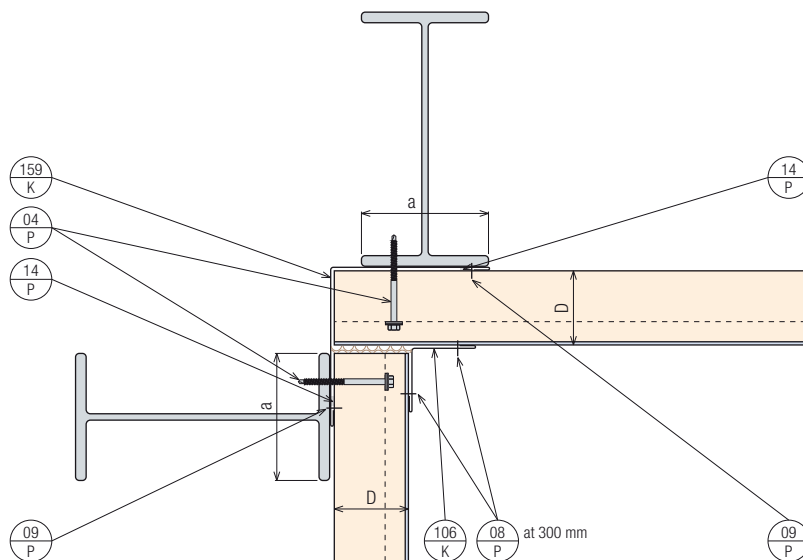


## Wall Panels

### Internal Corner (vertical)



### Internal Corner (horizontal)



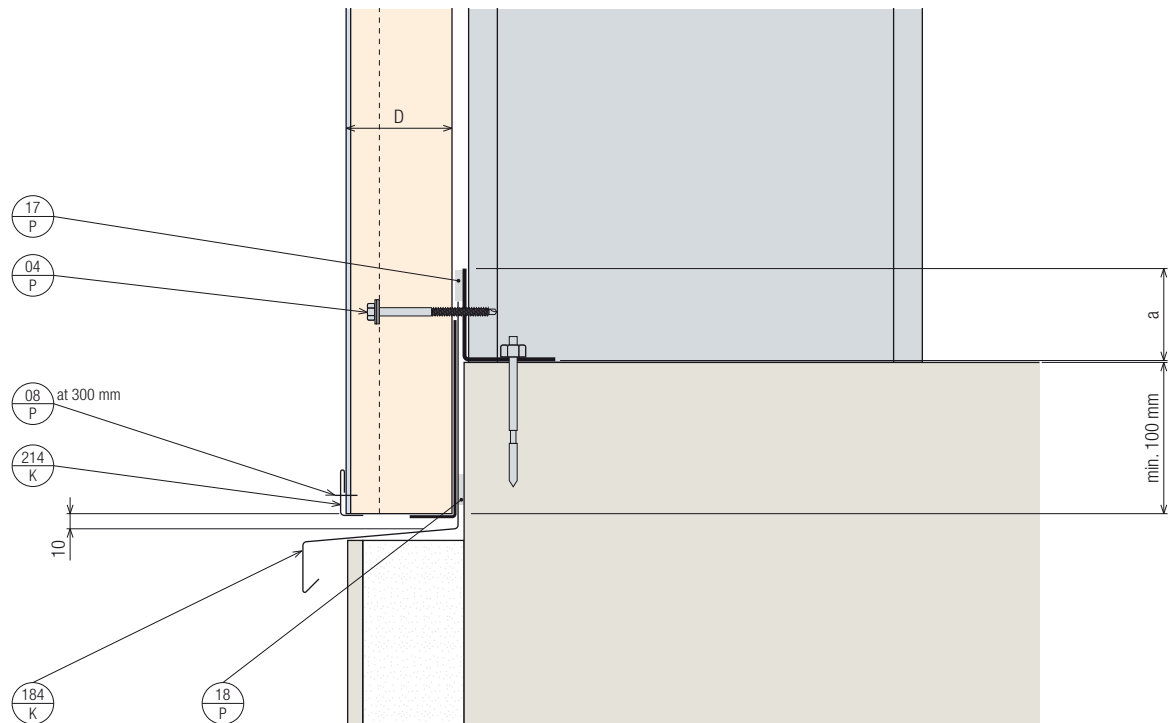
**Note:**

**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

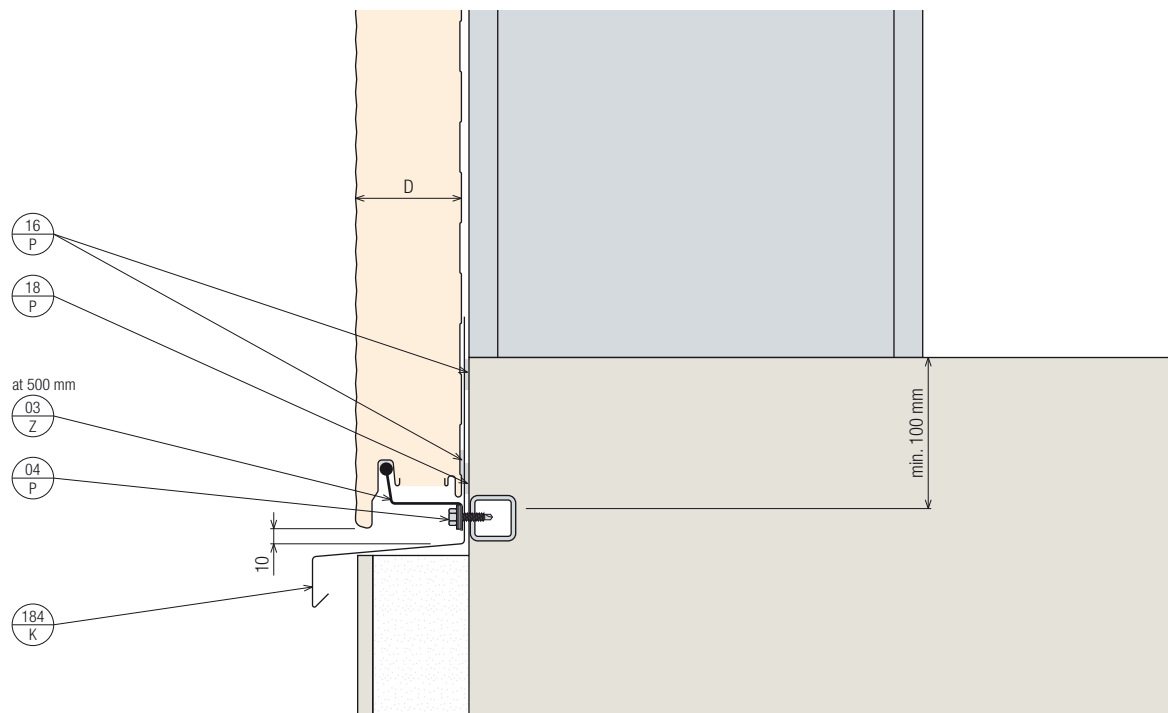
### Concrete Wall Cill (vertical)



**Note:**

**a** according to structural/static requirements

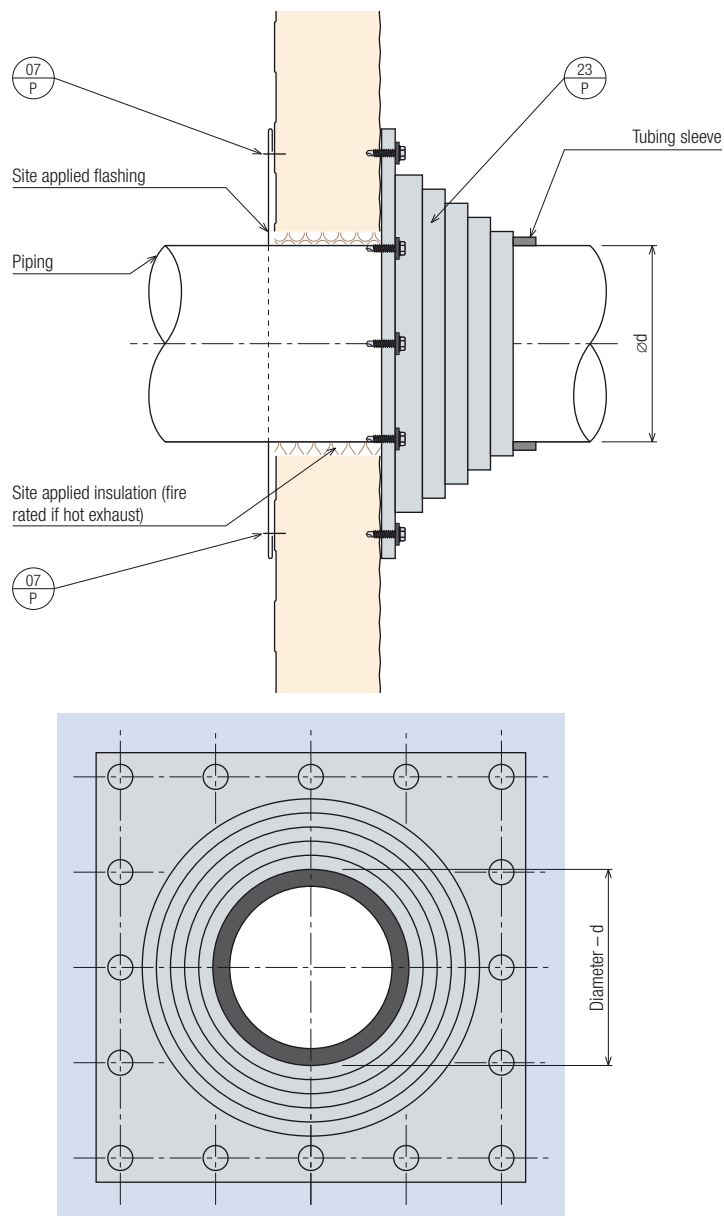
### Concrete Wall Cill (horizontal)



*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### Wall Pipe Extractor Flue



**Note:**

Complete installation contents:

- passage piping packing
- sealing material
- necessary quantity of fasteners

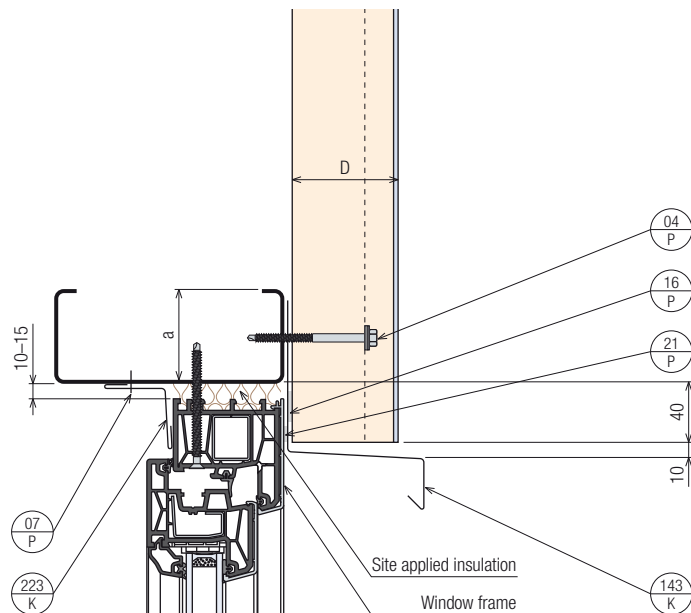
Piping sleeves for better additional sealing of passages can be ordered according to diameter of piping.

See to the section of the Accessories or contact Kingspan Technical Service Department for range of piping sleeves.

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

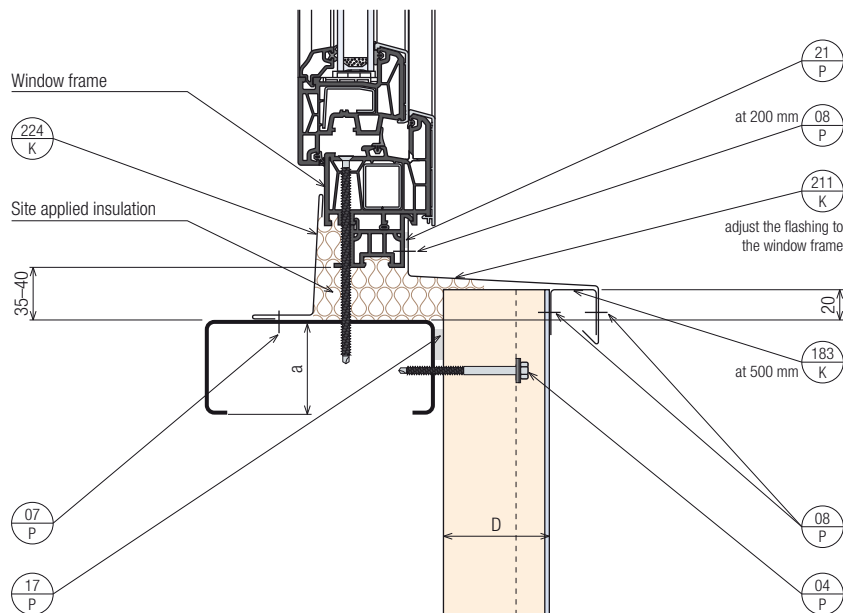
### Plastic Window – recessed (vertical) – Head



**Note:**

**a** according to structural/static requirements

### Plastic Window – recessed (vertical) – Cill



**Note:**

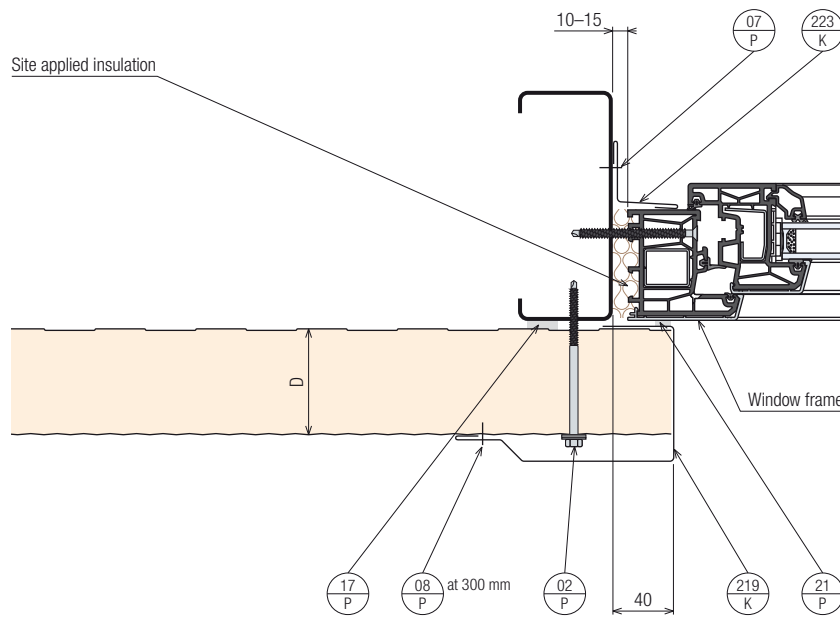
The flashing K211 adjusts according to the window frame.

**a** according to structural/static requirements

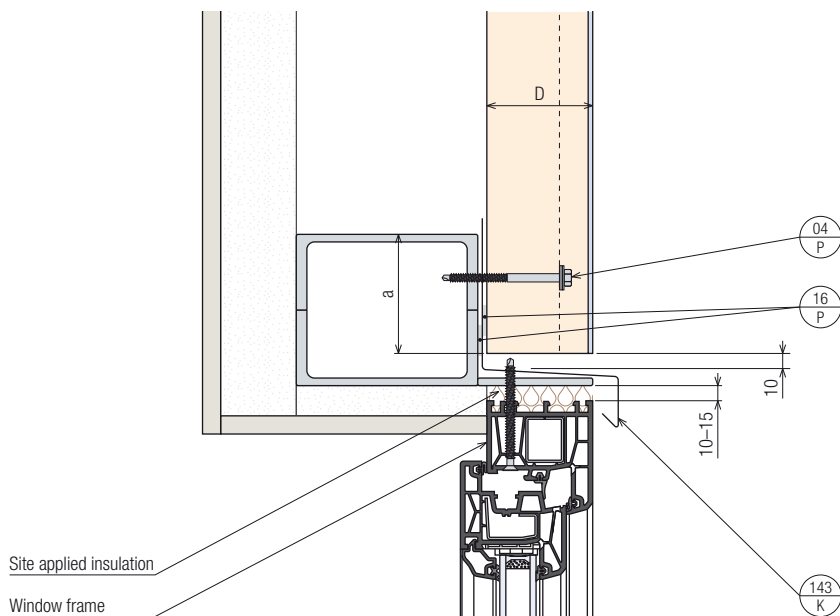
*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### Plastic Window – recessed (vertical) – Jamb



### Plastic Window – coplanar (vertical) – Head



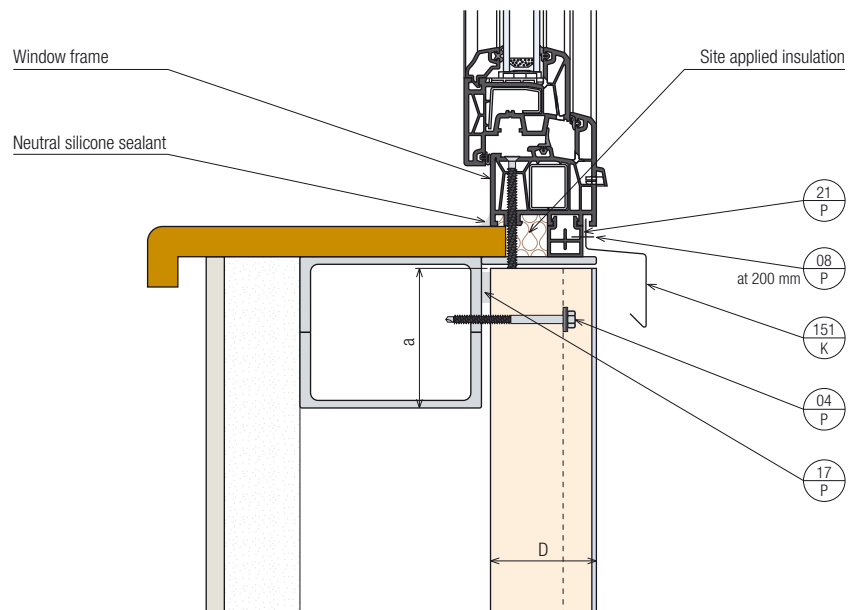
**Note:**

**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

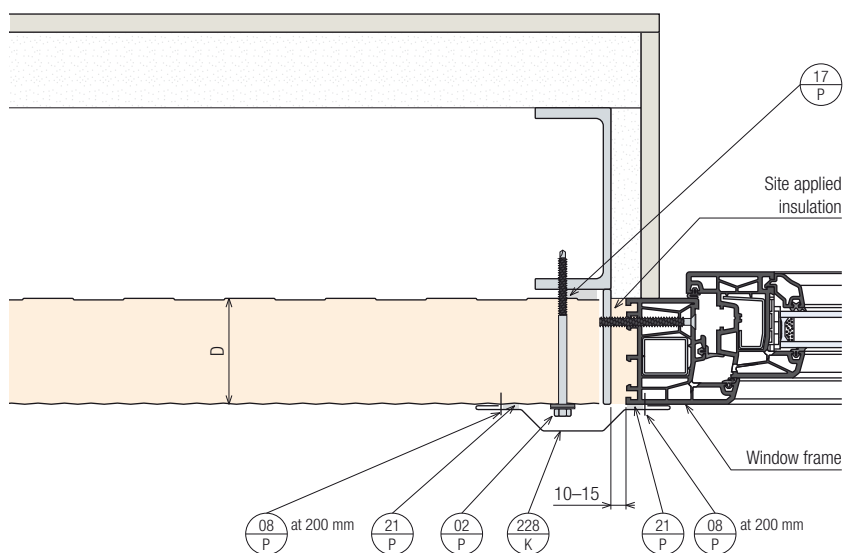
### Plastic Window – coplanar (vertical) – Cill



**Note:**

a according to structural/static requirements

### Plastic Window – coplanar (vertical) – Jamb

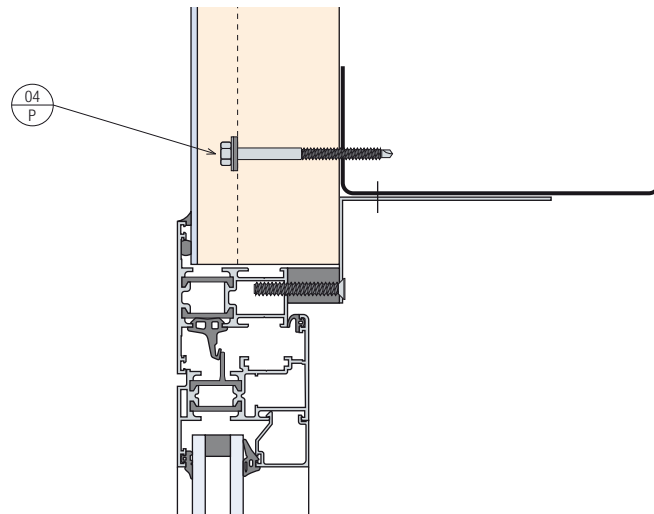


All technical information is subject to alterations. Errors and omissions excepted.

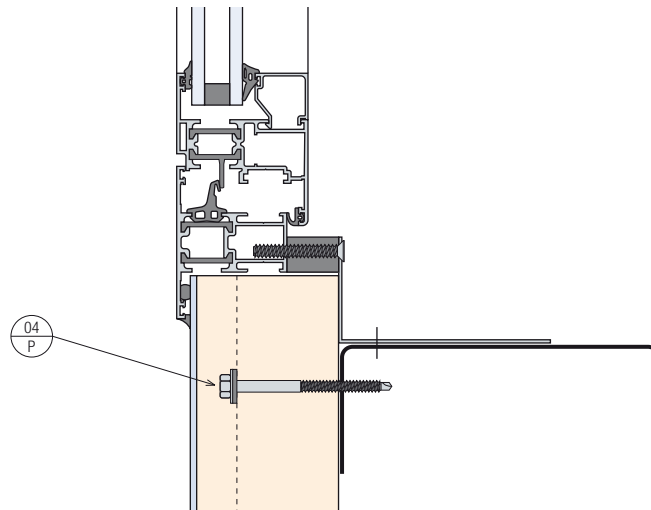
## Wall Panels

## Aluminium Window – vertical (coplanar)

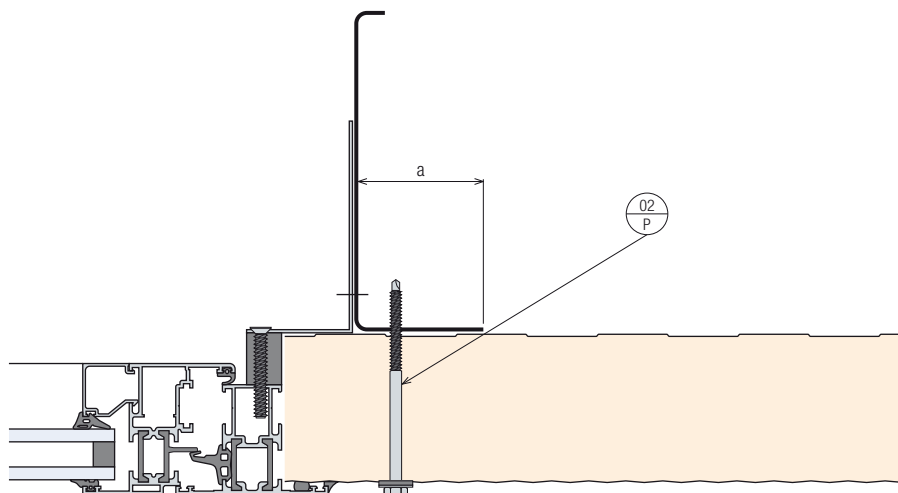
Head



Cill

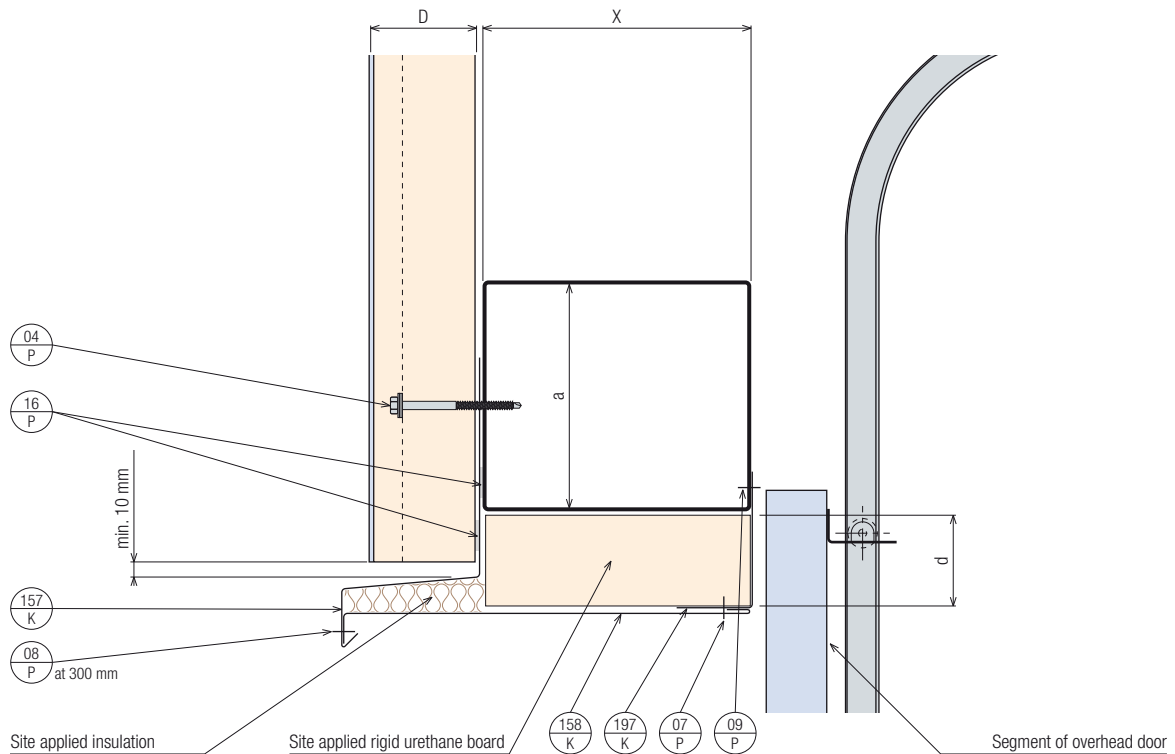


Jamb

**Note:****a** according to structural/static requirements*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

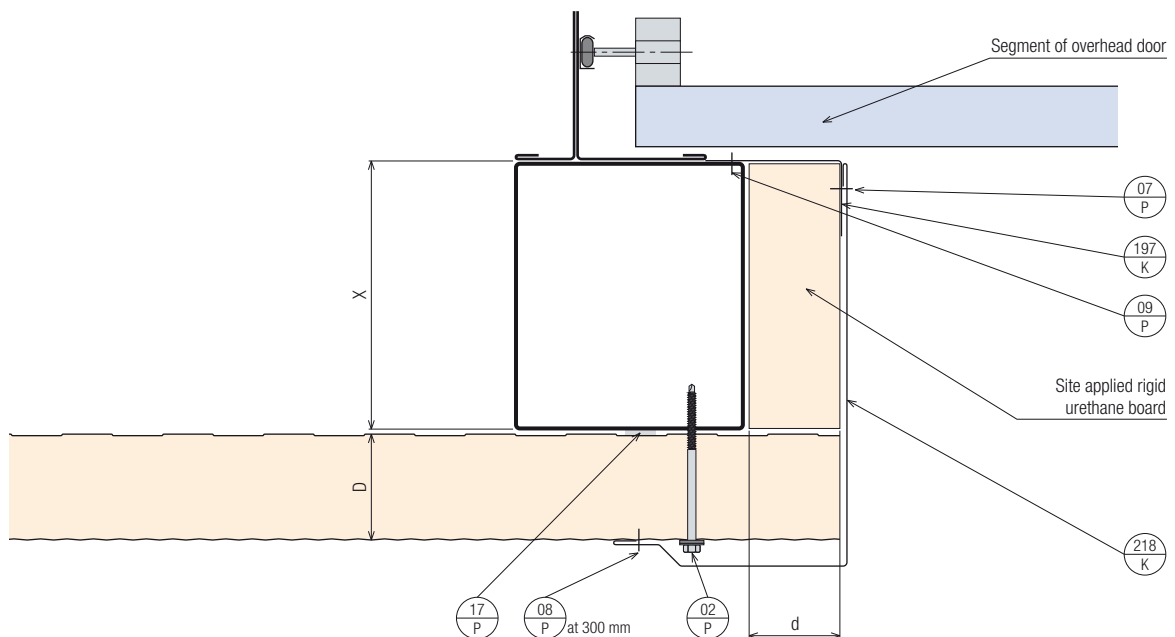
### Roller Shutter Door (vertical) – Head



**Note:**

- a** according to structural/static requirements
- X** specify dimension to define flashing K158

### Roller Shutter Door (vertical) – Jamb



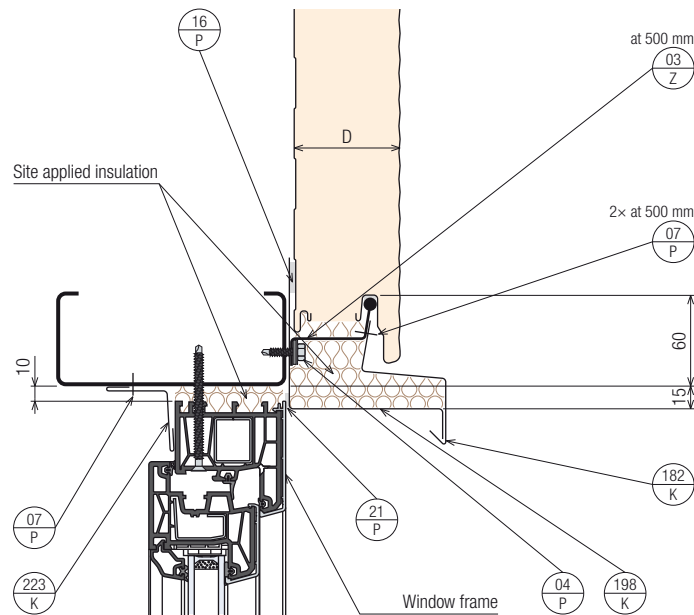
**Note:**

- a** according to structural/static requirements
- X** specify dimension to define flashing K218

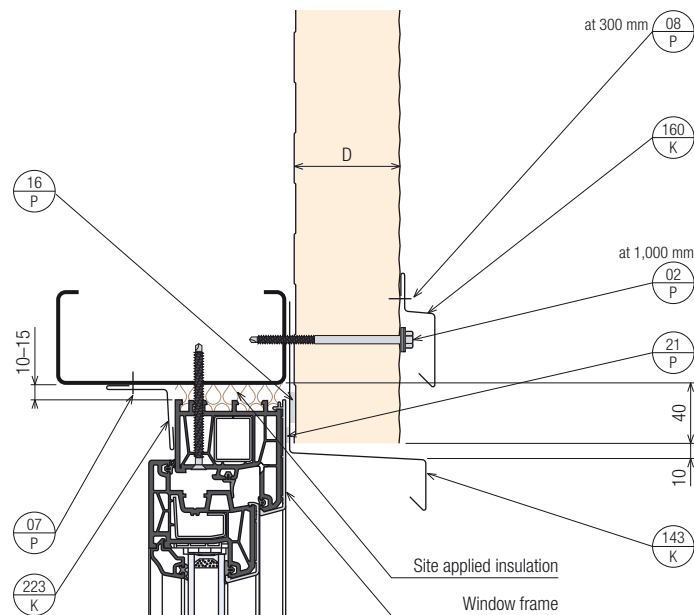
All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Plastic Window – recessed (horizontal) – Head



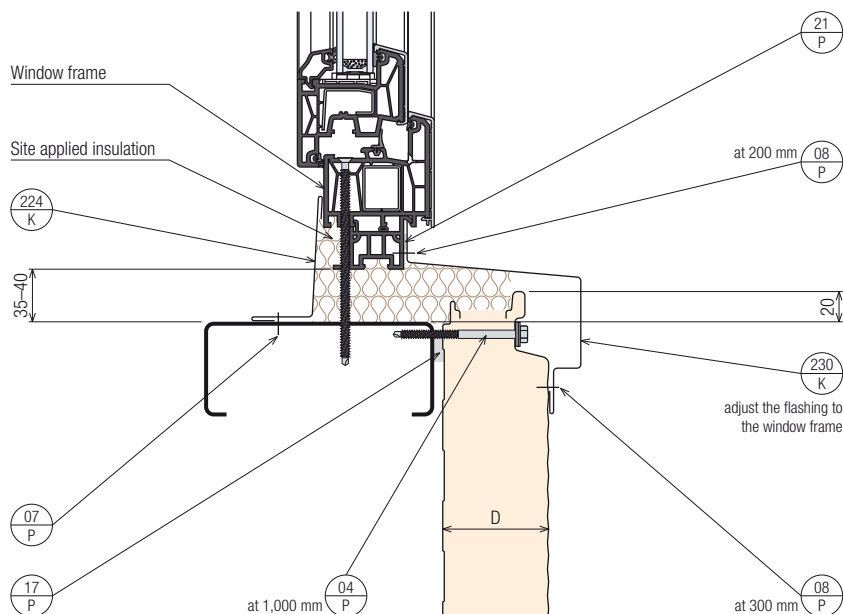
### Plastic Window – recessed (horizontal) – Head (cut end)



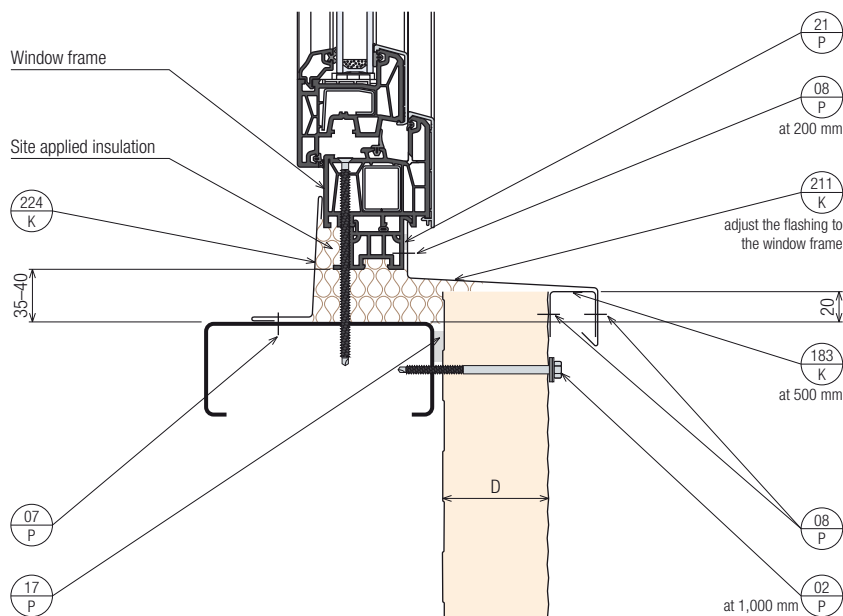
All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Plastic Window – recessed (horizontal) – Cill



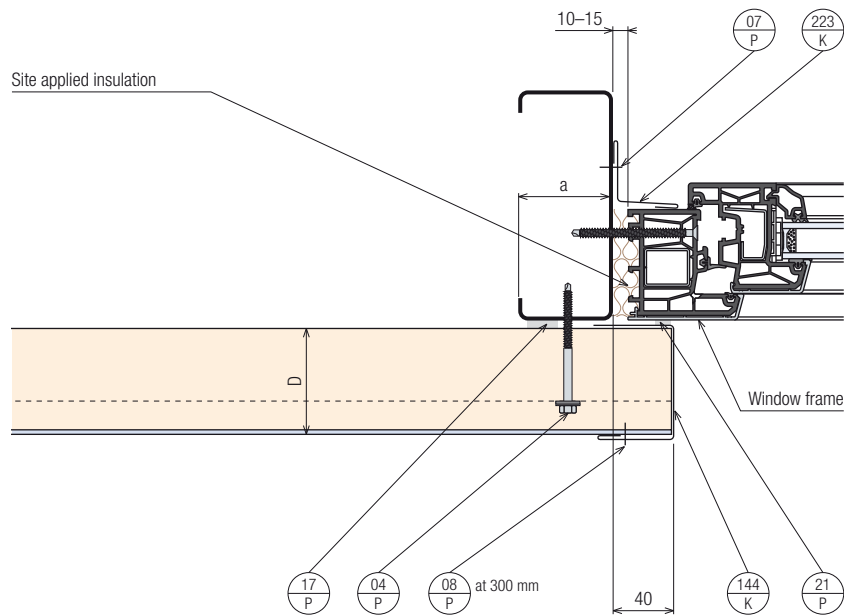
### Plastic Window – recessed (horizontal) – Cill (cut end)



All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

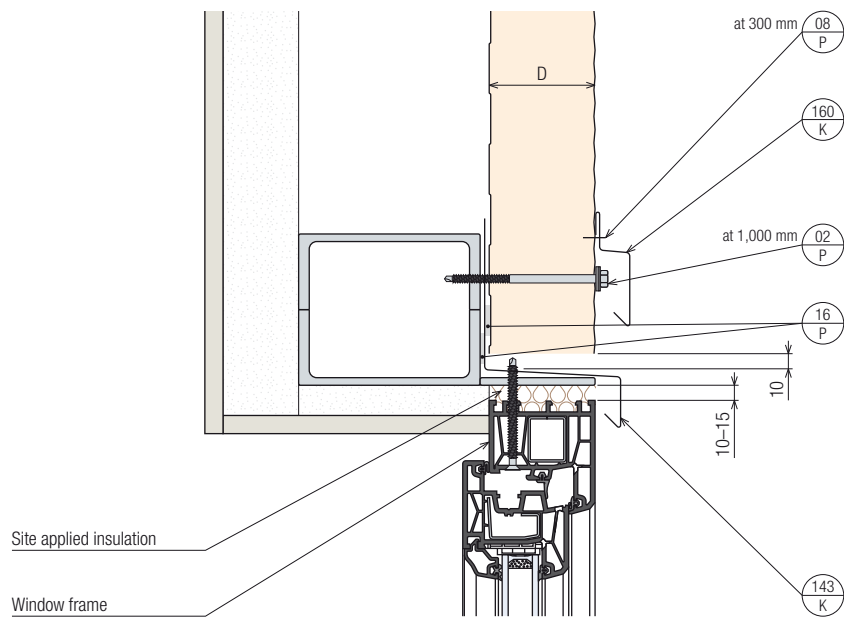
### Plastic Window – recessed (horizontal) – Jamb



**Note:**

a according to structural/static requirements

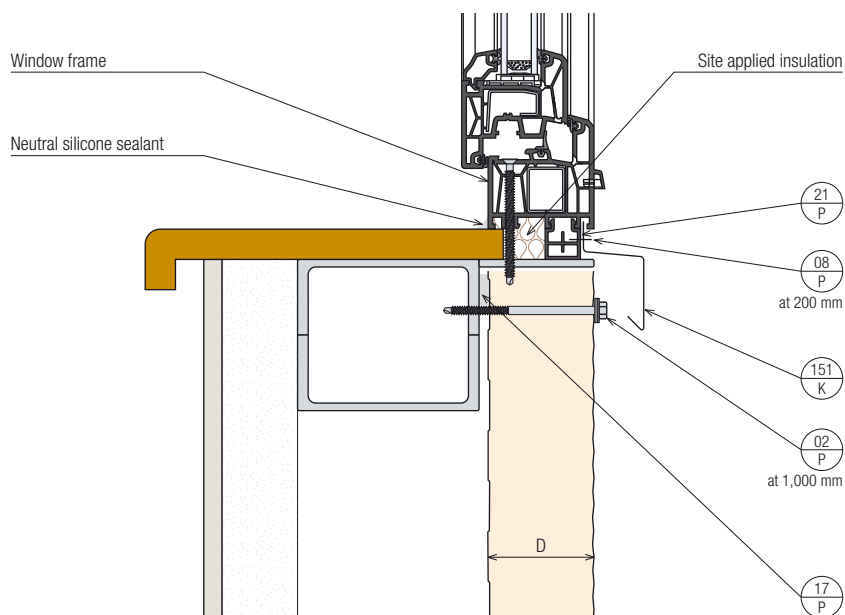
### Plastic Window – coplanar (horizontal) – Head



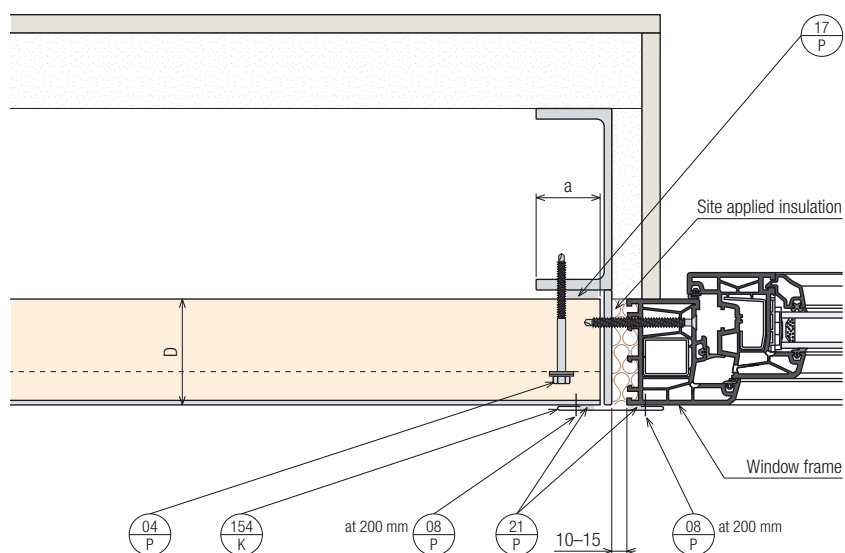
All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Plastic Window – coplanar (horizontal) – Cill



### Plastic Window – coplanar (horizontal) – Jamb



**Note:**

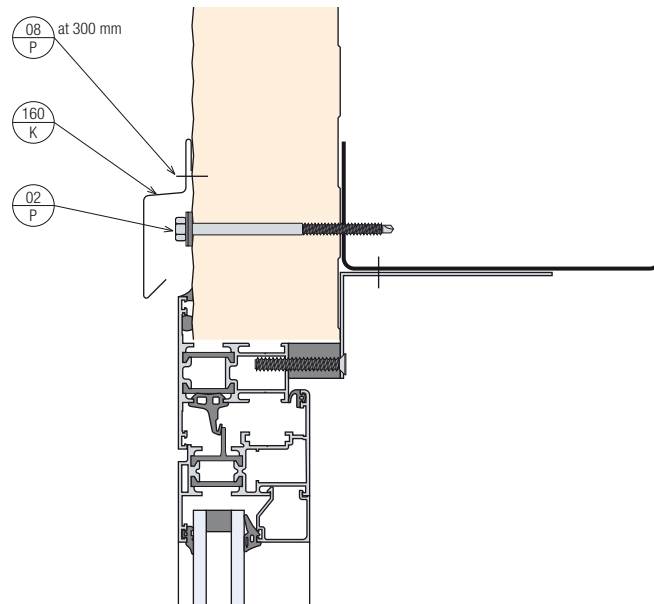
**a** according to structural/static requirements

*All technical information is subject to alterations. Errors and omissions excepted.*

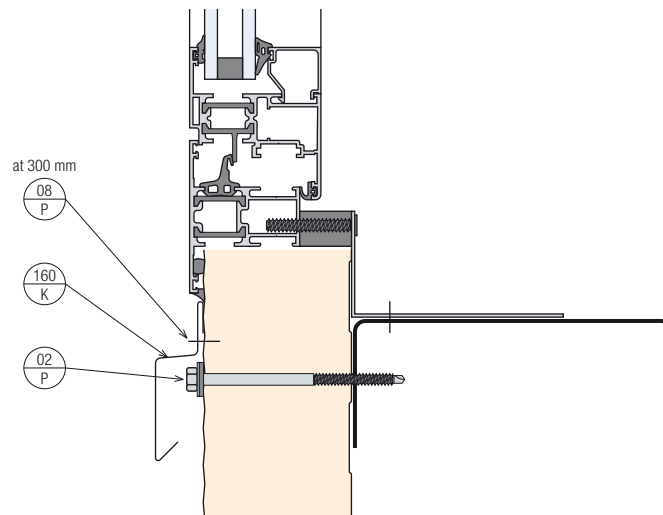
## Wall Panels

## Aluminium Window – coplanar (horizontal)

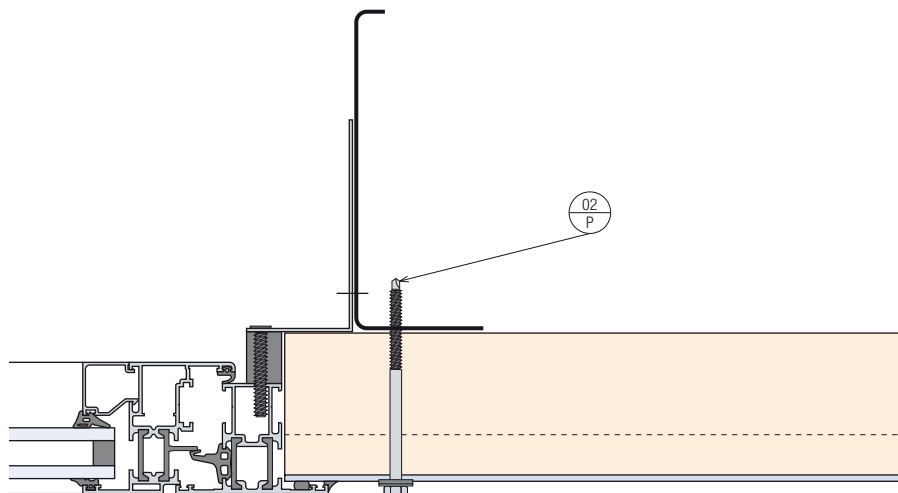
Head



Cill



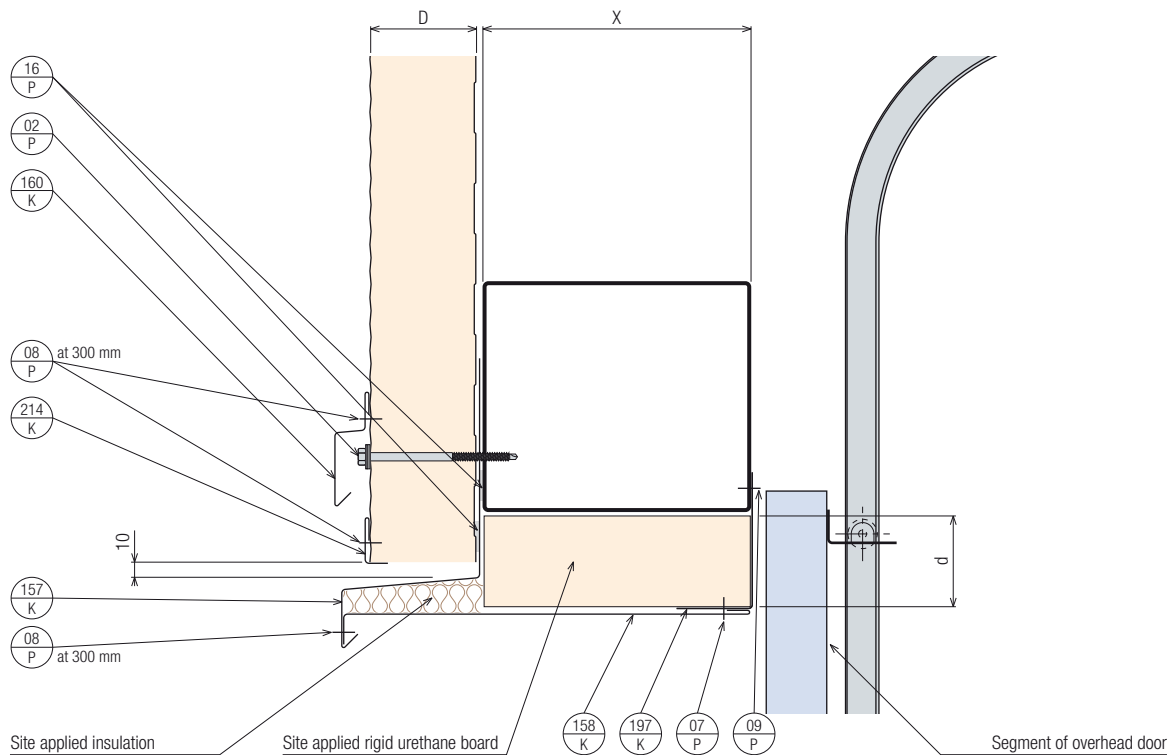
Jamb



All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

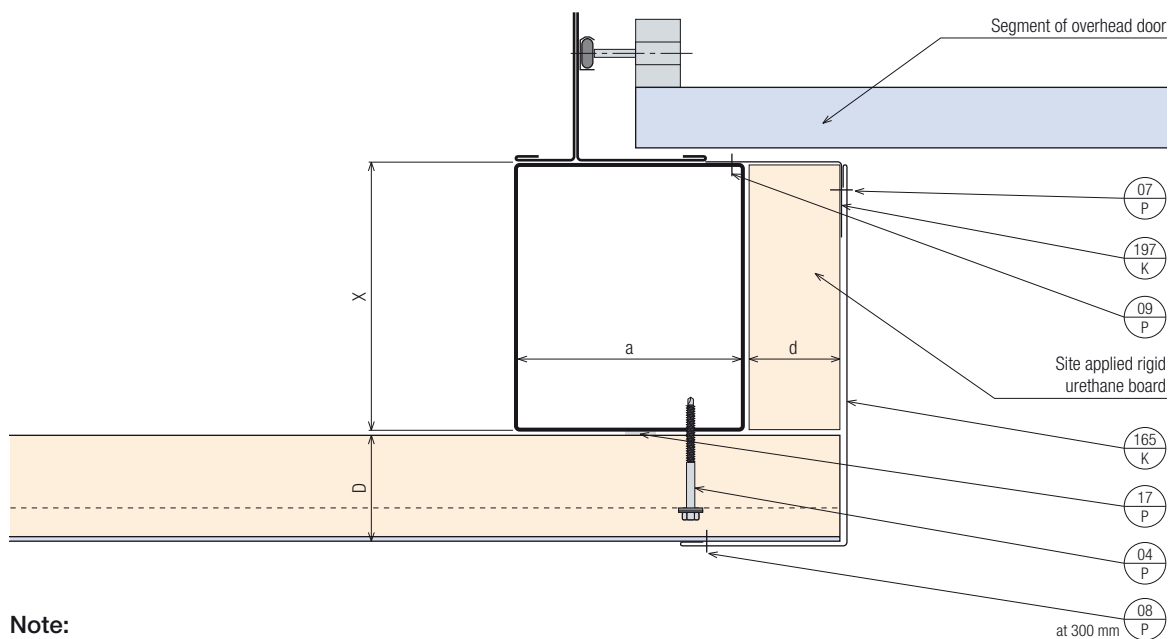
### Roller Shutter Door (horizontal) – Head



#### Note:

**X** specify dimension to define flashing K158

### Roller Shutter Door (horizontal) – Jamb



#### Note:

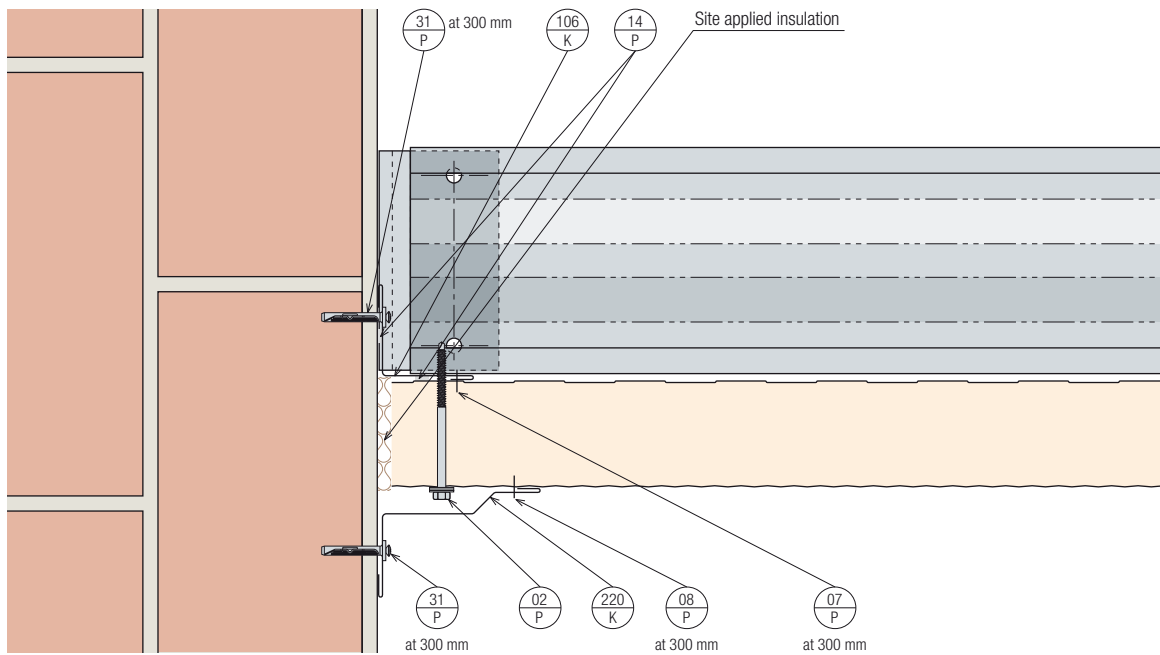
**a** according to structural/static requirements

**X** specify dimension to define flashing K165

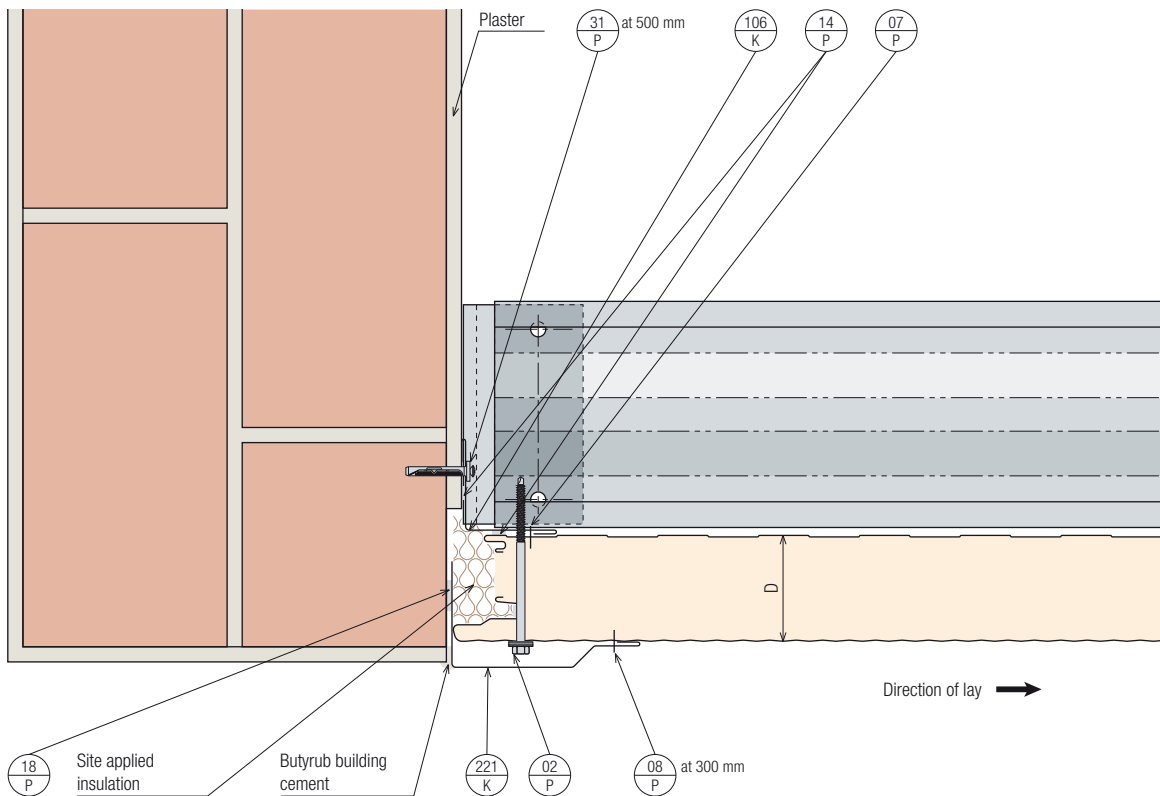
*All technical information is subject to alterations. Errors and omissions excepted.*

## Wall Panels

### Wall Junction (vertical)



### Wall Junction (vertical)

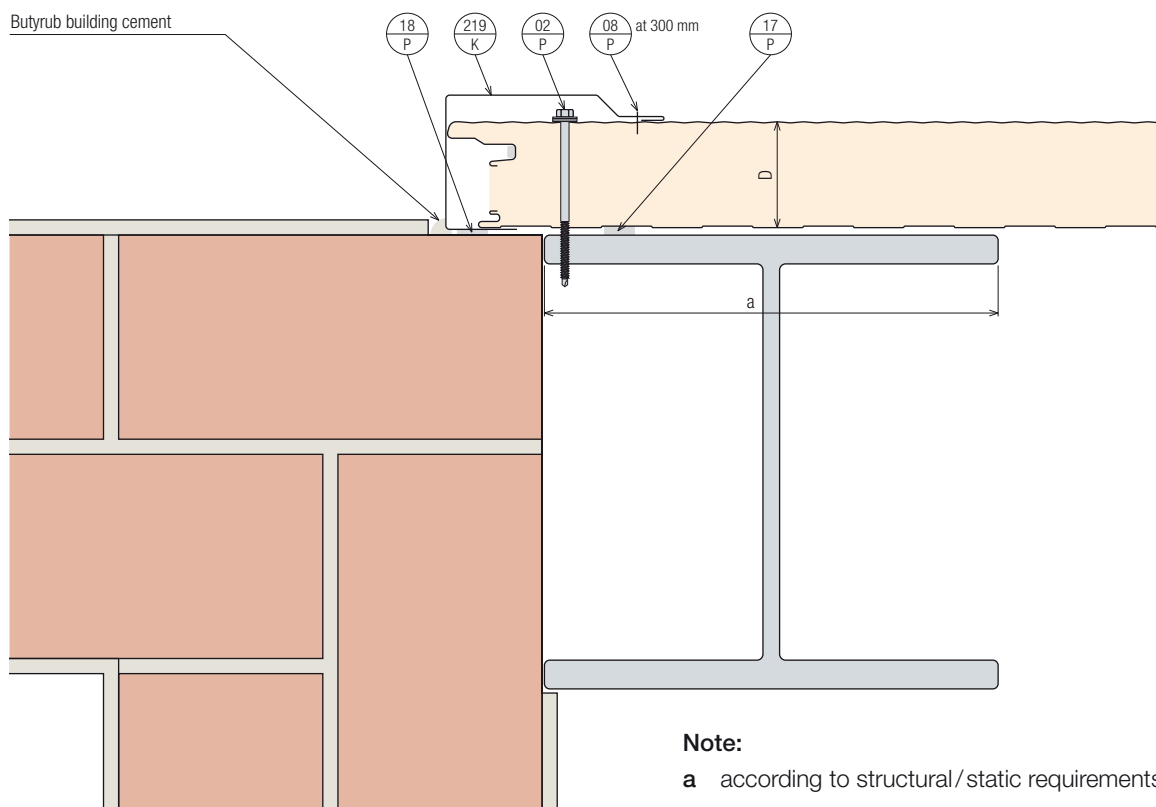


All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Wall Junction (vertical)

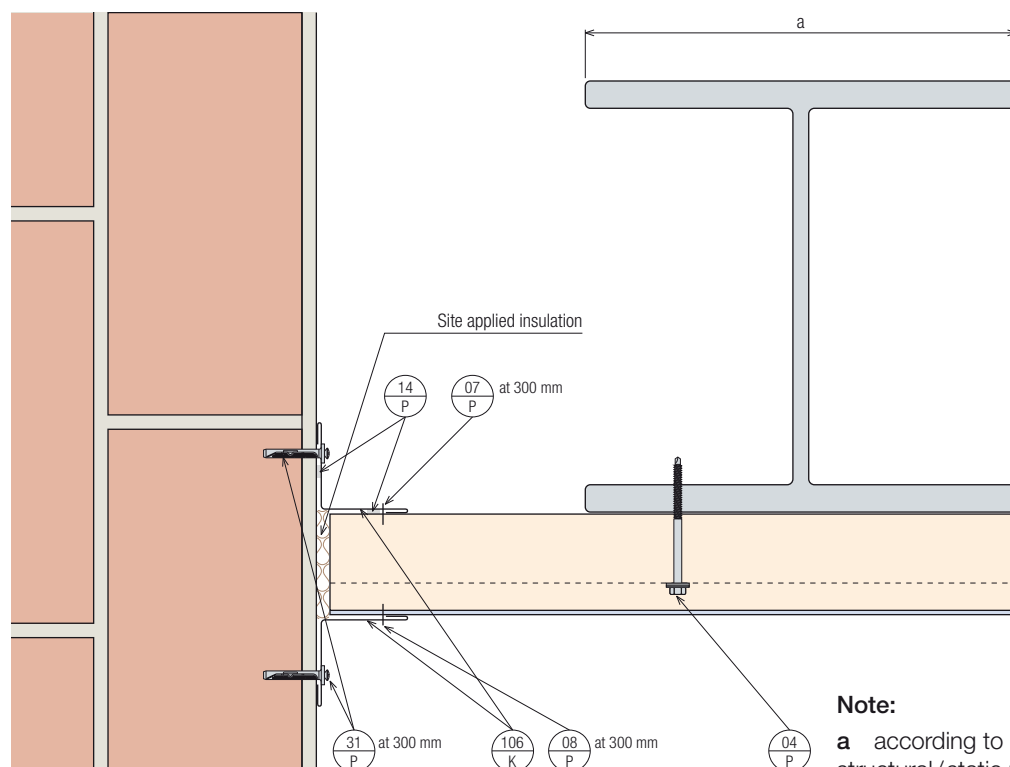
Butyrub building cement



**Note:**

**a** according to structural/static requirements

### Wall Junction (horizontal)



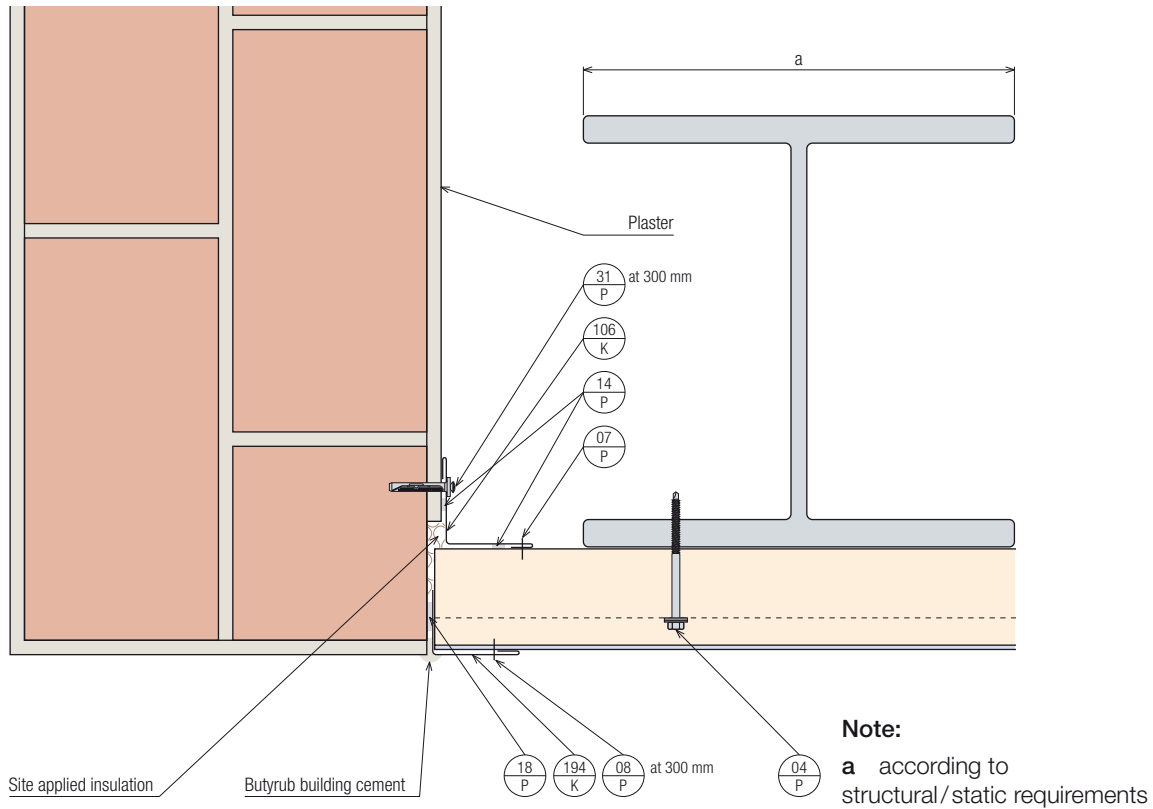
**Note:**

**a** according to structural/static requirements

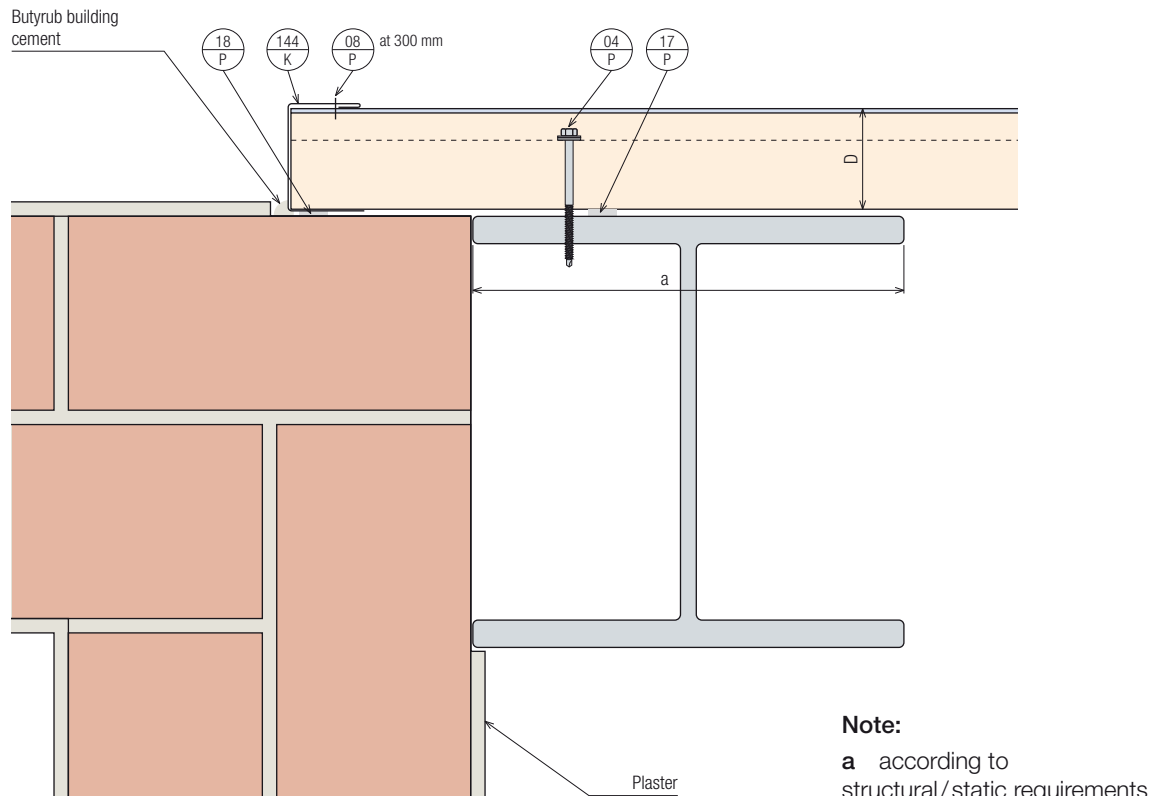
All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Wall Junction (horizontal)



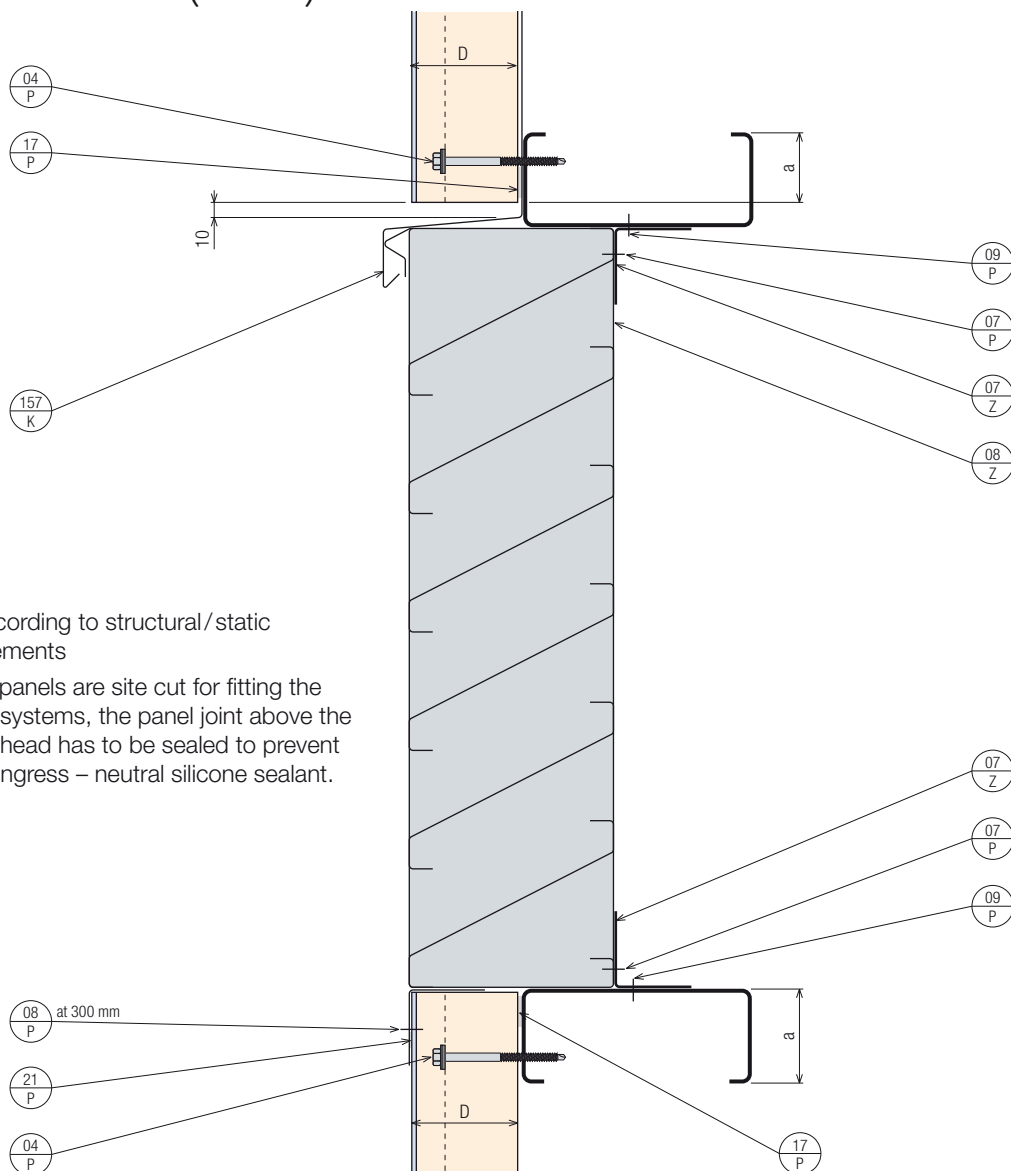
### Wall Junction (horizontal)



All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

### Louvre Head & Cill (vertical)

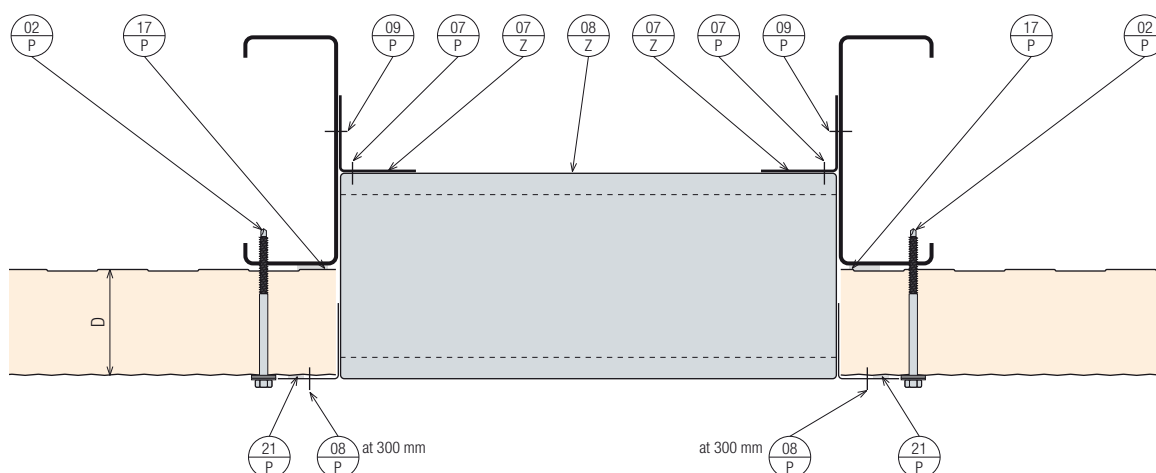


**Note:**

**a** according to structural/static requirements

When panels are site cut for fitting the louvre systems, the panel joint above the louvre head has to be sealed to prevent water ingress – neutral silicone sealant.

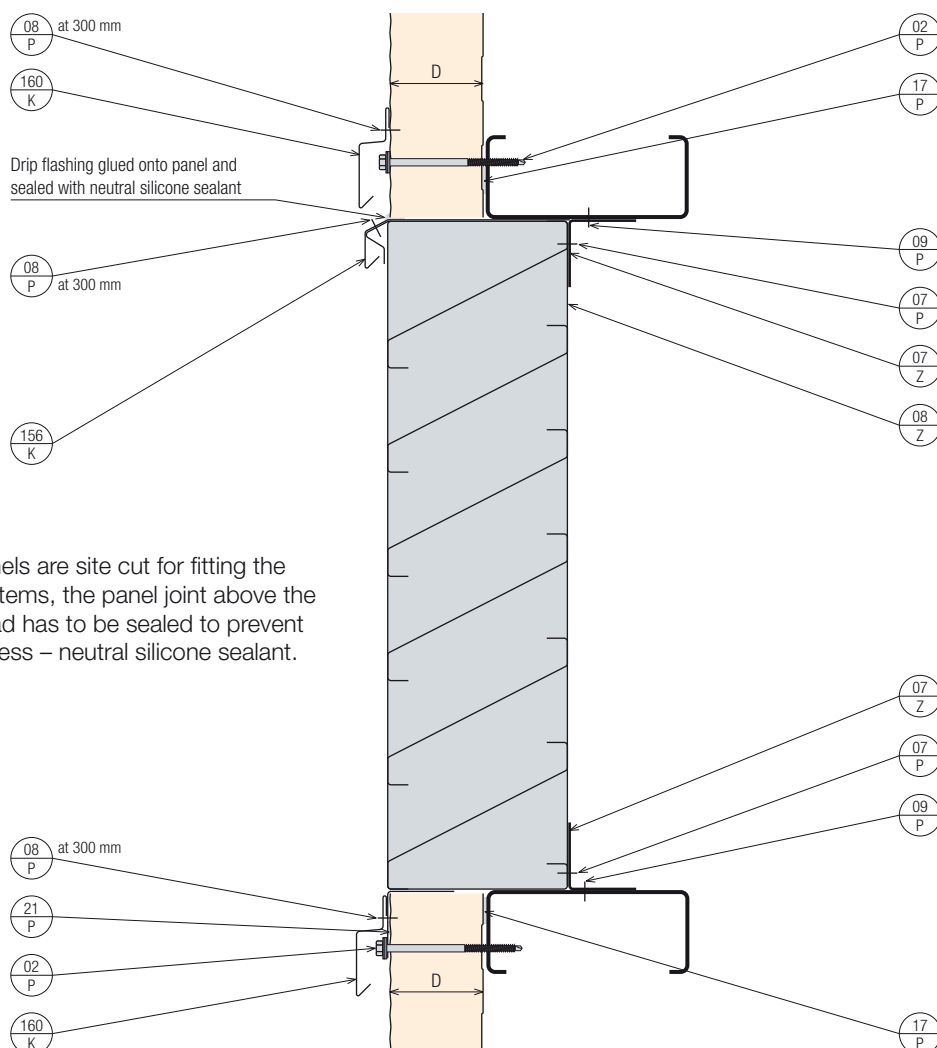
### Louvre Jamb (vertical)



All technical information is subject to alterations. Errors and omissions excepted.

## Wall Panels

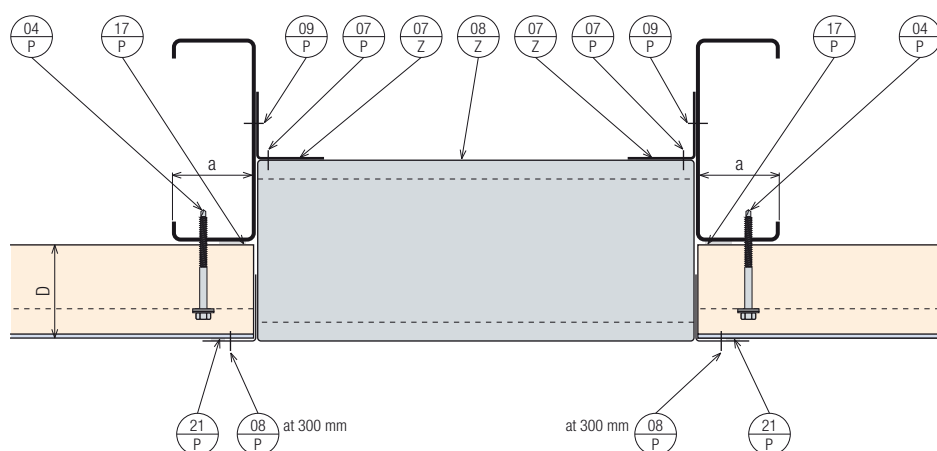
### Louvre Head & Cill (horizontal)



#### Note:

When panels are site cut for fitting the louvre systems, the panel joint above the louvre head has to be sealed to prevent water ingress – neutral silicone sealant.

### Louvre Jamb (horizontal)



#### Note:

**a** according to structural/static requirements

All technical information is subject to alterations. Errors and omissions excepted.

# Accessories

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■	Eave Rainwater System Specification – Angular	8.63
■	Eave Rainwater System Specification – Round	8.70
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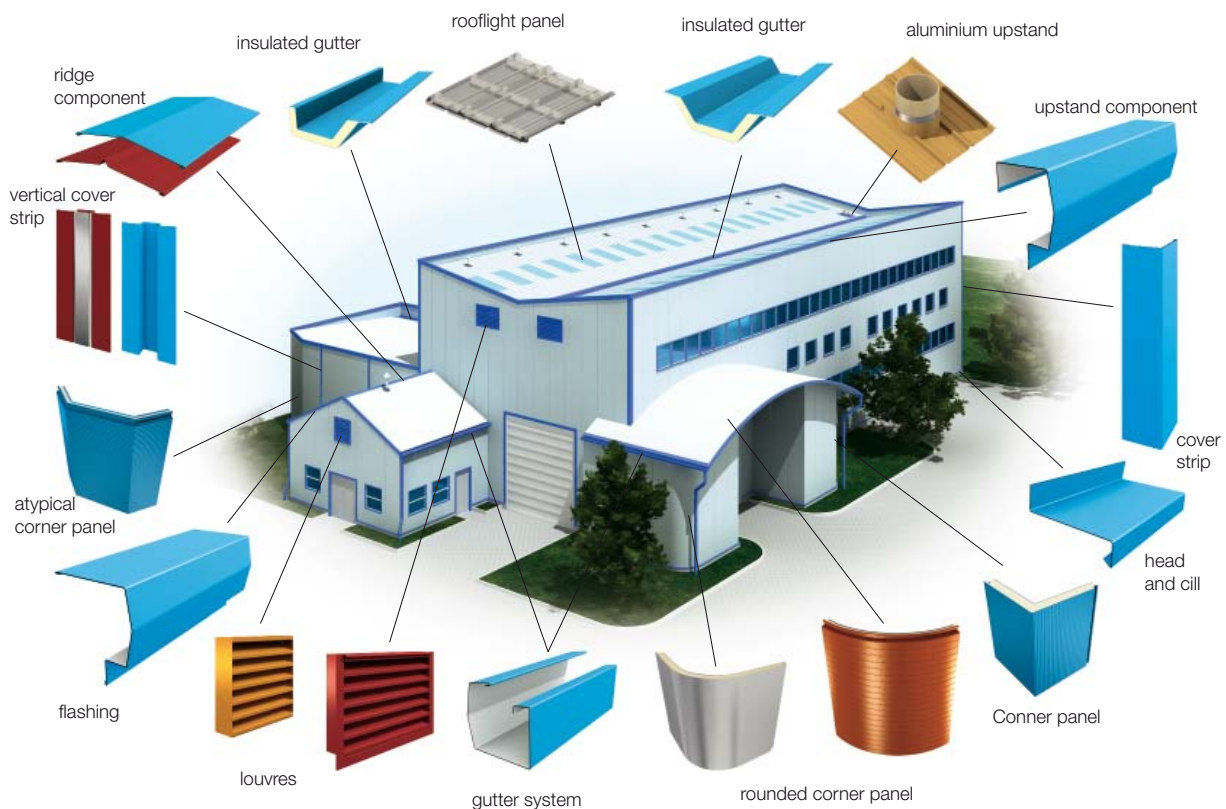




## Introduction

Kingspan has become the market leader in the specialist industry of providing ancillary components for completing all aspects of any buildings. High capital investment on flexible manufacturing equipment and systems enables rapid turnround of high quality components from order to site delivery to be achieved meeting clients and installers timeline requirements. Architects can incorporate special features to give their designs an individual and unique appearance, confident in the knowledge that Kingspan can turn them into reality. Including corporate styles or individual one-off designs, Kingspan can meet your requirements – and always to the same high standards of quality.

Kingspan manufacture and supply an extensive range of standard and bespoke ancillary components, which can be used to enhance the architectural imagery of the building. Kingspan's Technical Services and ancillary manufacturing operation provide designers and constructors with a total service package, both at design and through the construction and installation process.



## Flashings components

Flashings components made to supplement the complete roof and wall systems Kingspan, are manufactured from coated galvanized metal sheets 1,250 mm wide maximum and up to 8,000 mm long (the recommended length of flashing components is 6,000 mm).

### Roof flashing components

- Ridge components
- Expansion joints
- Rooflight flashing
- Roof panel junctions to walls
- Roof panel junctions to panel walls
- Gable flashings
- Parapet flashings
- Gutter flashings

### Wall flashing

- Corner and internal corner flashing
- Panel joint strips
- Panel junctions to adjoining buildings
- Cill flashings
- Openings flashing
- Window, door and gate flashing
- Louvers flashings

### MATERIAL SPECIFICATION

#### Source material

Galvanized metal sheet with coating 1,250 mm wide maximum (fully spread).

#### Metalsheet thickness

Standard thickness of 0.6 mm is available in standard colours, other thicknesses are possible according to suppliers production technology (0.5 mm, 0.6 mm, 0.75 mm, galvanized metalsheet 1 mm)

#### Internal surface coating:

- Polyester coating

#### Exterior surface coating:

- PES/polyester 25

High performance surface coating 25 µm thick with medium term life.

- Pvf2 (PVDF)

High performance surface coating 25 µm thick with excellent colour stability.

- PLASTISOL

One-side, high performance coating 200 µm, high levels of durability and colour stability, is highly resistant to damage in transit on site and assembly.

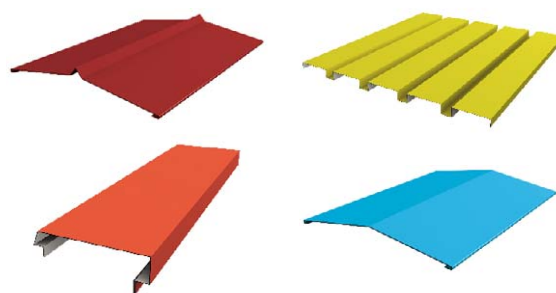
#### ■ Kingspan Spectrum™

60 µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability and weather resistance performance, its superior flexibility enables high resistance against mechanical damages.

### COLOUR RANGE

- Standard colours available according to Kingspan colour chart
- Please contact Kingspan for special colour shades requirements

### Ridge components



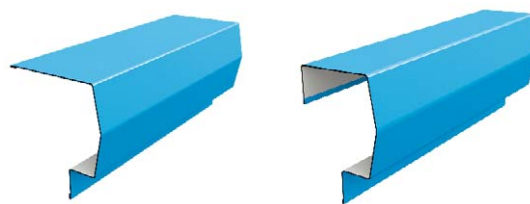
### Corner flashings



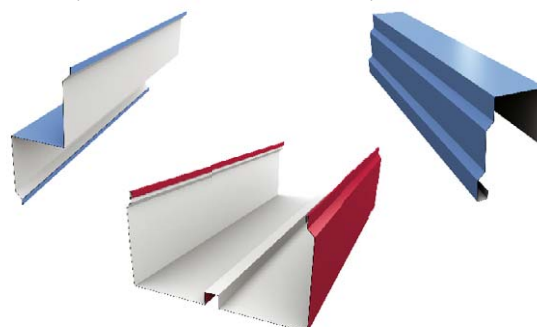
### Head and Cill



### Verge components



### Samples of non-standard production



## Rainwater system

### Drainage components characteristics

- Colour corresponding to wall and roof
- Simple and fast assembly
- Attractive design
- Insulation quality of pre-fabricated insulated rainwater systems is comparable to panels of the same thickness.

### Roof drainage systems

- Kingspan eaves gutter system (angular) – level
- Eaves gutter system (semi-circular)
- Kingspan prefabricated thermally insulated gutter system – level
  - Valley gutter
  - Boundary gutter

### External Gutter system

The rainwater drainage off the roof into the sewer system is important part of roof systems. Kingspan offers external gutter system (angular or semi-circular) for gable and pitch roofs without a parapet.

Level angular external gutters

- Gutter capacity (standard profile) = 11.8 l/s
- Outflow capacity (Ø 100 mm) = 4.7 l/s
- Outflow capacity (Ø 150 mm) = 9.1 l/s
- Maximum outflow span = 15.0 m

Level external gutters Kingspan are manufactured according to supplier's abilities from galvanized metalsheet 0.6 mm thick with single-side coating (PES/polyester 25 µm or Plastisol 200 µm) 6,000 mm long.

All accessories (gutter support, connections, heads, corner components, downpipes, elbowpipes...) are components of the system.

### System components

- Hanging gutter (gutter connections)
- Downpipe (angular)
- Gutter support
- Outlet
- Downpipe sleeve
- Sill and spout elbow-pipe accessories (rivets, fasteners, caps, sealant, stub nail)

### Kingspan Insulated Gutter System – valley and boundary gutters

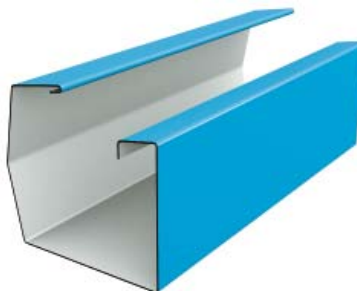
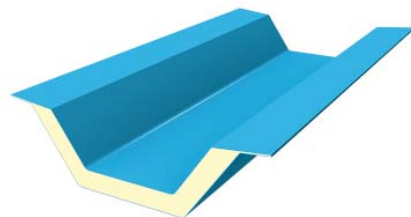
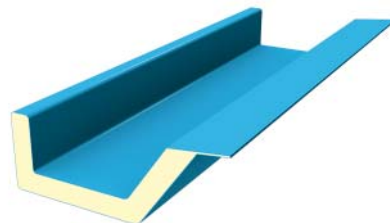
It is necessary to design a drainage system to internal drainage in case of gable and pitch roofs without a parapet. Kingspan offers the internal drainage system of level prefabricated insulated valley and parapet gutters.

- Manufactured according to customer's requirements
- From galvanized metalsheet 0.6 mm thick, PES/polyester 25 µm, Plastisol 200 µm or Skinplate 0.75 mm, 500 µm in Kingspan standard shades.
- Thermal insulation from IPN or mineral fibre. IPN insulation can be 40, 50, 60, 70, 80, 100 or 120 mm thick, mineral fibre insulation can be 60, 80, 100, 120 or 150 mm thick.
- Standard gutters include standard heads/or with overflow.

When designing internal gutter, please keep in mind, that vertical drainage system can not cross with horizontal support components of roof construction (girders, clamps, purlins, etc.).

As the gutters are not self-supporting, it is necessary to adjust the steel construction for their application or to use hooks.

Kingspan recommends electrical heating of gutters.



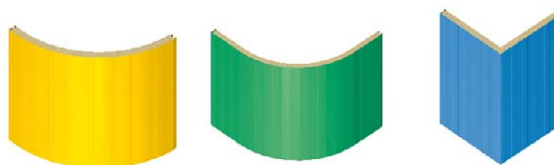
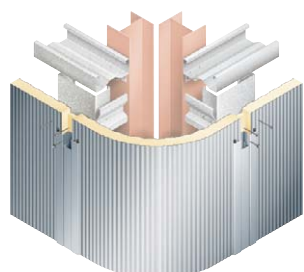
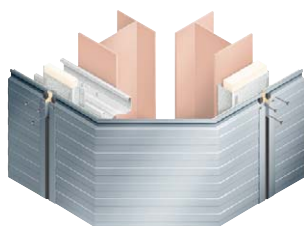
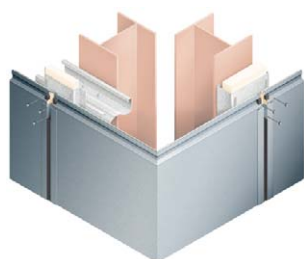
## Corner components, Steel sheets, steel in coils

### Pre-formed corner panels

Wall panels TF, AWP, FR, FH, TL and TC allow to use pre-formed sandwich panels for corners. Detailed pictures show the way of junction to standard wall and geometry of corners.

#### ADVANTAGES

- Accessory to sandwich panel systems
- Simply assembly
- Innovative and attractive solution
- Wide colour range



vertically laid panels



horizontally laid panels

### Steel sheets

Accessories Division delivers metal sheets formed by its own machinery. Metal sheets are available in wide range according to metal sheets used for manufacture of Kingspan panels. Metal sheets length according to customer's requirements. Maximum recommended length is 6,000 mm. Metal sheet width depends on sheet span and can vary from 1,100 to 1,250 mm. Metal sheet thickness range from 0.5 to 0.75 mm.

External facing of metal sheet is protected by foil. The metal sheets are despatched on wooden pallets.



### Steel in coils

- Rewinding is secured on Kingspan equipment
- Delivery of the quantity according to the customer requirement (maximal weight of one coil is 3 t depending on steel thickness)
- Width of the coil is between 1,058 and 1,250 mm
- Thickness of the steel is between 0.5 and 0.75 mm
- Colour shades of the steel in PES coating available according to the current standards
- Other coating and colours available according to actual stock situation
- Coils are powered by protective foil on the exterior side



## Tophats

Vertical tophats are used for overlap of the cross joint at horizontally laid panels

Max. length: 7 m

### Materials

- Zinc coated steel with final surface coating

Steel thickness:

Standard steel thickness 0.6 mm is delivered for Kingspan standard colour shades

Standard exterior surface coating:

- PES/polyester 25

High performance surface coating 25 µm thick with medium lifetime

- Kingspan Spectrum™

60 µm Polyurethane coated semi gloss finish with a slight granular effect. It offers an outstanding durability and weather resistance performance. Its superior flexibility enables high resistance against mechanical damages.

- Pvf2 (PVDF)

High performance surface coating 25 µm thick with excellent colour stability

- Foodsafe

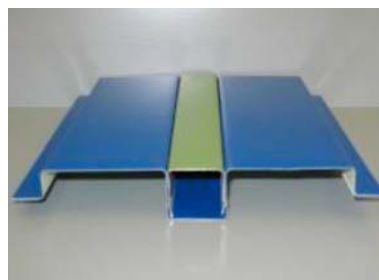
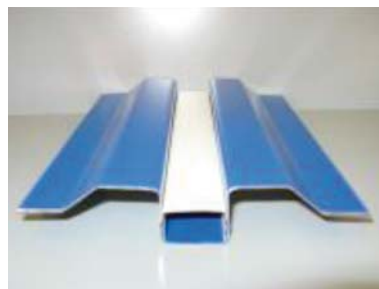
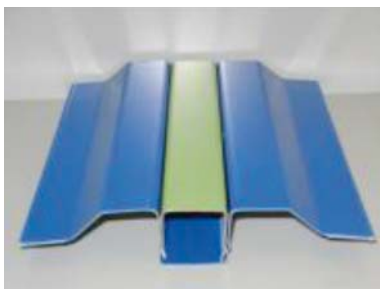
The surface of this 150 µm thick polymer coating is non-toxic and resistant to mould, durable and easy to clean. It is chemically inert and safe for continuous contact with unpacked food. Steel thickness 0.5 mm.

- Stainless steel

Stainless steel with thickness 0.5 mm.



catalogue K175a



atypical tophats

## Wall-Lite™

Wall light panel KS1000 WL is a product designed for any buildings where wall panels Kingspan KS1000 AWP are used. The panel is made from polycarbonate and it helps to reach optimal thermal values of the insulated building. The panel is suitable for all types of buildings except those with high air humidity caused by the influence of building users or production processes. They are also not suitable for buildings with low inside temperature.

### Application

Wall light panel KS1000 WL can be used for vertical and horizontal cladding. Maximal span is determined by the static tables calculation.

### Materials

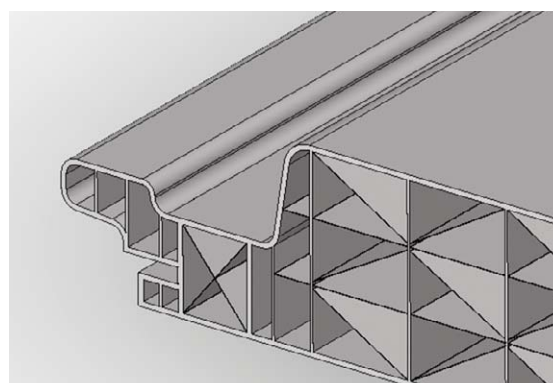
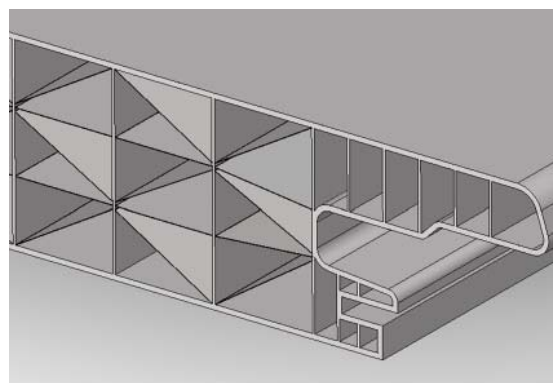
Polycarbonate chamber board, thickness 38 mm. Colour: clear. It is possible to offer other colour shades according to actual stock situation.

### Construction

- Modular width 1,000 mm
- Weight: 4.7 kg/m<sup>2</sup>
- Panel joint shape corresponds to the joint of panel KS1000 AWP
- Thickness difference between panel KS1000 AWP and panel KS1000 WL is solved by aluminium distance profiles
- Distance profiles are available for thicknesses of following panels: KS1000 AWP 60, 80, 100
- Length: max. 6,000 mm
- Exterior side is provided with UV filter.
- Thermal characteristics - U value = 1.26 W/m<sup>2</sup>K
- Sound depression ( $R_w$ ) 24 dB

### Light transmission

Transmission range is 55 % for clear colour. In case of other colour shade, please contact Accessories department Kingspan.



Polycarb Rooflight – Natural Light Trapezoidal Translucent System

Introduction

Sustainability is the latest buzzword in not just the construction industry, but in the wider environment too. Sustainability however is far from just being a ‘fad’ it is a way of living and constructing, to help preserve the environment in which we live. There are indeed many ways of acting sustainably, but one of the easiest and cost efficient ways is to reduce the energy that we use.

One way of reducing the energy we use is to reduce our reliance on artificial lighting to light our buildings. How though, do you reduce the amount of artificial light yet maintain a workable level of lighting? The answer is to incorporate rooflight systems into roof constructions. By allowing more natural light in to a building, the need for artificial lighting is reduced.

The benefits of using rooflights go further than just reducing our energy consumption; research has shown that increased levels of daylight can aid health, learning and also increase productivity.

The Kingspan Polycarb Rooflight allows natural light to penetrate in to the building, therefore reducing the need for artificial lighting. The rooflight system, which is designed for use with the KS1000 RW system, is made from polycarbonate, a lightweight, high performance, durable plastic. It has superior UV resistance and will not discolour over time coupled with a U-value of 1.64 W/m²K.

Product Data

Available Lengths

Kingspan Polycarb Rooflight panels are available in standard lengths from 1.8 to 6.44 metres. Longer lengths can be manufactured on request.

Dimensions & Weight

Dimension A – core thickness nominal [mm]	20
Dimension B – overall dimension [mm]	55
Weight [kg/m²]	3.3

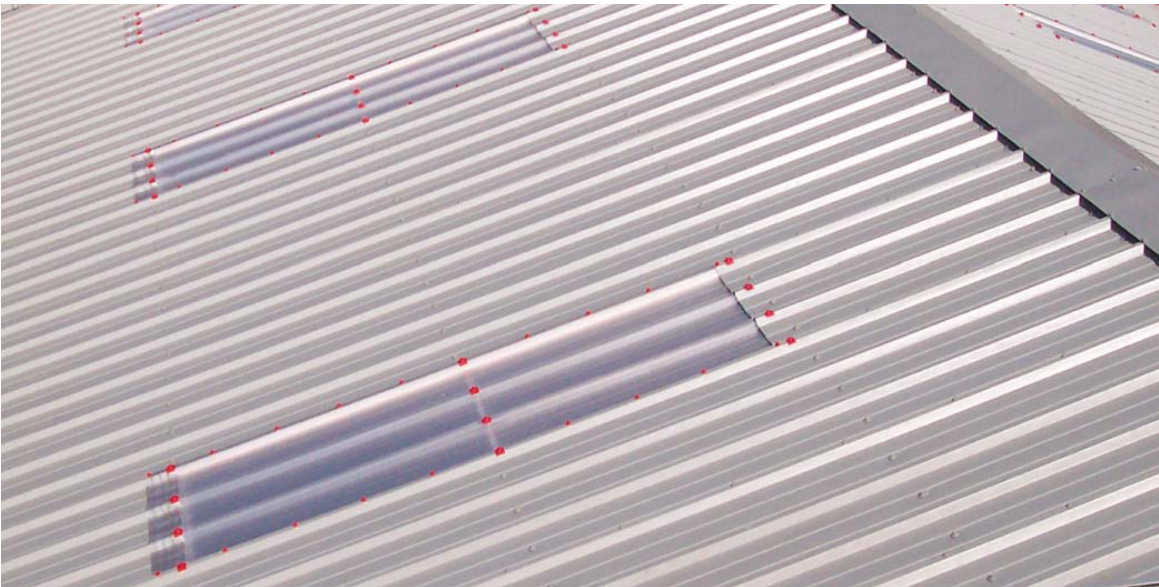
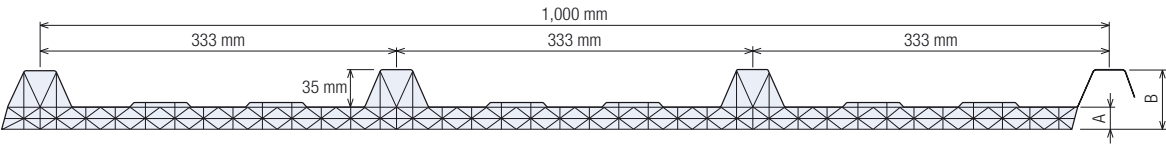
Performance & Properties

Light Transmission

Clear Polycarbonate

- 63% light transmission to EN410
- 76% solar transmission to DIN 67507

Polycarb Rooflight – Application with KS1000 RW



## Rooflight panels HTL

Rooflight is an optimal appliance to enable daylight to the interior of the building. This applies especially to longspan roofs, where skylights or rooflight panels are the only way to effectively fulfill requirements of even daylight spread inside the building. Rooflight panels are laid at the roof surface level. In case of rooflight panels there is no light loss compared to skylights (skylight support, transversal skylight walls).

### Application

A KS1000 HTL – Hybrid Rooflight is a product with GRP top sheet and polycarbonate bottom sheet combination for buildings with Kingspan KS1000 RW and KS1000 FF roof panel where thermo insulation and designed surface are required.

#### The basic conditions of the installation:

- Slope of the roof minimum for RW = 5.7° (10 %); for FF = 8° (14 %)
- Standard overlap is 250 mm
- Distance between supports must be determined from the span tables calculation. Please, contact technical department Kingspan.

### Fire performance

- Grade of fire spreading: without fire spreading
- Property of “burning while dropping”: burning while dropping
- Fire classification: hard to burn
- (TMI-28/2007)

#### Note!

In case of Roofligths, there are exceptions from the fire resistance regulations in the following cases:

- In case the internal height of building is min. 3 m
- In case there are no flammable materials (stored or built in) in the following ranges:
  - within 1 m range (vertical and horizontal ) of rooflight
  - within 3 m distance from the level of the roof support elements

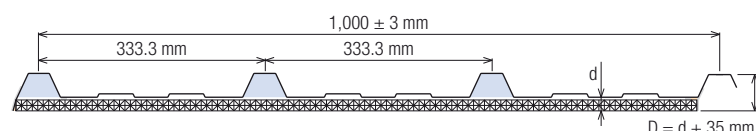
### Light transmission

Approximately 55 %

### Dimensions

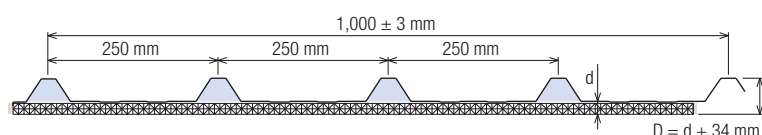
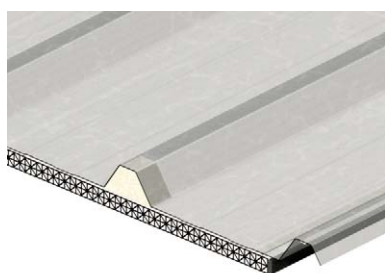
- The shape of the GRP top layer is same as the shape of KS1000 RW roof panel.
- Standard length: max. 6,250 mm (including overlap 250 mm)
- Width: 1,000 mm (polycarbonate)

#### KS1000 RW/HTL



d [mm]	U [W/m²K]	weight [kg]
16	2.124	5.0
25	1.738	5.9
32	1.34	6.6

#### KS1000 FF/HTL



d [mm]	U [W/m²K]	weight [kg]
16	2.124	5.0
25	1.738	5.9
32	1.34	6.6

## Rooflights panels GRP40

Rooflight is an optimal appliance to enable daylight to the interior of the building. This applies especially to longspan roofs, where skylights or rooflight panels are the only way to effectively fulfill requirements of even daylight spread inside the building. Rooflight panels are laid at the roof surface level. In case of rooflight panels there is no light loss compared to skylights (skylight support, transversal skylight walls).

### Applications

The KS1000 GRP are factory assembled double skin units which can be used with KS1000 RW where the roof slope is 6° (10 %) or more and KS1000 FF where the roof slope is 8° (14 %) or more. Maximum available panel length is 6,500 mm including overlap.

Rooflight panels can be laid as chequerboard or in ridge following roof inclination, rooflight panels layout influences daylight spread inside the building.

### Materials

External and internal facing from fibreglass sheets 1.2/0.8 mm thick with maximum wave of 35 mm are joined together by PE distance spacers.

### Light transmission

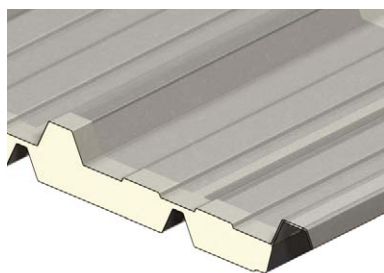
GRP rooflight panels transmit 70 % of the light and are opaque.

### Construction

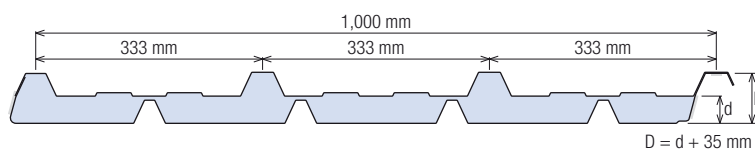
Maximum distance of rooflight panels supports can be 1,200 mm (please consult with Kingspan Technical Bureau).

### Fire protection

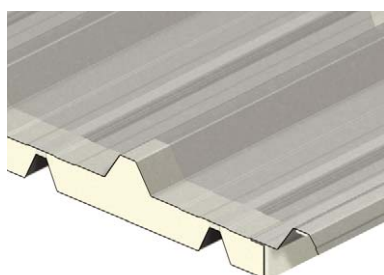
Kingspan rooflight panels comply with standard building regulations and norms for fibreglass fibre products and their technical parameters.



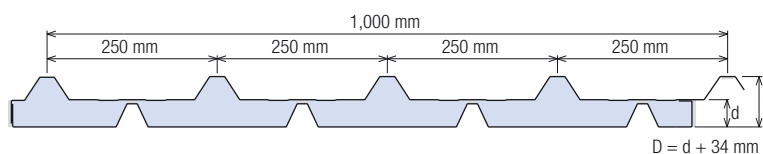
KS1000 RW/GRP40



d [mm]	U [W/m²K]	weight [kg]
40	3.0	3.7



KS1000 FF/GRP40



d [mm]	U [W/m²K]	weight [kg]
40	3.0	3.7

## Aluminium programme

Aluminium products, which are very effective and easy for installation with faultless functionality, can highlight the originality of any building. Primary material used is aluminium sheet with final komaxit coating. This guarantees a high quality and life time of the parts as well as a colour range according to the request of a customer.

### Al louvres

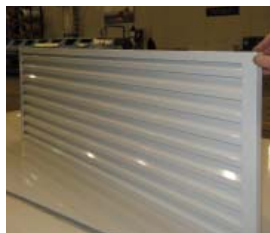
The advantages of these products are shape variability and possibility of any colour coating.

Louvers are made for ventilating of buildings, either direct or connected to a ventilating system.

#### Technical parameters:

Louvers can be produced upon agreement in dimensions and shapes according to individual needs of a customer, in max. length up to 3,000 mm and width up to 1,500 mm.

- High shape variability
- No standard shapes
- Production to individual needs of a customer
- Komaxit coating
- For high-powered operations



- Round max. 800 mm

Different dimensions can be produced upon agreement.

- High shape variability
- No standard shapes
- Upstands for RW and FF panel
- Production to individual needs of a customer
- Komaxit coating
- Finished product, no other completion works

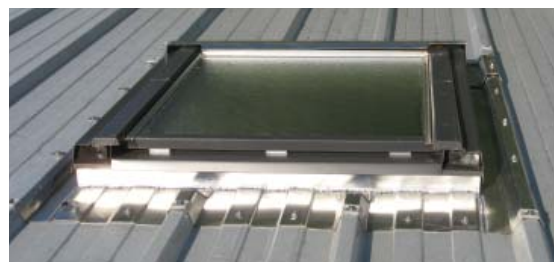
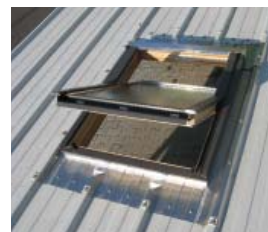


### Upstands for roof windows

It is possible to produce various dimensions to fit the building, for Velux and Fenestra roof windows.

#### Examples of available dimensions:

- 78 × 98
- 78 × 118
- 78 × 140
- 78 × 160



### Roof upstands

Aluminium Upstands allow trouble free sealing for installation on the roof. As a final product it does not require any other finishing works.

Optimal usage of Upstands is for RW panels or for flat roofs (TOP-DEK panels/X-DEK), alternatively according to the needs of a customer.

#### Standard technical parameters:

- Width max. 1,000 mm
- Length max. 3,000 mm
- Square max. 2 m<sup>2</sup>

## Aluminium programme

Special insulated upstands – for RW, FF, TOP-DEK (komaxit coating)

Fire damper SO<sub>2</sub> with termosensor

example of the thermal performance:

order size	U value
100 × 100	2.7 W/m <sup>2</sup> K
100 × 200	2.7 W/m <sup>2</sup> K
120 × 120	2.7 W/m <sup>2</sup> K

Point rooflight (possible with electromotor)

example of the thermal performance:

order size	U value
100 × 100	2.7 W/m <sup>2</sup> K
100 × 200	2.7 W/m <sup>2</sup> K

For delivery possibilities of Fire damper SO<sub>2</sub> and Point rooflight please contact Accessories department Kingspan.



## Architectural parts and special constructions

Architectural parts aesthetically reinforce the overall design of a building. There are no standards set, only unique parts are produced based on the project of a building. These parts are original in their appearance, offering the possibility of various architectural versions, colour combinations and workshop processing.

**Arc attics:**

- Length max. = 3,000 mm
- Radius min. = 230 mm

Other parts can be produced upon agreement in relation to project specification. Full offer and pricelists are available from Sales representatives.



## Aluminium window frames

- Custom manufacturing according to the project design
- High variability



## Zinc coated profiles

- Production on Kingspan equipment (bending machine 8 m, press brake 3 m) according to customers' requirements
- Different profiles (Z,U,L ...+ atypical)
- Profiles with verges
- Very flexible delivery terms and production shapes
- Profiles are despatched on wooden palettes or steel boxes, depending on the order size
- Profiles up to 8 m length available in steel thickness up to 1 mm
- Profiles less than 3 m length available in steel thickness 1.5, 2 and 3 mm



## Fe Louvres

Company Kingspan offers ventilation louvres as accessories to insulated panel systems.

Standard louvres are manufactured from galvanized metal sheets.

Standard louvres are available 1,000 mm long and up to 3,000 mm wide. Louvre construction is manufactured from bended steel sheets riveted to cladding frame at both sides (front and back). Protective net to prevent insect getting inside can be supplied; it is not part of standard delivery. Other louvres of different profiles, rib spacing, sizes and shapes can be delivered according to customer's requirements.

### Characteristics

- Colour shades corresponding with the wall/roof colour shade
- Standard module height 1,000 mm
- Standard module width from 500 to 3,000 mm
- Standard module depth 100 mm
- Special louvres can be delivered according to customers' requirements

### Material specifications

- Frame and ribs are manufactured from galvanized steel sheets
- Standard sheet width is 0.6 mm
- Coating:

- PES/polyester, coating 25 µm, anti-corrosive finish applied to a galvanized steel sheet with the average lifetime
- Plastisol, coating 200 µm, excellent finish with extra long lifetime, colour fastness, resistant to corrosion, resistant to damage during transport and installation
- Pvf2, coating 25 µm, fluorocarbon finish with colour fastness also in temperatures over 120 °C and very good lifetime
- Kingspan Spectrum™, coating 60 µm Polyurethane coated semi gloss finish with a slight granular effect.

It offers an outstanding durability and weather resistance performance, its superior flexibility enables high resistance against mechanical damages.

Internal facing is finished with protective coat (usually light grey shade).

Material specification depends on production facilities of company Kingspan (please consult with Kingspan Technical Bureau).



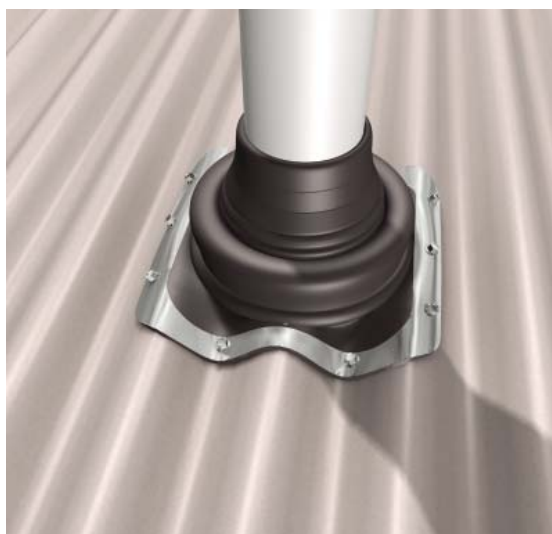
## Passage Piping Packing

### MF STANDARD

solution for sealing round pipe penetrations on steel finished roof

#### Benefits:

- Excellent sealing of round pipes penetrations on roof and wall panels.
- Rubber elastic collar compensates thermal and dynamic movements of pipes.



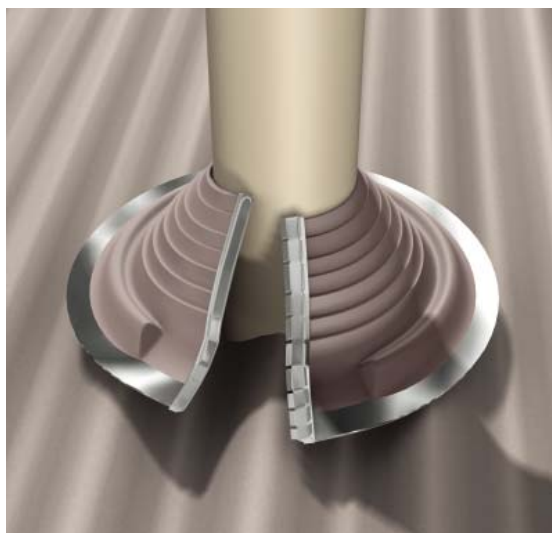
Reference		Pipe diameter [mm]	Base dimension [mm]	Tubes of silicone [pcs]		Fasteners 7510-5,5 x 25 E16 [pcs]
				40 ml	80 ml	
STANDARD	Mini	3–19	57 x 57	1		4
	MF1	6–50	114 x 114	1		8
	MF2	32–76	152 x 152	1		12
	MF3	6–102	203 x 203	1		16
	MF4	76–152	254 x 254	1		16
	MF5	102–178	280 x 280		1	20
	MF6	127–228	305 x 305		1	20
	MF7	152–280	356 x 356		1	24
	MF8	178–330	432 x 432	1	1	28
	MF9	254–457	635 x 635		2	44
	MAXI	330–660	864 x 864		3	64

### MAGE RETROFIT

for sealing of existing penetrations

#### Benefits:

- For use in difficult roof conditions.
- Installation on existing pipes without uninstalling the tube.



Reference		Pipe diameter [mm]	Base dimension [mm]	Tubes of silicone [pcs]		Fasteners 7510-5,5 x 25 E16 [pcs]
				40 ml	80 ml	
RETRO FIT	RF 1	13–102	208 x 208	1		17
	RF 2	102–235	362 x 362		1	25
	RF 3	235–413	546 x 546		2	41

## Passage Piping Packing

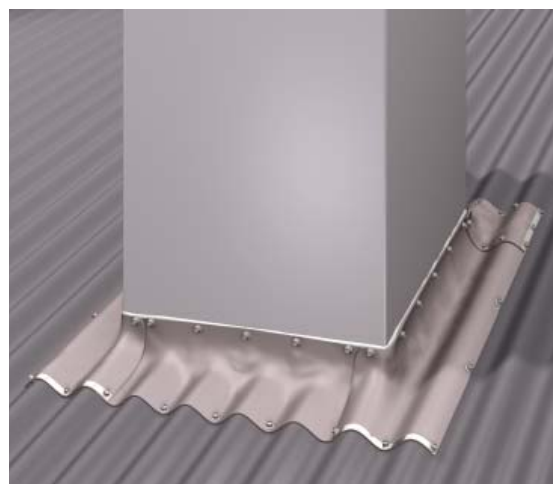
### STRIPFLASH

#### Benefits:

- Sealing of circular and rectangular sections.
- Material of sealing allows 20% elongation at edges.
- The sealing is possible to be painted with acrylic paint.
- Application up to 40 mm of weather sheet section height.

#### Remark:

- Application on rectangular tubes requires fixing with rivets or screws, consult with mechanical engineer possibility of drilling the tube skin.



Reference	Length [m]	Width [mm]	Tubes of silicone 80 ml [pcs]	Fasteners 7510-5,5×25 E16 [pcs]
STRIP 235 mm / 10 m	10	235	20	410
STRIP 450 mm / 15 m	15	450	30	620

## Fastening & Sealing Components

Ref.	Description
P01	Self-drilling or self-tapping screw with sealing washer, callot and plastic cap – to be determined by the designer (for panel/construction – crown locations) (see chapter Fixing screws)
P02	Self-drilling or self-tapping screw (with thread under head) with sealing washer, plastic cap – to be determined by the designer (for panel/construction – crown locations) (see chapter Fixing screws)
P03	Self-drilling screw with groove under the head and sealing washer – to be determined by the designer (for sheet steel/sheet steel)
P04	Self-drilling or self-tapping screw (with thread under head) with sealing washer (plastic cap) – to be determined by the designer (for panel/construction – valley locations) (see chapter Fixing screws)
P06	Self-drilling or self-tapping screw with countersunk head – to be determined by the designer (for panel/construction)
P07	Single side rivet 4 x 10 Al/E (for sheet steel/sheet steel – inside)
P08	Single side closed rivet 4.8 x 10 Al/E (for sheet steel/sheet steel – outside)
P09	Single side rivet 4.8 x 15.1 Al/E (for sheet steel/construction)
P10	Shank with a nut (2 pieces), sealing washer (2 pieces), callot (2 pieces) and plastic cap (As per eaves gutter specification)
P11	PU self-adhesive sealant tape – 10 x 2 – (10 mm expanded) (to seal points between flashing components and panel with wave profile)
P12	PE profiled sealing filler „B“ (outside) – specify type of panel
P13	PE profiled sealing filler „A“ (inside) – specify type and thickness of panel
P14	PE self-adhesive sealant tape – 9 x 3 mm (Under flashing components)
P15	PVC self-adhesive sealant tape – 9 x 6 mm (to panel side lap)
P16	PE self-adhesive sealant tape – 20 x 3 mm (for panel overlap and flashing components)
P17	PE self-adhesive sealant tape – 20 x 5 mm (between panel and structure)
P18	PU self-adhesive sealant tape – 20 x 4 – (20 mm expanded) (to seal joints between panel and wall, concrete or dilatation)
P19	PE self-adhesive sealant tape – 30 x 8 mm or 2 pieces of tape – 20 x 5 mm (to seal winder joints)
P20	Butyl self-adhesive sealant tape – 12 x 6 mm (for waterproof and vapor connections)
P21	Butyl self-adhesive sealant tape – 10 x 3 mm (for waterproof and vapor connections)
P22	Nailing screw with dowel – to be determined by the designer (see chapter Fixing screws)
P23	Passage piping packing – to be determined by the designer (see chapter Passage piping)
P24	Concrete anchorage – steel – to be determined by the designer
P25	Self-drilling screw with groove under the head and sealing washer – to be determined by the designer (for sheet/insulation/sheet – with thickness 6–20 mm)
P26	PE profiled sealing filler (or piece of sealant tape P18) for side lap of panel FH and AWP – specify type of panel
P27	Laplox/Translap stitching screw 9 x 16 – to be determined by the designer (for the connection of roof panel – HTL and GRP40)
P28	Galvanised self-drilling screw and plate washer – to be determined by the designer (for fixing of the membrane coated metal to panels)
P29	Butyl self-adhesive sealant tape – 4 mm diameter (for waterproof and vapor connections)
P30	Nailing rivet – to be determined by the designer (for concrete, metal, wood, masonry)
P31	Nailing dowel with pre – assembled nail and thread for dismantling – to be determined by designer (for concrete, solid and hollow masonry, etc.)
P32	Single side rivet TPR with sealing washer (for fixing panels and gutters)
P33	Fab-Lok stainless single side screw (for fixing KS1000 TOP-DEK to cold rolled purlins)
P34	Self-tapping screw with plate – to be determined by the designer (for fixing the plastic spacers profile under the roof panels HTL and GRP40)
P35	Insulating pipe ARMAFLEX AC – to be determined by the designer (for the expansion joint)
P36	Spread footing washer with five holes (for the FF wall panel)
P37	Self-drilling screw with drill washer – to be determined by the designer (for the fixing roof panel TOP-DEK or XD/TR)
P38	Self-tapping or self-drilling screw and plate washer – to be determined by the designer (for the fixing flat roof – panel/construction)
P39	Nailing spike and sealing washer – to be determined by the designer (for the fixing panel/concrete)
P40	PE profiled sealing according to thickness of the AWP panel – to be determined by the designer (under WL panel)
P41	Butyl self-adhesive sealant tape – 22 x 1.5 mm (for waterproof and vapor connections)

Note:

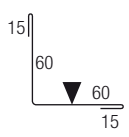
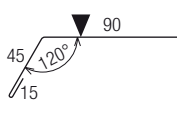
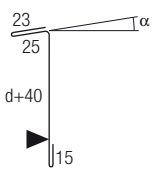
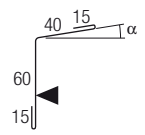
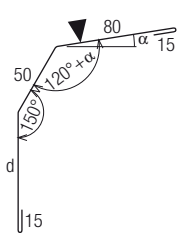
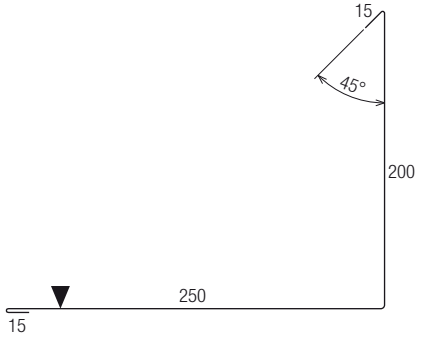
Index “p” indicates bigger diameter of sealing washer for applications as below:

- Ø22 mm for KS1000 FR, FH, FA and FF fixing system
- Ø29 mm for KS1000 HTL and GRP40 fixing system (in position valley)

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K101		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K102		varies for RW, FF, TOP-DEK (SR) panels indication of roof panel type required max. length = 1,000 mm
K103a		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K103b		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K103c		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K103d		$\alpha$ = specify roofslope (° or %) poznámka o hodnotě? max. length = 6,000 mm
K104		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K105		X = specify dimension max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K106		max. length = 6,000 mm
K107		max. length = 6,000 mm
K108		$\alpha$ = specify roofslope ( $^{\circ}$ or %) d = specify panel insulation thickness max. length = 6,000 mm
K109		$\alpha$ = specify roofslope ( $^{\circ}$ or %) max. length = 6,000 mm
K110		$\alpha$ = specify roofslope ( $^{\circ}$ or %) d = specify roof panel insulation thickness max. length = 6,000 mm
K111		max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K112		max. length = 6,000 mm
K113		max. length = 6,000 mm
K114		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K115		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K117		d = specify panel insulation thickness max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K118		max. length = 6,000 mm
K120		max. length = 6,000 mm
K121		max. length = 6,000 mm
K122		max. length = 6,000 mm
K123		max. length = 6,000 mm
K124		max. length = 6,000 mm
K125		D = specify wall panel thickness max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K126		see gutter system specification
K127		see gutter system specification
K128		max. length = 6,000 mm
K129		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm

Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K130		D = specify wall panel thickness d = specify thickness X = specify value max. length = 6,000 mm
K131		max. length = 6,000 mm
K132		max. length = 6,000 mm
K133		D = specify wall panel thickness max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K134		<p>D = specify wall panel thickness</p> <p>max. length = 6,000 mm</p>
K135		<p>D = specify wall panel thickness</p> <p>L = specify height</p> <p>max. length = 6,000 mm</p>
K136		<p>see gutter system specification</p>
K137		<p>max. length = 6,000 mm</p>
K138		<p>d = specify insulation core thickness</p> <p>max. length = 6,000 mm</p>

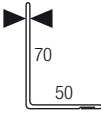
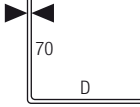

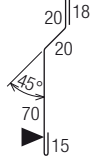
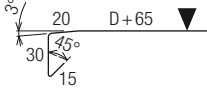
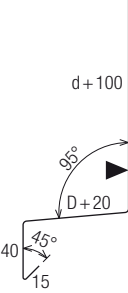
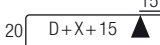
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K139		$\alpha$ = specify roofslope ( $^{\circ}$ or %) d = specify insulation core thickness max. length = 6,000 mm
K140		X = specify dimension $\beta$ = specify roofslope ( $^{\circ}$ or %) max. length = 6,000 mm
K141		max. length = 6,000 mm
K142		D = specify panel thickness max. length = 6,000 mm
K143		D = specify wall panel thickness max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K144		D = specify wall panel thickness d = specify insulation core thickness max. length = 6,000 mm
K145		D = specify wall panel thickness max. length = 6,000 mm
K146		max. length = 6,000 mm
K147		B = specify dimension (difference of panels thicknesses) max. length = 6,000 mm
K148		D = specify wall panel thickness max. length = 6,000 mm
K149		max. length = 6,000 mm
K150		max. length = 6,000 mm
K151		max. length = 6,000 mm

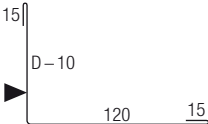
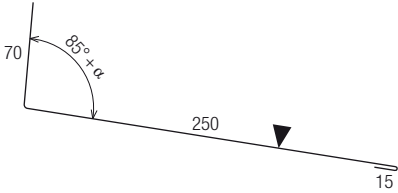
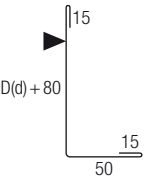
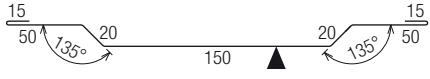
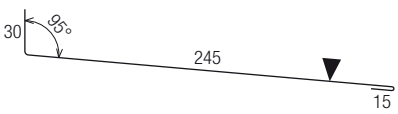
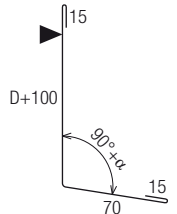
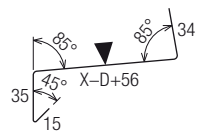
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K152		max. length = 6,000 mm
K153		D = specify wall panel thickness max. length = 6,000 mm
K154		max. length = 6,000 mm
K155		max. length = 6,000 mm
K156		D = specify wall panel thickness max. length = 6,000 mm
K157		D = specify wall panel thickness max. length = 6,000 mm
K158		D = specify wall panel thickness X = specify dimension max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K159		D = specify wall panel thickness X = 100 for $D \leq 60$ X = 140 for $60 < D \leq 100$ X = 190 for $D > 100$ max. length = 6,000 mm
K160		max. length = 6,000 mm
K161		X = specify dimension max. length = 6,000 mm
K162		max. length = 6,000 mm
K163		D = specify wall panel thickness X = specify dimension max. length = 6,000 mm
K164		max. length = 6,000 mm
K165		D = specify wall panel thickness d = specify insulation thickness X = specify dimension max. length = 6,000 mm
K166		max. length = 6,000 mm

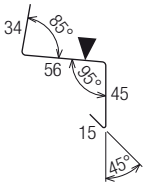
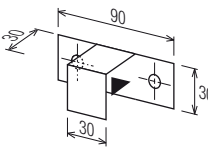
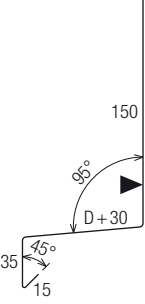
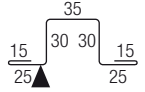
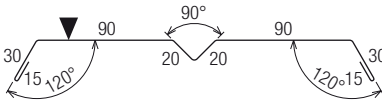
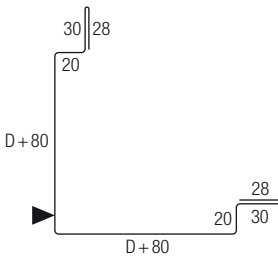
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K167		D = specify roof panel thickness max. length = 6,000 mm
K168		α = specify roofslope (° or %) max. length = 6,000 mm
K169		D = specify roof panel thickness d = specify insulation thickness max. length = 6,000 mm
K170		max. length = 6,000 mm
K171		max. length = 6,000 mm
K172		D = specify roof panel thickness α = specify roofslope (° or %) max. length = 6,000 mm
K173		D = specify wall panel thickness X = specify dimension max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K174		max. length = 6,000 mm
K175a		max. length = 6,000 mm assembled X = specify dimension $X_{\min} = 35$ , $X_{\max} = 90$ $X_{\text{standard}} = 60$
K175b		max. length = 6,000 mm assembled X = specify dimension $X_{\min} = 35$ , $X_{\max} = 90$ $X_{\text{standard}} = 60$
K176		D = specify wall panel thickness max. length = 6,000 mm
K178		D = specify wall panel thickness max. length = 6,000 mm
K179		D = specify wall panel thickness max. length = 6,000 mm
K180		max. length = 6,000 mm
K181		D = specify wall panel thickness max. length = 6,000 mm


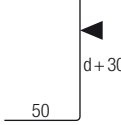
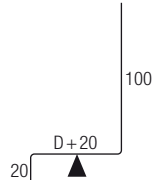
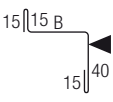
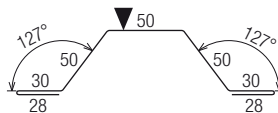
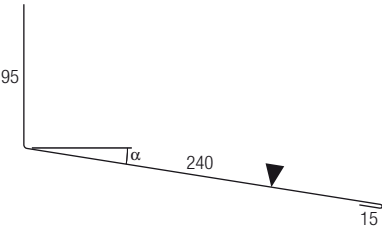
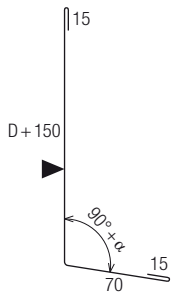
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K182		max. length = 6,000 mm
K183		3 items per meter recommended
K184		D = specify wall panel thickness max. length = 6,000 mm
K185		max. length = 6,000 mm
K186		max. length = 6,000 mm
K187		D = specify wall panel thickness max. length = 6,000 mm

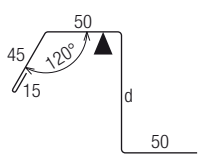
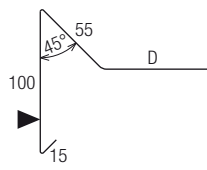
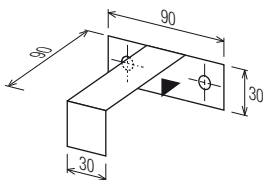
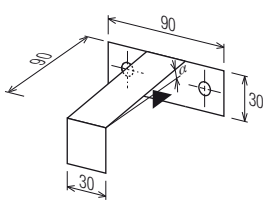
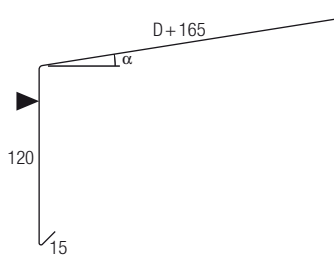
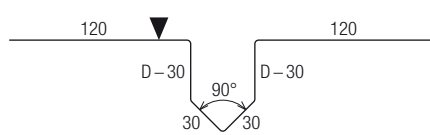
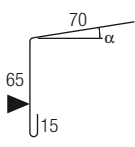
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K188		D = specify wall panel thickness max. length = 6,000 mm
K189		D = specify wall panel thickness max. length = 6,000 mm
K190		D = specify wall panel thickness max. length = 6,000 mm
K191		max. length = 6,000 mm
K192		max. length = 6,000 mm
K193		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K194		D = specify wall panel thickness max. length = 6,000 mm
K195		D = specify panel thickness d = specify insulation thickness Y = specify dimension max. length = 6,000 mm


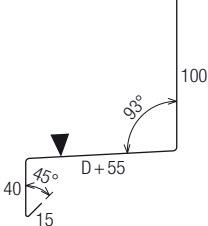
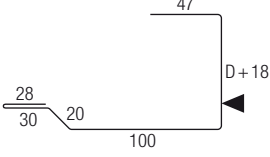
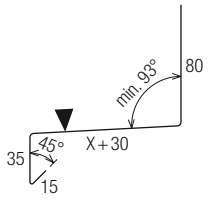

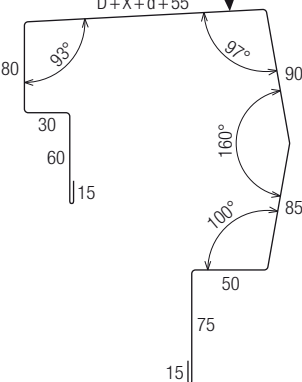
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K196		max. length = 6,000 mm
K197		d = specify insulation thickness max. length = 6,000 mm
K198		D = specify wall panel thickness max. length = 6,000 mm
K199		B = specify dimension max. length = 6,000 mm
K200		max. length = 6,000 mm
K201		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K202		D = specify roof panel thickness $\alpha$ = specify roofslope (° or %) max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K203		d = specify roof panel insulation thickness max. length = 6,000 mm
K204		D = specify wall panel thickness max. length = 6,000 mm
K205		3 items per meter recommended
K206		3 items per meter recommended $\alpha$ = specify roofslope (° or %)
K207		D = specify wall panel thickness $\alpha$ = specify roofslope (° or %) max. length = 6,000 mm
K208		D = specify wall panel thickness max. length = 6,000 mm
K209		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K210		<p>B = specify dimension (<math>D_1 - D_2</math>)</p> <p><math>D_1</math> = specify thickness of thicker roof panel</p> <p><math>D_2</math> = specify thickness of thinner roof panel</p> <p>max. length = 6,000 mm</p>
K211		<p>D = specify wall panel thickness</p> <p>max. length = 6,000 mm</p>
K212		<p>D = specify wall panel thickness</p> <p>max. length = 6,000 mm</p>
K213		<p>X = specify dimension</p> <p>max. length = 6,000 mm</p>
K214		<p>max. length = 6,000 mm</p>
K215		<p>D = specify wall panel thickness</p> <p>X = specify dimension</p> <p>d = specify insulation thickness</p> <p>max. length = 6,000 mm</p>

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K216		max. length = 6,000 mm
K217		d = specify roof panel insulation thickness $\alpha$ = specify roof slope (° or %) max. length = 6,000 mm
K218		D = specify wall panel thickness d = specify insulation thickness X = specify dimension max. length = 6,000 mm
K219		D = specify wall panel thickness max. length = 6,000 mm
K220		max. length = 6,000 mm
K221		D = specify wall panel thickness max. length = 6,000 mm
K222		max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K223		max. length = 6,000 mm
K224		max. length = 6,000 mm
K225		max. length = 6,000 mm
K226		max. length = 6,000 mm
K227		max. length = 6,000 mm
K228		max. length = 6,000 mm
K229		$\alpha$ = specify roofslope (° or %) max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes										
K230		D = specify wall panel thickness max. length = 6,000 mm										
K231		D = specify wall panel thickness max. length = 6,000 mm										
K232		see gutter system specification										
K233		<table><tr><th>d (mm)</th><th>A (mm)</th></tr><tr><td>80</td><td>30</td></tr><tr><td>100</td><td>44</td></tr><tr><td>120</td><td>58</td></tr><tr><td>150</td><td>72</td></tr></table> <p>d = specify roof panel insulation thickness FF specify for roof light panel FF/GRP40 right and left side lap</p>	d (mm)	A (mm)	80	30	100	44	120	58	150	72
d (mm)	A (mm)											
80	30											
100	44											
120	58											
150	72											

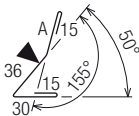
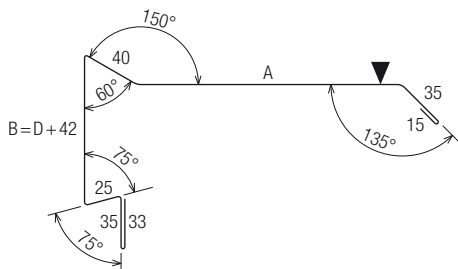
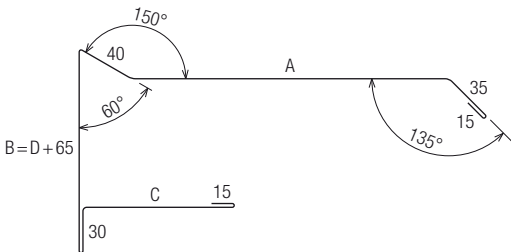
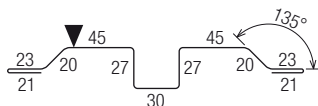
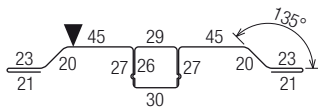
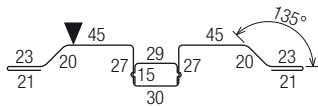
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K234		$\alpha$ = specify roofslope ( $^{\circ}$ or %) D = specify wall panel thickness max. length = 6,000 mm
K235		$\alpha$ = specify roofslope ( $^{\circ}$ or %) max. length = 6,000 mm
K236		specify for roof panel RT max. length = 6,000 mm
K237		$\beta$ = specify angle ( $^{\circ}$ or %) specify for roof panel RT max. length = 1,000 mm
K238		$\beta$ = specify angle ( $^{\circ}$ or %) max. length = 6,000 mm

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes												
K239	<p>35 15 90 110° 100° 59 170 196 35 25 β*</p>	see gutter system specification												
K240	<p>450 21 1 1 1-1 21 30 15 45 30 15 88 138°</p>	see gutter system specification												
K241	<p>60 50</p>	max. length = 6,000 mm												
K242	<p>105° 80° 15 30 34 155° A</p>	<table><tr><th>d (mm)</th><th>A (mm)</th></tr><tr><td>60</td><td>20</td></tr><tr><td>80</td><td>28</td></tr><tr><td>100</td><td>48</td></tr><tr><td>120</td><td>68</td></tr><tr><td>150</td><td>98</td></tr></table> <p>d = specify roof panel insulation thickness RW specify for roof light panel RW/GRP40 max. length = 6,000 mm</p>	d (mm)	A (mm)	60	20	80	28	100	48	120	68	150	98
d (mm)	A (mm)													
60	20													
80	28													
100	48													
120	68													
150	98													

## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes												
K243		<table border="1"><thead><tr><th>d (mm)</th><th>A (mm)</th></tr></thead><tbody><tr><td>60</td><td>20</td></tr><tr><td>80</td><td>30</td></tr><tr><td>100</td><td>50</td></tr><tr><td>120</td><td>70</td></tr><tr><td>150</td><td>100</td></tr></tbody></table> <p>d = specify roof panel insulation thickness RW specify for roof light panel RW/GRP40 max. length = 6,000 mm</p>	d (mm)	A (mm)	60	20	80	30	100	50	120	70	150	100
d (mm)	A (mm)													
60	20													
80	30													
100	50													
120	70													
150	100													
K244		<p>D = specify roof panel thickness A = specify dimension max. length = 6,000 mm</p>												
K245		<p>D = specify roof panel thickness A, C = specify dimensions max. length = 6,000 mm</p>												
K246		<p>max. length = 6,000 mm</p>												
K246a		<p>max. length = 6,000 mm</p>												
K246b		<p>max. length = 6,000 mm</p>												

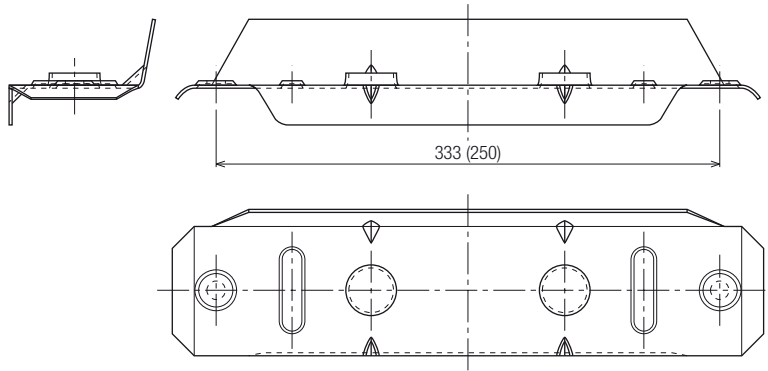
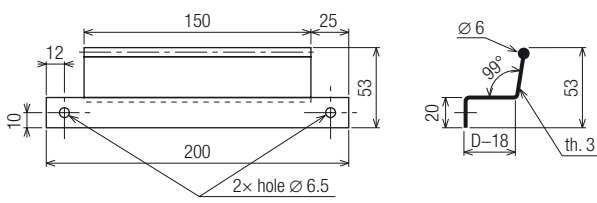
## Flashing Components Specification

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K247		d = specify panel insulation thickness max. length = 6,000 mm
K248a		d = specify panel insulation thickness max. length = 6,000 mm
K248b		max. length = 6,000 mm
K249		max. length = 6,000 mm

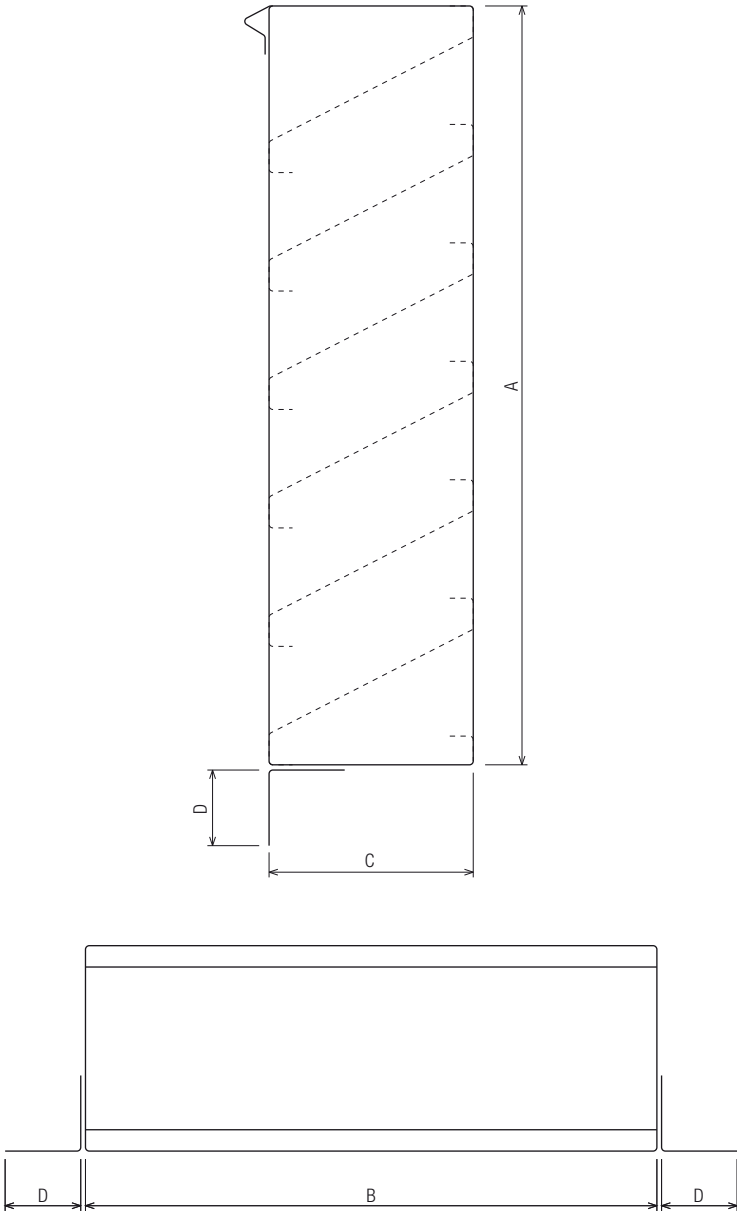
## Pre-fabricated Components Specification

Ref.	Profile (all dimensions in millimetres)	Notes
Z03		<p>D = specify wall panel thickness</p> <p>2 items per meter recommended (for wall panel AWP)</p>
Z04		<p>D = specify wall panel thickness</p> <p>sheet thickness = 1.5 mm for lengths up to 3,000 mm</p> <p>sheet thickness = 1 mm for lengths from 3,000 mm to 6,000 mm</p> <p>(for wall panels TF, FR)</p>
Z05		<p>D = specify panel thickness</p>
Z06		<p>D = specify panel thickness</p> <p>sheet thickness = 1.5 mm for lengths up to 3,000 mm</p> <p>sheet thickness = 1 mm for lengths from 3,000 mm to 6,000 mm</p>
Z07		<p>sheet thickness = 1.5 mm for lengths up to 3,000 mm</p> <p>sheet thickness = 1 mm for lengths from 3,000 mm to 6,000 mm</p>
Z10		<p>D = specify wall panel thickness</p>
Z11		<p>D = specify wall panel thickness</p> <p>sheet thickness = 1.5 mm for lengths up to 3,000 mm</p> <p>sheet thickness = 1 mm for lengths from 3,000 mm to 6,000 mm</p> <p>(for wall panel RW)</p>

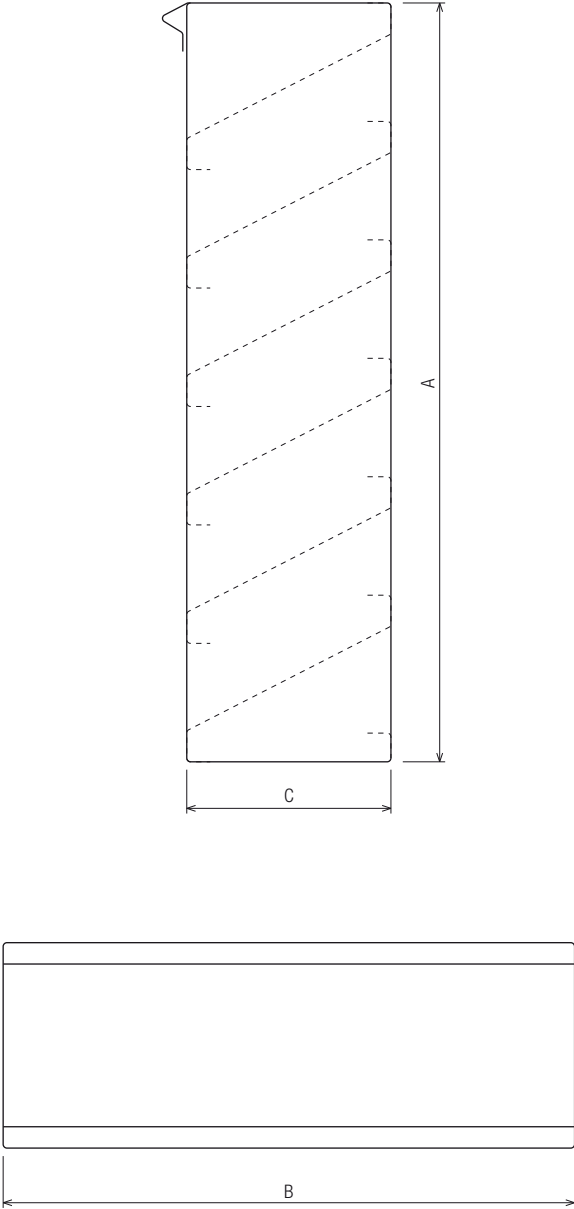
## Pre-fabricated Components Specification

Ref.	Profile (all dimensions in millimetres)	Notes
Z12		<p>Snow fence should be installed according to manufacturers instructions. Exact location and quantity of snow fences must be specified by designer.</p> <p>Snow fence can be installed on RW or FF roof panels. (If required, we can supply for panel RT.)</p> <p>For order panel profile (RW or FF) must be specified.</p>
Z13		<p>D = specify wall panel thickness</p> <p>2 items per meter recommended (for wall panel FH)</p>

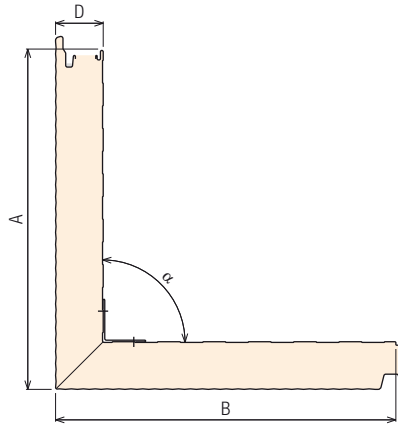
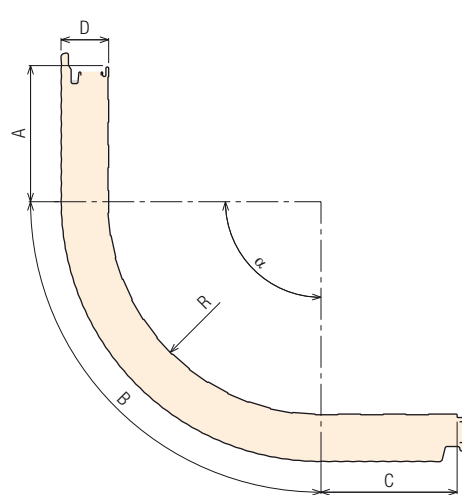
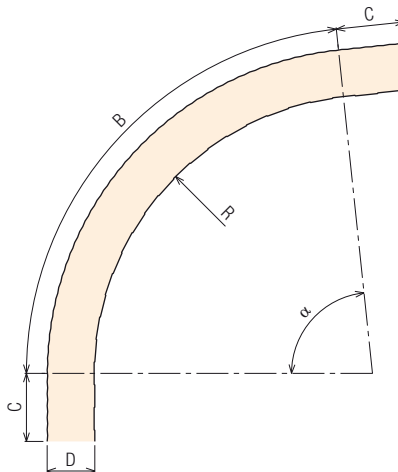
Pre-fabricated Components Specification

Ref.	Profile (all dimensions in millimetres)	Notes
Z08	 <p>The technical drawing illustrates the profile of a louvre. The top view shows a rectangular profile with a height dimension 'A' and a width dimension 'C'. The side view shows a rectangular profile with a width dimension 'B' and a height dimension 'D'. The profile is shown with dashed lines indicating the internal structure and the louvre blades.</p>	<p>Louvres are manufactured from coated galvanised steel sheets. For colour and coating availability please contact Kingspan.</p> <p>A, B, C = specify dimensions</p> <p>Standard louvre dimensions:</p> <p>A = 1,000 mm, B = 500–3,000 mm, C = 100 mm, D = 50 mm.</p> <p>For production of louvres with non-standard dimensions (A, B, C) please consult Kingspan before.</p>

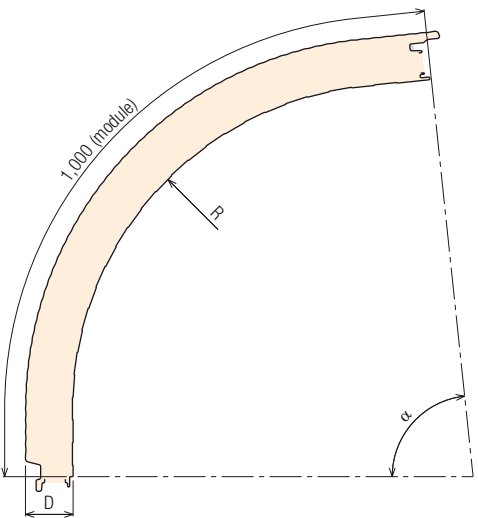
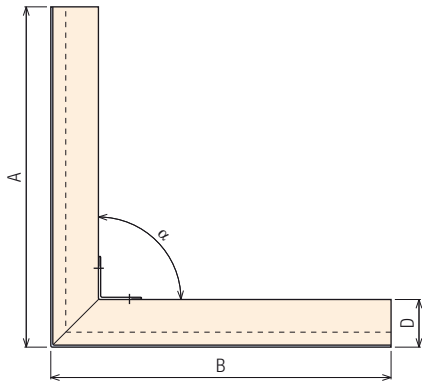
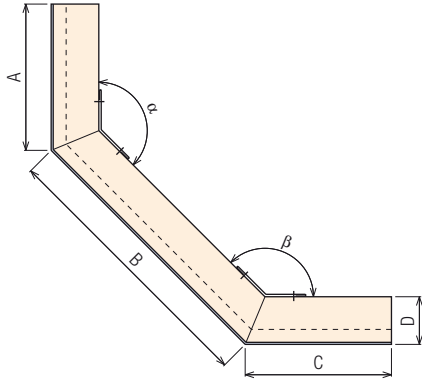
Pre-fabricated Components Specification

Ref.	Profile (all dimensions in millimetres)	Notes
Z09		<p>Louvres are manufactured from coated galvanised steel sheets. For colour and coating availability please contact Kingspan.</p> <p>A, B, C = specify dimensions</p> <p>Standard louver dimensions:</p> <p>A = 1,000 mm, B = 500–3,000 mm, C = 100 mm.</p> <p>For production of louvres with non-standard dimensions (A, B, C) please consult Kingspan before.</p>

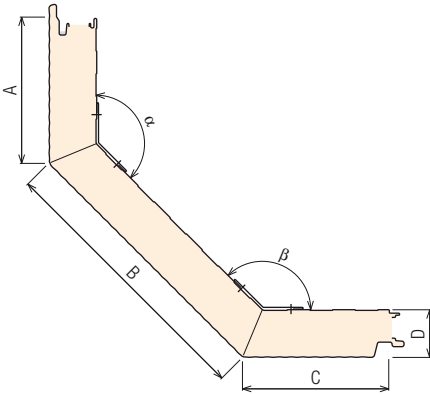
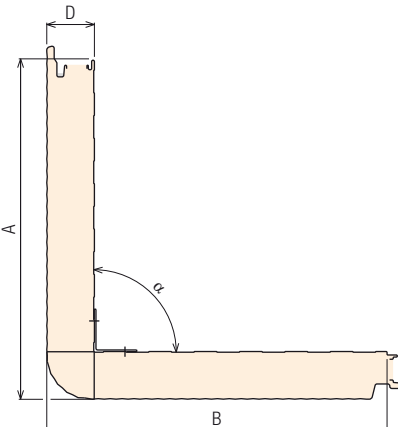
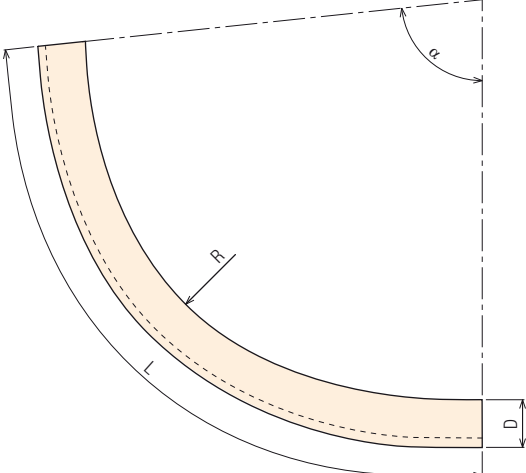
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R11		<p><b>Panel KS1000 AWP</b>  max. length 8,000 mm  <math>A_{\min} \cdot B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{module } 1,000 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R12		<p><b>Panel KS1000 AWP</b>  max. length 8,000 mm  <math>A_{\min} \cdot C_{\min} = 100 \text{ mm}</math>  <math>A + B + C = \text{max. module } 1,000 \text{ mm}</math>  <math>R_{\min} = D</math>  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R13		<p><b>Panel KS1000 AWP</b>  max. length 8,000 mm  <math>2 \times C + B \leq 900 \text{ mm}</math>  <math>B &gt; 300 \text{ mm}</math>, <math>C_{\min} = 100 \text{ mm}</math>  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} = D</math></p>

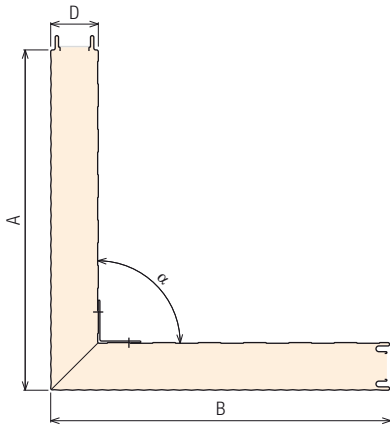
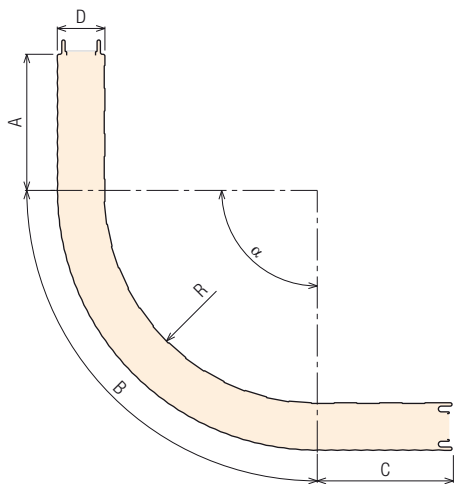
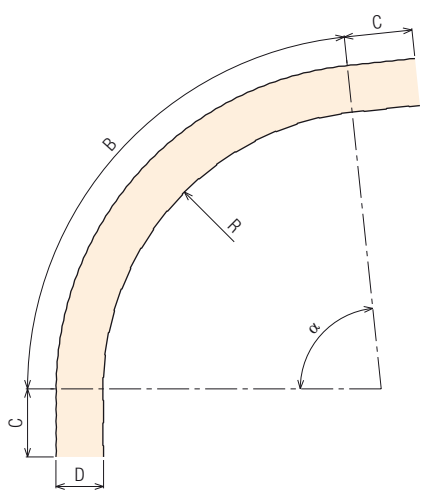
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R14		<p><b>Panel KS1000 AWP</b>  max. length 8,000 mm  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} = D</math></p>
R15		<p><b>Panel KS1000 AWP</b>  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A_{\max} = 1,500 \text{ mm},</math>  <math>B_{\max} = 4,500 \text{ mm}</math>  <math>\alpha = 90^\circ - 180^\circ</math>  module 1,000 mm</p>
R16		<p><b>Panel KS1000 AWP</b>  <math>A_{\min}, C_{\min} = 250 \text{ mm},</math>  <math>B_{\min} = 500 \text{ mm}</math>  <math>A_{\max}, C_{\max} = 1,500 \text{ mm},</math>  <math>B_{\max} = 3,000 \text{ mm}</math>  <math>\alpha, \beta = 90^\circ - 180^\circ</math>  module 1,000 mm</p>

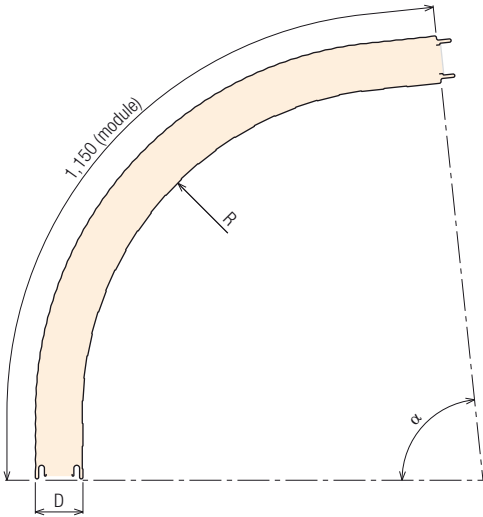
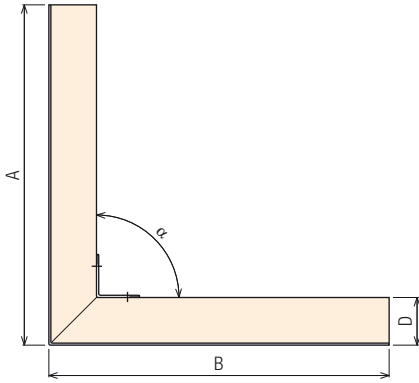
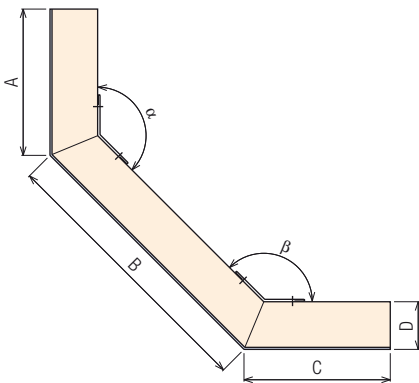
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R17		<p><b>Panel KS1000 AWP</b></p> <p><math>D_{\max} = 100 \text{ mm}</math></p> <p><math>\alpha, \beta = 135^\circ</math> standard</p> <p><math>\alpha, \beta</math> – be consulted</p> <p><math>A+B+C = \text{max. module } 1,000 \text{ mm}</math></p>
R18		<p><b>Panel KS1000 AWP</b></p> <p>max. length 8,000 mm</p> <p><math>A_{\min}, B_{\min} = 250 \text{ mm}</math></p> <p><math>A+B = \text{max. module } 1,000 \text{ mm}</math></p> <p><math>\alpha = 90^\circ, R_{\min} = D</math></p> <p>at the asymmetric corners to determine the orientation of side lap</p>
R19		<p><b>Panel KS1000 AWP</b></p> <p>max. length <math>L = 7,000 \text{ mm}</math></p> <p><math>R = \text{outer radius, } D_{\max} = 120 \text{ mm}</math></p> <p><math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 40, 60, 80, 100, 120 \text{ mm}</math></p> <p>other sizes consult with the manufacturer</p>

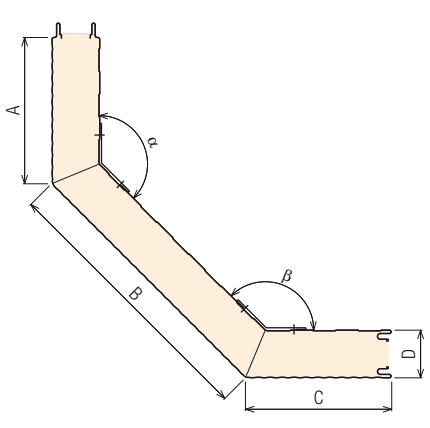
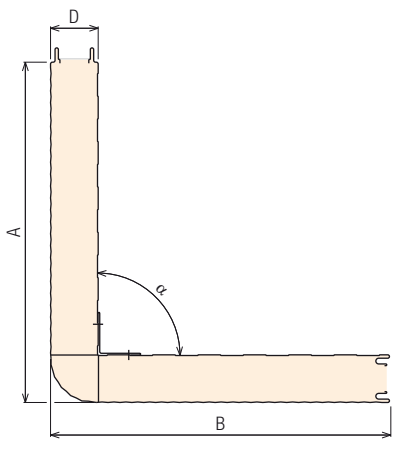
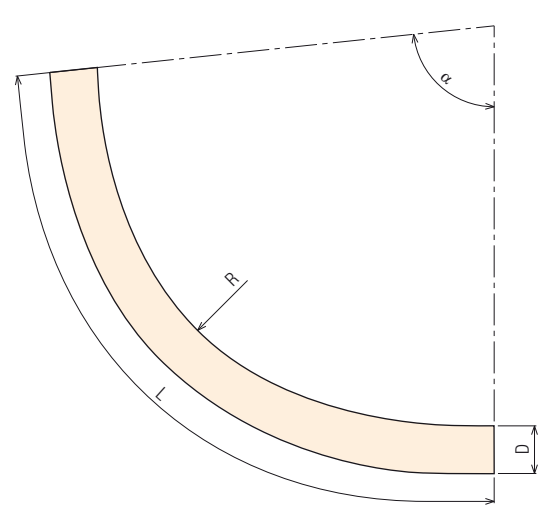
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R21		<p><b>Panel KS1150 TF</b>  max. length 8,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R22		<p><b>Panel KS1150 TF</b>  max. length 8,000 mm  <math>A_{\min}, C_{\min} = 100 \text{ mm}</math>  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>R_{\min} = D</math>  at the asymmetric corners  to determine the orientation  of side lap</p>
R23		<p><b>Panel KS1150 TF</b>  max. length 8,000 mm  <math>B &gt; 300 \text{ mm}</math>  <math>C_{\min} = 60 \text{ mm}</math>  <math>2 \times C + B \leq 950 \text{ mm}</math>  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} = D</math></p>

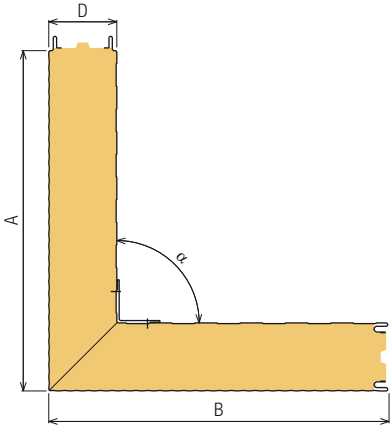
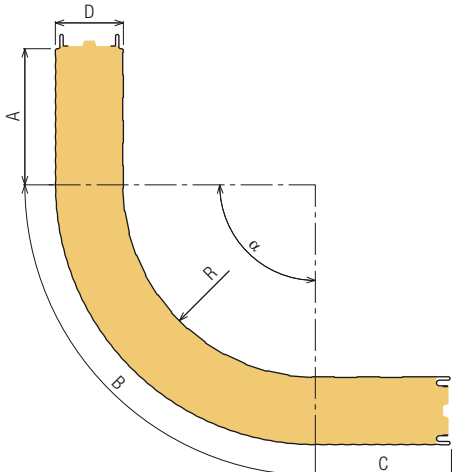
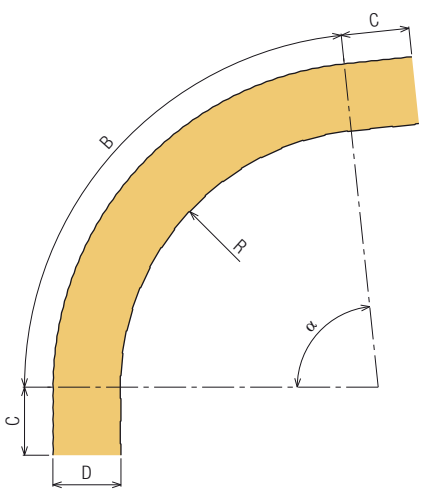
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R24		<p><b>Panel KS1150 TF</b>  max. length 8,000 mm  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} \geq D</math></p>
R25		<p><b>Panel KS1150 TF</b>  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A_{\max} = 1,500 \text{ mm}</math>  <math>B_{\max} = 4,500 \text{ mm}</math>  <math>\alpha = 90^\circ - 180^\circ</math>  module 1,150 mm</p>
R26		<p><b>Panel KS1150 TF</b>  <math>A_{\min}, C_{\min} = 250 \text{ mm}</math>  <math>B_{\min} = 500 \text{ mm}</math>  <math>A_{\max}, B_{\max} = 1,500 \text{ mm}</math>  <math>B_{\max} = 3,000 \text{ mm}</math>  <math>\alpha, \beta = 90^\circ - 180^\circ</math>  module 1,150 mm</p>

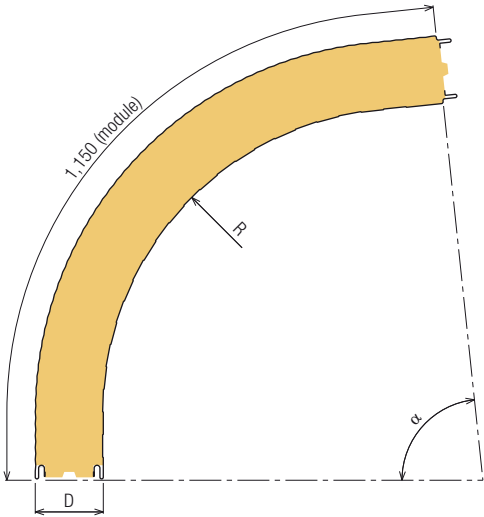
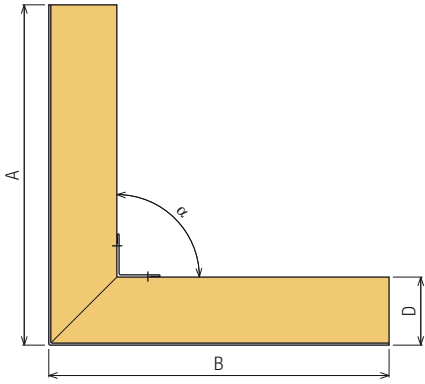
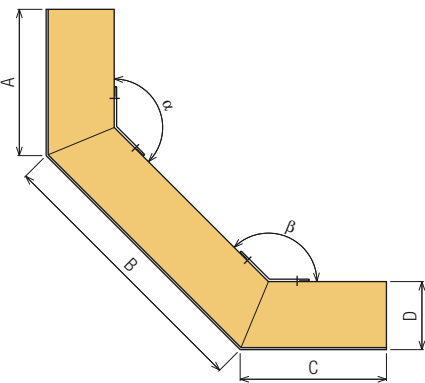
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R27		<p><b>Panel KS1150 TF</b>  <math>D_{\max} = 100 \text{ mm}</math>  <math>\alpha, \beta = 135^\circ</math> standard  <math>\alpha, \beta</math> – be consulted  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math></p>
R28		<p><b>Panel KS1150 TF</b>  max. length 8,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 90^\circ, R_{\min} = D</math>  at the asymmetric corners to determine the orientation of side lap</p>
R29		<p><b>Panel KS1150 TF</b>  max. length <math>L = 7,000 \text{ mm}</math>  <math>R = \text{outer radius, } D_{\max} = 120 \text{ mm}</math>  <math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 40, 60, 80, 100, 120 \text{ mm}</math>  other sizes consult with the manufacturer</p>

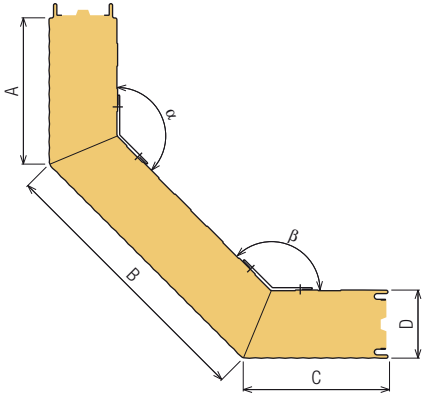
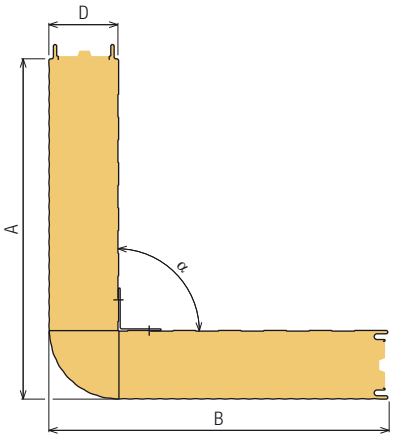
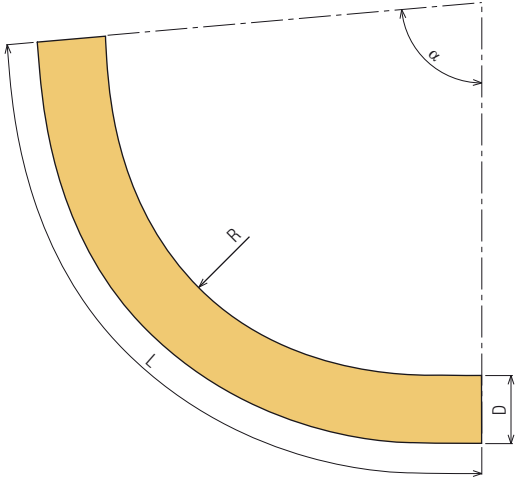
## Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R31		<p><b>Panel KS1150 FR</b>  max. length 6,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap</p>
R32		<p><b>Panel KS1150 FR</b>  max. length 6,000 mm  <math>A_{\min}, C_{\min} = 60 \text{ mm}</math>  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>R_{\min} = D</math>  <math>D_{\max} = 120 \text{ mm}</math>  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R33		<p><b>Panel KS1150 FR</b>  max. length 6,000 mm  <math>B &gt; 300 \text{ mm}, C_{\min} = 100 \text{ mm}</math>  <math>2 \times C + B \leq 950 \text{ mm}</math>  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} = D</math>  <math>D_{\max} = 120 \text{ mm}</math></p>

## Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R34		<b>Panel KS1150 FR</b> max. length 6,000 mm $60^\circ < \alpha < 175^\circ$ $R_{\min} = D$ $D_{\max} = 120 \text{ mm}$
R35		<b>Panel KS1150 FR</b> $A_{\min}, B_{\min} = 250 \text{ mm}$ $A_{\max} = 1,500 \text{ mm}$ $B_{\max} = 4,500 \text{ mm}$ $\alpha = 90^\circ - 180^\circ$ module 1,150 mm
R36		<b>Panel KS1150 FR</b> $A_{\min}, C_{\min} = 250 \text{ mm}$ $B_{\min} = 500 \text{ mm}$ $A_{\max}, C_{\max} = 1,500 \text{ mm}$ $B_{\max} = 3,000 \text{ mm}$ $\alpha, \beta = 90^\circ - 180^\circ$ module 1,150 mm

## Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R37		<p><b>Panel KS1150 FR</b></p> <p><math>D_{\max} = 100 \text{ mm}</math></p> <p><math>\alpha, \beta = 135^\circ</math> standard</p> <p><math>\alpha, \beta</math> – be consulted</p> <p><math>A+B+C = \text{max. module}</math> 1,150 mm</p>
R38		<p><b>Panel KS1150 FR</b></p> <p>max. length 4,000 mm</p> <p><math>A_{\min}, B_{\min} = 250 \text{ mm}</math></p> <p><math>A+B = \text{max. module}</math> 1,150 mm</p> <p><math>\alpha = 90^\circ, R_{\min} = D</math></p> <p>at the asymmetric corners to determine the orientation of side lap</p>
R39		<p><b>Panel KS1150 FR</b></p> <p>max. length <math>L = 6,000 \text{ mm}</math></p> <p><math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 80, 100, 120 \text{ mm}</math></p>

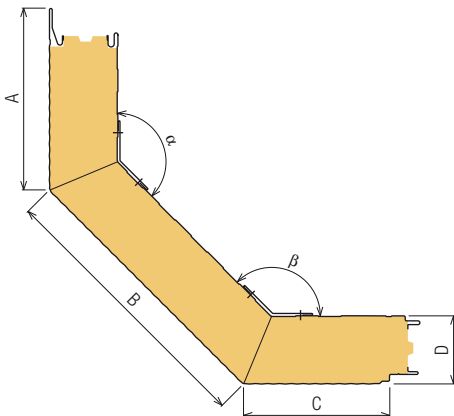
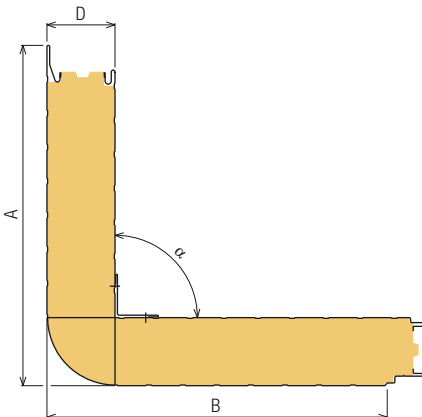
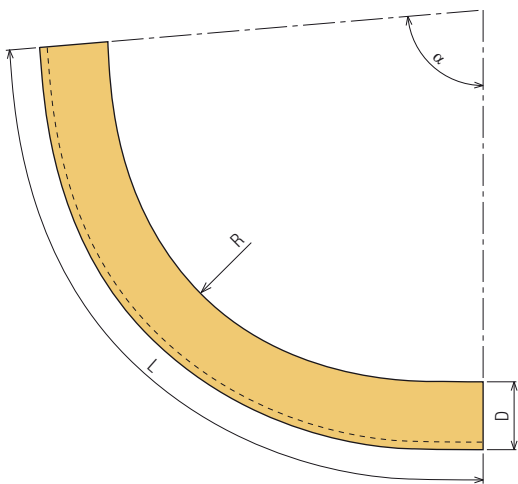
## Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R41		<p><b>Panel KS1000 FH</b>  max. length 6,000 mm  <math>A_{min}, B_{min} = 250</math> mm  <math>A + B = \text{max. module}</math>  1,000 mm  <math>\alpha = 80^{\circ} - 175^{\circ}</math>, <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R42		<p><b>Panel KS1000 FH</b>  max. length 6,000 mm  <math>A_{min}, C_{min} = 60</math> mm  <math>A + B + C = \text{max. module}</math>  1,000 mm  <math>\alpha = 80^{\circ} - 175^{\circ}</math>  <math>R_{min} = D</math>  <math>D_{max} = 120</math> mm  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R43		<p><b>Panel KS1000 FH</b>  max. length 6,000 mm  <math>2 \times C + B \leq 900</math> mm  <math>B &gt; 300</math> mm  <math>C_{min} = 100</math> mm  <math>60^{\circ} &lt; \alpha &lt; 175^{\circ}</math>  <math>R_{min} = D</math>  <math>D_{max} = 120</math> mm</p>

Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R44		<p><b>Panel KS1000 FH</b> max. length 6,000 mm <math>60^\circ &lt; \alpha &lt; 175^\circ</math> <math>R_{min} = D</math> <math>D_{max} = 120 \text{ mm}</math></p>
R45		<p><b>Panel KS1000 FH</b> <math>A_{min}, B_{min} = 250 \text{ mm}</math> <math>A_{max} = 1,500 \text{ mm}</math> <math>B_{max} = 4,500 \text{ mm}</math> <math>\alpha = 90^\circ - 180^\circ</math> module 1,000 mm</p>
R46		<p><b>Panel KS1000 FH</b> <math>A_{min}, C_{min} = 250 \text{ mm}</math> <math>B_{min} = 500 \text{ mm}</math> <math>A_{max}, C_{max} = 1,500 \text{ mm}</math> <math>B_{max} = 3,000 \text{ mm}</math> <math>\alpha, \beta = 90^\circ - 180^\circ</math> module 1,000 mm</p>

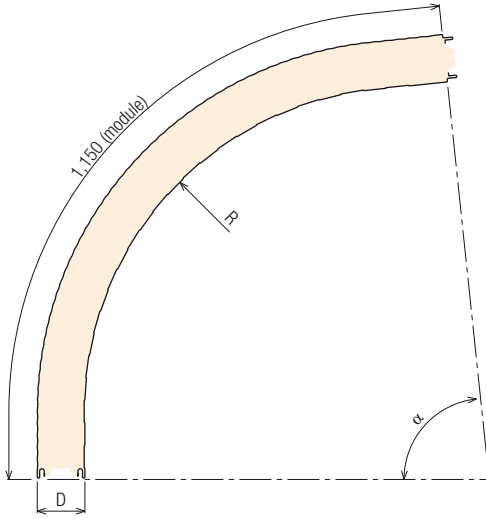
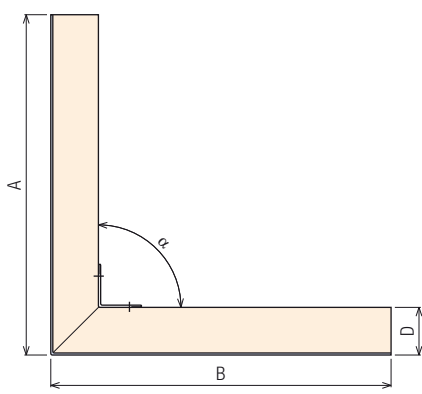
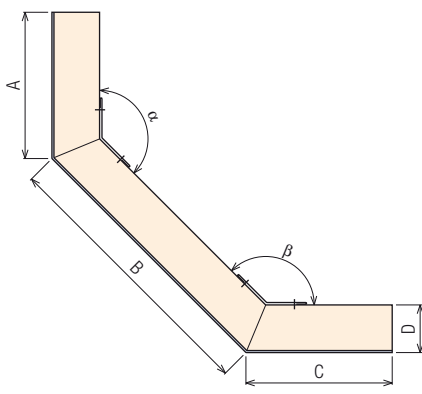
## Pre-fabricated Insulated Corners Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
R47		<p><b>Panel KS1000 FH</b>  <math>D_{\max} = 100 \text{ mm}</math>  <math>\alpha, \beta = 135^\circ</math> standard  <math>\alpha, \beta</math> – be consulted  <math>A + B + C = \text{max. module } 1,000 \text{ mm}</math></p>
R48		<p><b>Panel KS1000 FH</b>  max. length 4,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,000 \text{ mm}</math>  <math>\alpha = 90^\circ, R_{\min} = D</math>  at the asymmetric corners to determine the orientation of side lap</p>
R49		<p><b>Panel KS1000 FH</b>  max. length <math>L = 6,000 \text{ mm}</math>  <math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 80, 100, 120 \text{ mm}</math>  other sizes consult with the manufacturer</p>

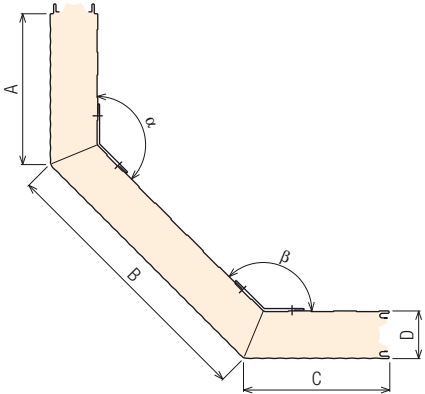
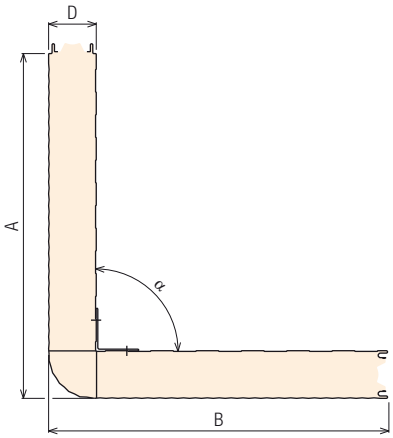
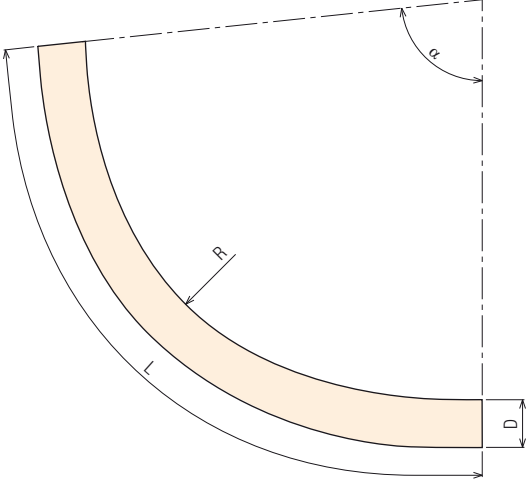
## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R51		<p><b>Panel KS1150 TL</b>  max. length 8,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap</p>
R52		<p><b>Panel KS1150 TL</b>  max. length 8,000 mm  <math>A_{\min}, C_{\min} = 100 \text{ mm}</math>  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^\circ - 175^\circ</math>  <math>R_{\min} = D</math>  at the asymmetric corners  to determine the orientation  of side lap</p>
R53		<p><b>Panel KS1150 TL</b>  max. length 8,000 mm  <math>B &gt; 300 \text{ mm}</math>  <math>C_{\min} = 60 \text{ mm}</math>  <math>2 \times C + B \leq 950 \text{ mm}</math>  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{\min} = D</math></p>

## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R54		<p><b>Panel KS1150 TL</b>  max. length 8,000 mm  <math>60^\circ &lt; \alpha &lt; 175^\circ</math>  <math>R_{min} \geq D</math></p>
R55		<p><b>Panel KS1150 TL</b>  <math>A_{min}, B_{min} = 250 \text{ mm}</math>  <math>A_{max} = 1,500 \text{ mm}</math>  <math>B_{max} = 4,500 \text{ mm}</math>  <math>\alpha = 90^\circ - 180^\circ</math>  module 1,150 mm</p>
R56		<p><b>Panel KS1150 TL</b>  <math>A_{min}, C_{min} = 250 \text{ mm},</math>  <math>B_{min} = 500 \text{ mm}</math>  <math>A_{max}, B_{max} = 1,500 \text{ mm},</math>  <math>B_{max} = 3,000 \text{ mm}</math>  <math>\alpha, \beta = 90^\circ - 180^\circ</math>  module 1,150 mm</p>

## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R57		<p><b>Panel KS1150 TL</b></p> <p><math>D_{\max} = 100 \text{ mm}</math></p> <p><math>\alpha, \beta = 135^\circ</math> standard</p> <p><math>\alpha, \beta</math> – be consulted</p> <p><math>A+B+C = \text{max. module}</math> 1,150 mm</p>
R58		<p><b>Panel KS1150 TL</b></p> <p>max. length 8,000 mm</p> <p><math>A_{\min}, B_{\min} = 250 \text{ mm}</math></p> <p><math>A+B = \text{max. module}</math> 1,150 mm</p> <p><math>\alpha = 90^\circ, R_{\min} = D</math></p> <p>at the asymmetric corners to determine the orientation of side lap</p>
R59		<p><b>Panel KS1150 TL</b></p> <p>max. length <math>L = 7,000 \text{ mm}</math></p> <p><math>R = \text{outer radius},</math> <math>D_{\max} = 120 \text{ mm}</math></p> <p><math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 40, 60, 80, 100, 120 \text{ mm}</math></p> <p>other sizes consult with the manufacturer</p>

## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R61		<p><b>Panel KS1150 TC</b>  max. length 8,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^{\circ} - 175^{\circ}</math>  <math>\alpha</math> be consulted  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R62		<p><b>Panel KS1150 TC</b>  max. length 8,000 mm  <math>A_{\min}, C_{\min} = 100 \text{ mm}</math>  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 80^{\circ} - 175^{\circ}</math>  <math>R_{\min} = D</math>  at the asymmetric corners  to determine the orientation  of side lap  profilation to be discussed</p>
R63		<p><b>Panel KS1150 TC</b>  max. length 8,000 mm  <math>2 \times C + B \leq 950 \text{ mm}</math>  <math>B &gt; 300 \text{ mm}</math>  <math>C_{\min} = 60 \text{ mm}</math>  <math>60^{\circ} &lt; \alpha &lt; 175^{\circ}</math>  <math>R_{\min} = D</math>  <math>D_{\max} = 120 \text{ mm}</math></p>

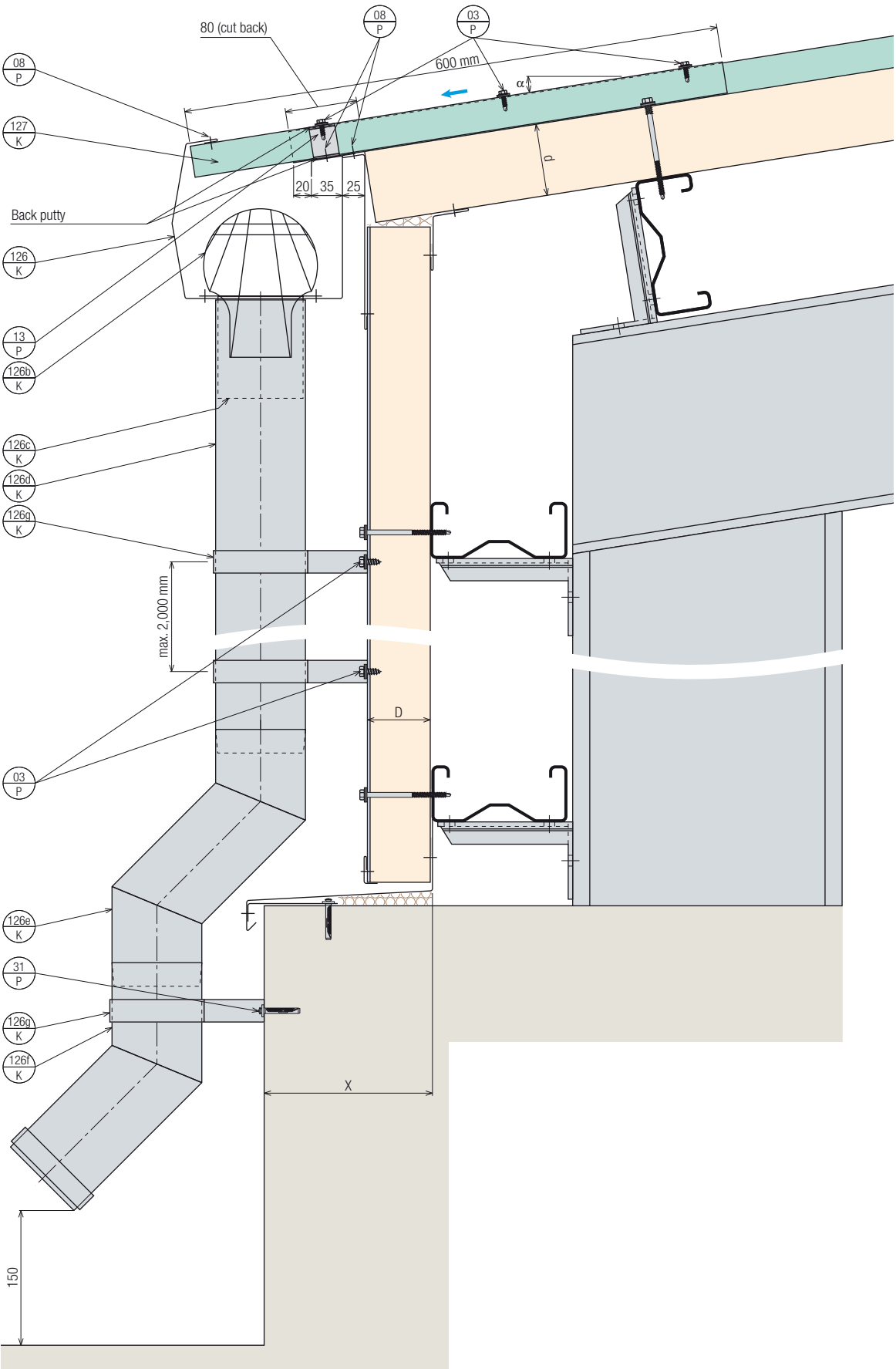
Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R64		<p><b>Panel KS1150 TC</b> max. length 8,000 mm <math>60^{\circ} &lt; \alpha &lt; 175^{\circ}</math> <math>R_{min} \geq D</math> max. module 1,150 mm</p>
R65		<p><b>Panel KS1150 TC</b> <math>A_{min}, B_{min} = 250</math> mm <math>A_{max} = 1,500</math> mm <math>B_{max} = 4,500</math> mm <math>\alpha = 90^{\circ} - 180^{\circ}</math> module 1,150 mm <math>D_{max} = 120</math> mm</p>
R66		<p><b>Panel KS1150 TC</b> <math>A_{min}, C_{min} = 250</math> mm <math>B_{min} = 500</math> mm <math>A_{max}, C_{max} = 1,500</math> mm <math>B_{max} = 3,000</math> mm <math>\alpha, \beta = 90^{\circ} - 180^{\circ}</math> module 1,150 mm</p>

## Pre-fabricated Insulated Corners Specification – IPN (PUR)

Ref.	Profile (all dimensions in millimetres)	Notes
R67		<p><b>Panel KS1150 TC</b>  <math>D_{\max} = 100 \text{ mm}</math>  <math>\alpha, \beta = 135^\circ</math> standard  <math>\alpha, \beta</math> – be consulted  <math>A + B + C = \text{max. module } 1,150 \text{ mm}</math></p>
R68		<p><b>Panel KS1150 TC</b>  max. length 8,000 mm  <math>A_{\min}, B_{\min} = 250 \text{ mm}</math>  <math>A + B = \text{max. module } 1,150 \text{ mm}</math>  <math>\alpha = 90^\circ, R_{\min} = D</math>  at the asymmetric corners to determine the orientation of side lap</p>
R69		<p><b>Panel KS1150 TC</b>  max. length <math>L = 7,000 \text{ mm}</math>  <math>R = \text{outer radius, } D_{\max} = 120 \text{ mm}</math>  <math>R_{\min} = 2,500 \text{ mm}</math> for <math>D = 40, 60, 80, 100, 120 \text{ mm}</math>  other sizes consult with the manufacturer</p>

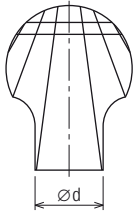
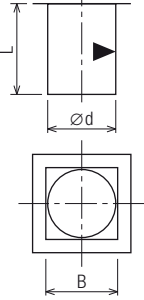
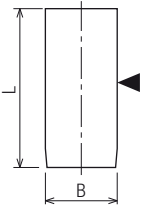
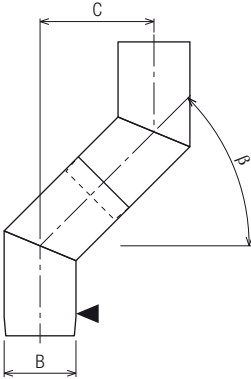
Eave Rainwater System Specification – Angular



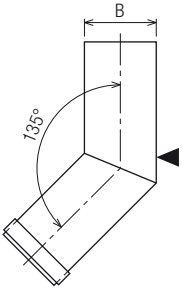
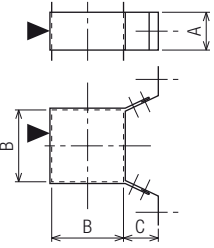
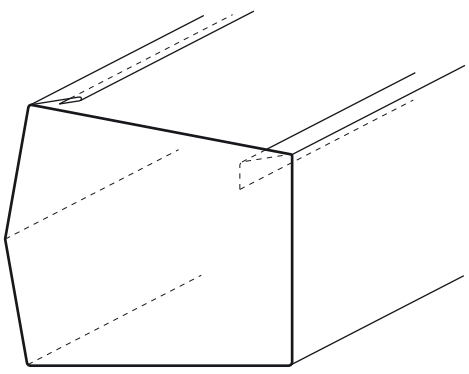
## Eave Rainwater System Specification – Angular

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes																																																																																																																																																											
K126	<div>Closed Gutter</div>	<table><tr><th>panel profile</th><th colspan="2">RW</th><th colspan="2">FF</th></tr><tr><th>roofslope <math>\alpha</math></th><th>X</th><th>material width</th><th>X</th><th>material width</th></tr><tr><th>[°]</th><th colspan="4">[mm]</th></tr><tr><td>3</td><td>143</td><td>596</td><td>144</td><td>597</td></tr><tr><td>4</td><td>146</td><td>599</td><td>147</td><td>600</td></tr><tr><td>5</td><td>149</td><td>602</td><td>150</td><td>603</td></tr><tr><td>6</td><td>152</td><td>605</td><td>153</td><td>606</td></tr><tr><td>7</td><td>155</td><td>608</td><td>156</td><td>609</td></tr><tr><td>8</td><td>158</td><td>611</td><td>159</td><td>612</td></tr><tr><td>9</td><td>161</td><td>614</td><td>162</td><td>615</td></tr><tr><td>10</td><td>165</td><td>618</td><td>166</td><td>619</td></tr><tr><td>11</td><td>168</td><td>621</td><td>169</td><td>622</td></tr><tr><td>12</td><td>171</td><td>624</td><td>172</td><td>625</td></tr><tr><td>13</td><td>174</td><td>627</td><td>175</td><td>628</td></tr><tr><td>14</td><td>177</td><td>630</td><td>178</td><td>631</td></tr><tr><td>15</td><td>180</td><td>633</td><td>181</td><td>634</td></tr><tr><td>16</td><td>183</td><td>636</td><td>184</td><td>637</td></tr><tr><td>17</td><td>186</td><td>639</td><td>187</td><td>640</td></tr><tr><td>18</td><td>189</td><td>642</td><td>190</td><td>643</td></tr><tr><td>19</td><td>192</td><td>645</td><td>193</td><td>646</td></tr><tr><td>20</td><td>195</td><td>648</td><td>197</td><td>650</td></tr><tr><td>21</td><td>199</td><td>652</td><td>200</td><td>653</td></tr><tr><td>22</td><td>202</td><td>655</td><td>203</td><td>656</td></tr><tr><td>23</td><td>205</td><td>658</td><td>206</td><td>659</td></tr><tr><td>24</td><td>209</td><td>662</td><td>210</td><td>663</td></tr><tr><td>25</td><td>212</td><td>665</td><td>213</td><td>666</td></tr><tr><td>26</td><td>215</td><td>668</td><td>216</td><td>669</td></tr><tr><td>27</td><td>219</td><td>672</td><td>220</td><td>673</td></tr><tr><td>28</td><td>222</td><td>675</td><td>223</td><td>676</td></tr><tr><td>29</td><td>226</td><td>679</td><td>227</td><td>680</td></tr><tr><td>30</td><td>229</td><td>682</td><td>231</td><td>684</td></tr></table>	panel profile	RW		FF		roofslope $\alpha$	X	material width	X	material width	[°]	[mm]				3	143	596	144	597	4	146	599	147	600	5	149	602	150	603	6	152	605	153	606	7	155	608	156	609	8	158	611	159	612	9	161	614	162	615	10	165	618	166	619	11	168	621	169	622	12	171	624	172	625	13	174	627	175	628	14	177	630	178	631	15	180	633	181	634	16	183	636	184	637	17	186	639	187	640	18	189	642	190	643	19	192	645	193	646	20	195	648	197	650	21	199	652	200	653	22	202	655	203	656	23	205	658	206	659	24	209	662	210	663	25	212	665	213	666	26	215	668	216	669	27	219	672	220	673	28	222	675	223	676	29	226	679	227	680	30	229	682	231	684
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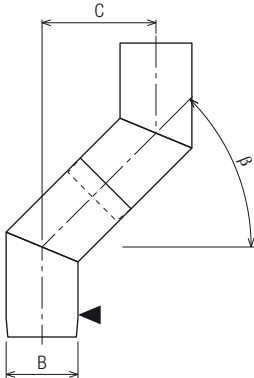
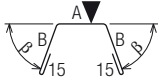
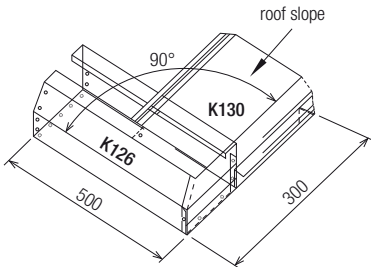
## Eave Rainwater System Specification – Angular

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K126b	<p><b>Cage</b></p>  <p>Ød</p>	<p>available for diameters: Ø100, Ø120, Ø150 (intended for circle K126c)</p>
K126c	<p><b>Square Gutter Gully</b></p>  <p>Ød</p> <p>B</p>	<p>L = specify dimension Ød = B – 2 available B × B dimensions: 100 × 100, 120 × 120, 150 × 150 available for diameters: Ø100, Ø120, Ø150</p>
K126d	<p><b>Downpipe – four-square</b></p>  <p>B</p>	<p>L = specify dimension (max. 6,000 mm) B = specify dimension available B × B dimensions: 100 × 100, 120 × 120, 150 × 150</p>
K126e	<p><b>Bounce – four-square</b></p>  <p>C</p> <p>B</p> <p>β</p>	<p>C = specify dimension B = specify dimension β = specify angle (°) available B × B dimensions: 100 × 100, 120 × 120, 150 × 150</p>
More information on the order form.		

## Eave Rainwater System Specification – Angular

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K126f	<p><b>Drain Elbow – four-square</b></p> 	<p>B = specify dimension available B × B dimensions: 100 × 100, 120 × 120, 150 × 150</p>
K126g	<p><b>Sleeve – four-square</b></p> 	<p>B, C = specify dimensions available B dimensions: 100, 120, 150 C = 50–100 mm A = 50 mm</p>
K126h	<p><b>Gutter stop</b></p> 	<p>Gutter stop end must be ordered separately. The gutter stop end can be produced in RIGHT or LEFT option. (The picture shows RIGHT gutter stop end.)</p> <p>For order please specify: – RIGHT or LEFT option – type and dimension of gutter</p>
More information on the order form.		

## Eave Rainwater System Specification – Angular

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes															
K126i	<p>Two-part Elbow – four-square</p> 	<p>C = specify dimension B = specify dimension <math>\beta</math> = specify angle (°) available B × B dimensions: 100 × 100, 120 × 120, 150 × 150</p>															
K127	<p>Gutter Hook</p> 	<table><tr><th>panel profile</th><th>A</th><th>B</th><th><math>\beta</math> [°]</th><th>material width [mm]</th></tr><tr><td>RW</td><td>35</td><td>35</td><td>70</td><td>132</td></tr><tr><td>FF</td><td>24</td><td>38</td><td>58</td><td>130</td></tr></table> <p>production length = 600 mm specify panel profile A, B = specify dimensions</p>	panel profile	A	B	$\beta$ [°]	material width [mm]	RW	35	35	70	132	FF	24	38	58	130
panel profile	A	B	$\beta$ [°]	material width [mm]													
RW	35	35	70	132													
FF	24	38	58	130													
K130a	<p>Corner Component</p> 	<p>On special agreement it is possible to produce preformed eave gutter-gable corner. For details please consult Kingspan Technical Services.</p> <p>For order please specify: <math>\alpha</math> = roofslope (° or %) type and dimension of gutter K126 dimension of flashing K130 colour and coating RIGHT or LEFT option OUTSIDE or INSIDE option (The picture is RIGHT OUTSIDE design.)</p>															

More information on the order form.

More information on the order form.

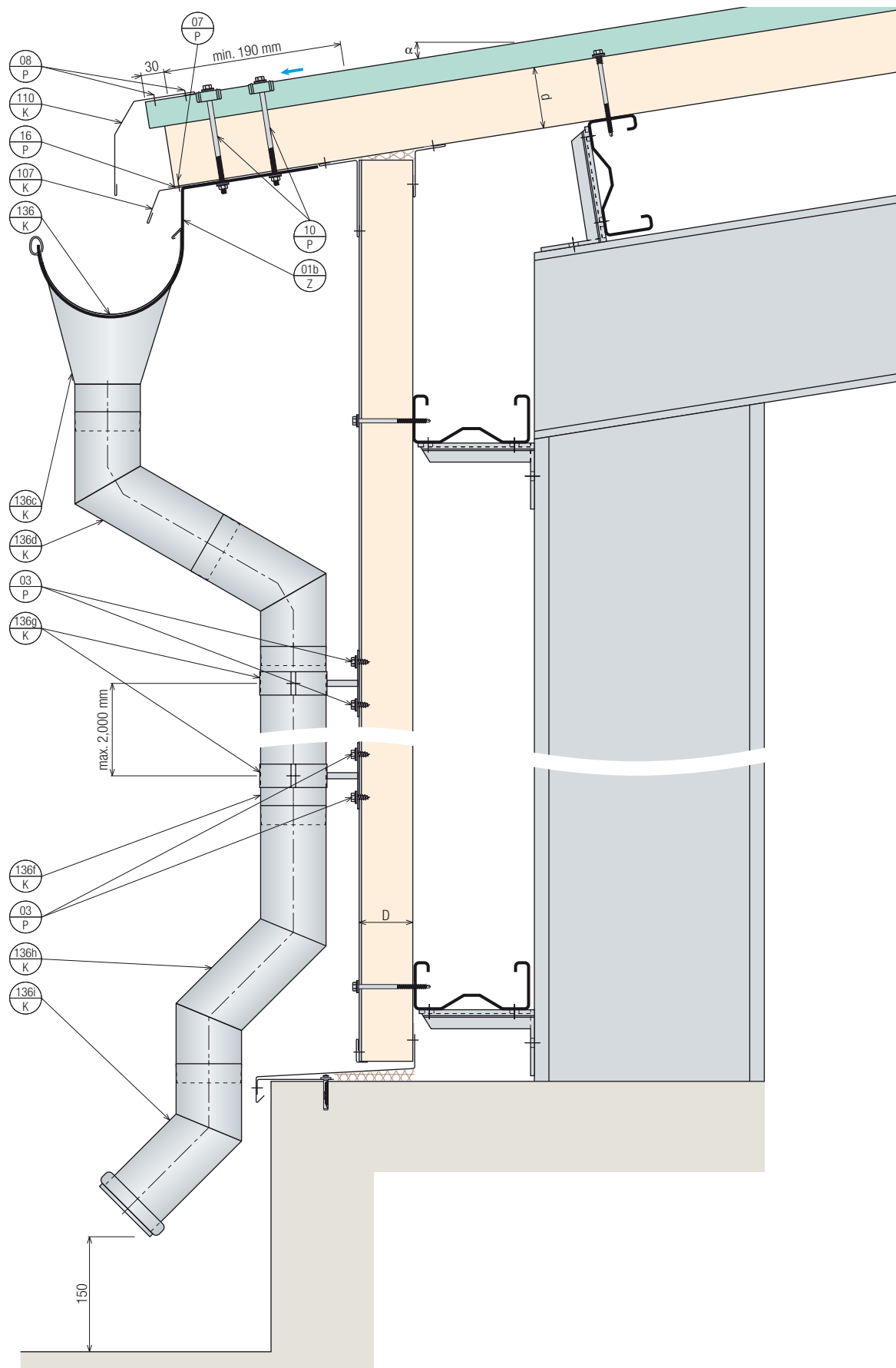
## Eave Rainwater System Specification – Angular

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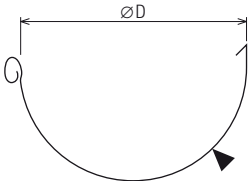
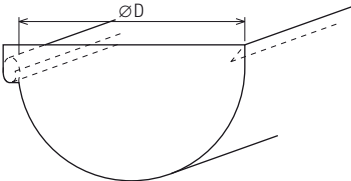
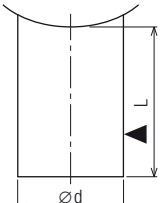
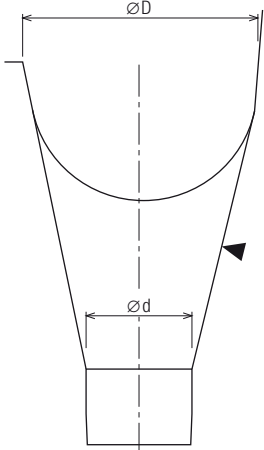
## Eave Rainwater System Specification – Angular

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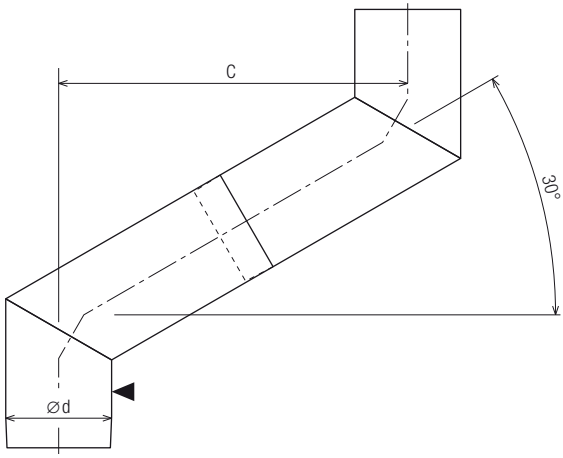
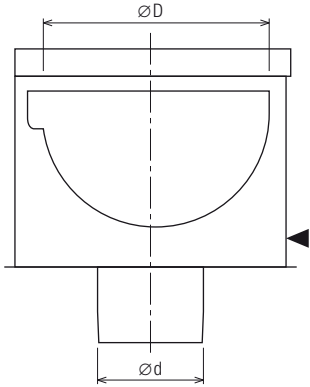
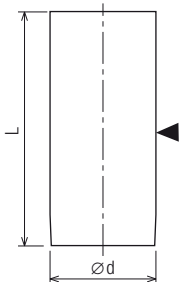
### Eave Rainwater System Specification – Round



## Eave Rainwater System Specification – Round

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K136	<p><b>Half-round Gutter</b></p> 	<p>ØD = specify diameter L = specify length (standard max. 4,000 mm)</p> <p>available ØD/girth: 120/280, 160/330, 200/400, 240/500</p>
K136a	<p><b>Gutter Stop End</b></p> 	<p>Gutter stop end it is possible ordered separately or factory applied.</p> <p>The gutter stop end can be produced in RIGHT or LEFT option. (The picture shows RIGHT gutter stop end.)</p> <p>For order please specify: ØD = diameter – RIGHT or LEFT option</p> <p>available ØD: 120, 160, 200, 240</p>
K136b	<p><b>Round Gutter Gully</b></p> 	<p>Ød = specify diameter L = specify length available Ød: 80, 100, 120, 150</p>
K136c	<p><b>Half-round Conical Basket</b></p> 	<p>For order please specify: Ød = specify diameter ØD = specify diameter colour and coating</p> <p>available Ød &amp; ØD combinations: 80 &amp; 120, 100 &amp; 160, 120 &amp; 200, 150 &amp; 240</p>
More information on the order form.		

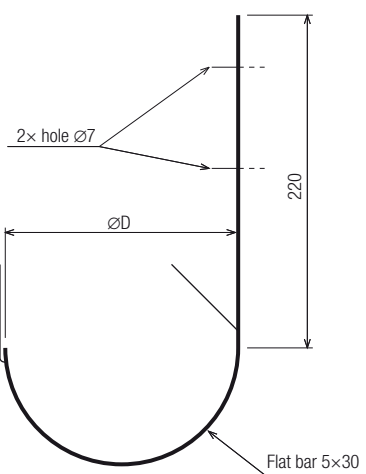
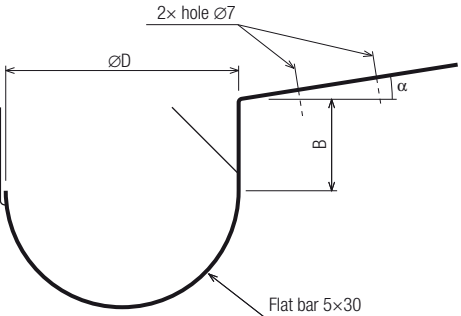
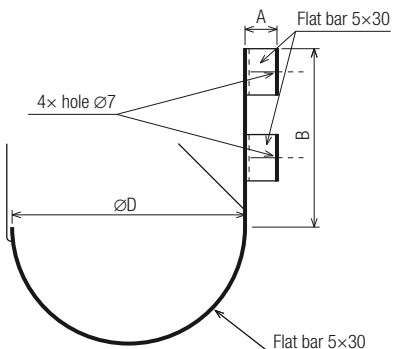
## Eave Rainwater System Specification – Round

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K136d	<p><b>Round Two-part Elbow</b></p> 	<p>Ød = specify diameter C = specify dimension available Ød: 80, 100, 120, 150</p>
K136e	<p><b>Expansion Basket</b></p> 	<p>Ød = specify diameter ØD = specify diameter available Ød &amp; ØD combinations: 80 &amp; 120, 100 &amp; 160, 120 &amp; 200, 150 &amp; 240</p>
K136f	<p><b>Round Down Pipe</b></p> 	<p>Ød = specify diameter L = specify dimension available Ød: 80, 100, 120, 150 Max. production length <math>L_{max} = 4,000</math> mm</p>
More information on the order form.		

## Eave Rainwater System Specification – Round

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
K136g	<p><b>Round Sleeve</b></p>	<p>Ød = specify diameter available Ød: 80, 100, 120, 150 external coating: galvanized + comax</p>
K136h	<p><b>Round Bounce</b></p>	<p>Ød = specify diameter C = specify dimension β = specify angle (°) available Ød: 80, 100, 120, 150</p>
K136i	<p><b>Round Drain Elbow</b></p>	<p>Ød = specify diameter available Ød: 80, 100, 120, 150</p>
More information on the order form.		

## Eave Rainwater System Specification – Round

Ref.	Profile (all dimensions in millimetres, ▲ – colorcoated side)	Notes
Z01a	<p><b>Half-round Gutter Hook – Basic</b></p> 	<p>ØD = specify diameter available ØD: 120, 160, 200, 240 external coating: galvanized + comax</p>
Z01b	<p><b>Half-round Gutter Hook – Downsloped</b></p> 	<p>ØD = specify diameter B = specify dimension α = specify angle (° or %) available ØD: 120, 160, 200, 240 external coating: galvanized + comax</p>
Z02	<p><b>Half-round Gutter Hook – Face</b></p> 	<p>ØD = specify diameter A = specify hook offset (standard 41 mm) B = specify hook height available ØD: 120, 160, 200, 240 external coating: galvanized + comax</p>
More information on the order form.		

## Pre-fabricated Insulated Rainwater Systems Specification – Rigid Urethane

Ref.	Profile (all dimensions in millimetres)	Notes
L01		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E (for non-standard sections)</li> <li>■ type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department</p> <p>available D: 40, 50, 60, 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p>
L02		<p>For insulated gutters it is possible to order pre-fabricated stop end (with overflow). For stop end it is necessary to specify RIGHT or LEFT option.</p>
L03		<p>For insulated gutters it is possible to order pre-fabricated stop end (with overflow). For stop end it is necessary to specify RIGHT or LEFT option.</p>
L04		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E, G (for non-standard sections)</li> <li>■ type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department</p> <p>available D: 40, 50, 60, 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p> <p>For insulated gutters it is possible to order pre-fabricated stop end (with overflow). For stop end it is necessary to specify RIGHT or LEFT option.</p>

## Pre-fabricated Insulated Rainwater Systems Specification – Mineral Fibre

Ref.	Profile (all dimensions in millimetres)	Notes
L05		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E (for non-standard sections)</li> <li>■ Specify type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour.</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department.</p> <p>available D: 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p>
L06		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E (for non-standard sections)</li> <li>■ Specify type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour.</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department.</p> <p>available D: 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p>
L07		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E, G (for non-standard sections)</li> <li>■ Specify type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour.</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department.</p> <p>available D: 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p>
L08		<p>Maximum length of insulated gutters is 6,000 mm including end overlaps.</p> <p>The production limit for insulated gutters is the maximum girth of bottom sheet, which is 1,250 mm.</p> <p>For order please specify:</p> <ul style="list-style-type: none"> <li>■ insulation depth D</li> <li>■ roof slope <math>\alpha</math></li> <li>■ total length of gutter, indicating the overlap size</li> <li>■ dimensions <math>\beta</math>, A, B, C, E, G (for non-standard sections)</li> <li>■ Specify type of coating (PES 25 <math>\mu\text{m}</math>, PVC 200 <math>\mu\text{m}</math>, Skinplate 500 <math>\mu\text{m}</math>) and colour.</li> </ul> <p>Assembly process for these surfaces is different. Contact the Technical Department.</p> <p>available D: 80, 100, 120</p> <p><math>F = D \times 1.3 + 80</math></p> <p>For insulated gutters it is possible to order pre-fabricated stop end (with overflow). For stop end it is necessary to specify RIGHT or LEFT option.</p>

# Handling & Installation

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## Packing, Delivery, Off-Loading & Site Storage

### Packing

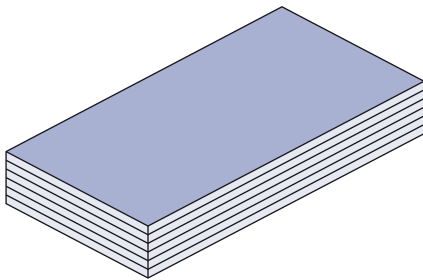
All Kingspan panels are packed in the factory and protected to ensure they arrive on site in first class condition.

The packing details vary from product to product because of their shapes, and details of each can be found on the product data sheets within the relevant roof or wall section.

In all cases however the panels are packed horizontally, with panels lying one on top of another, with additional anti damage protection to all sides and ends. The entire pack is wrapped in plastic film to keep the panels clean.

The number of panels in each pack varies depending on panel thickness, and customer requirements. Normally the standard height of each pack is approximately 1,100 mm. Each pack is labelled with the customers name and contents.

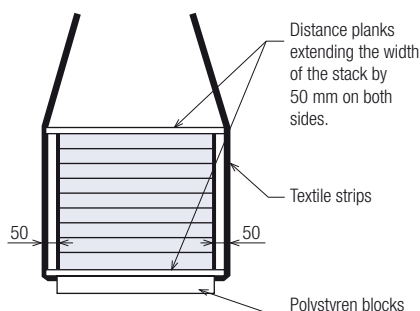
Fully timber crated packs are available on projects requiring delivery by sea freight shipping at additional-cost.



### Delivery & Off-Loading

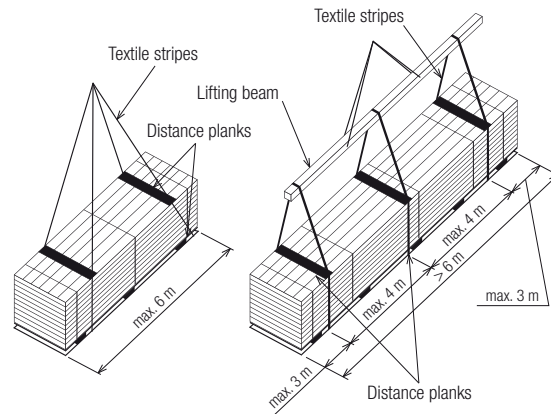
Panels are normally delivered to the site by road transport, the number of packs depending on panel and pack size. The packs are separated with timber bearers which create gaps between the packs to allow lifting straps or forklift tines to be inserted.

It is the customer's responsibility to arrange lifting equipment and labour to unload the packs. This usually requires using a crane, with or without a lifting beam, or a forklift, depending on panel length and weight.



The panel palettes shorter than 6 m which are handled with cranes, must be unloaded using textile strips and distance planks extending the width of the stack on both sides by 50 mm.

For crane handling of panel stacks longer than 6,000 mm, a lifting beam and textile strips must be used. Strips must be stretched upward and downward with a plank. Unloading using steel ropes is strictly forbidden!

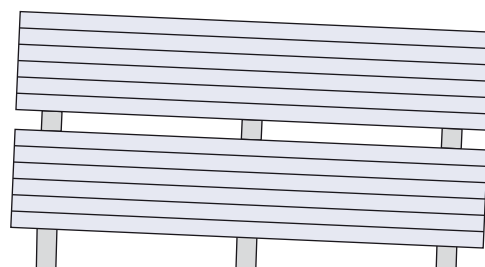


Separate panel stacks cannot be put on one another for longer time.

### Site Storage

- It is often necessary to store packs of panels on site for a period before they are fixed. To ensure that the panels remain in prime condition until they are installed the following precautions should be taken.
- Store packs off the ground and on a slope, so that should rain water penetrate the wrapping water will drain away. Support the packs evenly with timber bearers spaced at 1.5 metres. Bearers should always be placed one directly above another.
- If packs cannot be kept in a building they should be covered with a weatherproof sheet ensuring that the sheet drains water away effectively and does not allow ponding on top of the pack. It should also allow air circulation through the stacks of panels.

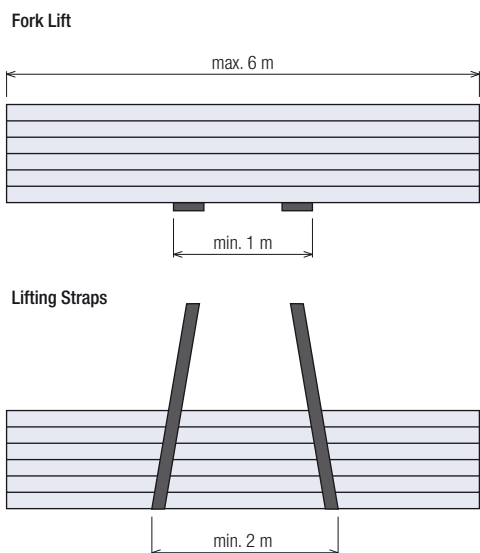
Do not store packs where people will walk across them.



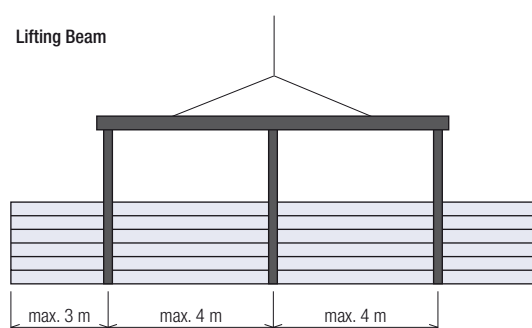
## Site Handling & Installation

### Site Handling

Packs of panels up to 6 metres long can be lifted either with a forklift, or by crane with lifting straps, as shown below. Care must be taken to ensure the forklift tines do not damage the bottom panel, and similarly when using straps, protect the edge of the panels to prevent local damage.



Packs longer than 6 metres should be lifted by crane with a lifting beam with straps at a maximum of 4 metres centres.



Individual panels should always be lifted from a pack and not dragged over others. The weight of individual panels for lifting can be determined from the information in the Product Data pages for the individual products.

Generally, however, it is normal to man handle roof panels up to 15 metres long into position, whereas for walls the limit is typically 8 metres. For panels longer than this the contractor would normally arrange to use a crane, hoist, or other equipment to help lift the panels into position.

Individual panels should always be handled carefully to avoid damage. In particular Roof and Wall panels should not be lifted by the side or end lap. Sliding panels on top of the other should be avoided, especially at edges.

Gloves should always be worn to avoid cuts and abrasions to operatives. Installers should always wear rubber soled footwear to avoid damage to the panel coating when installing roof panels (See Health & Safety Data Sheet).

### Protecting Film

Protection foil on goods serves as a temporary protection against damage of goods during transport or handling. Remove the foil within four weeks after assembly of the product at the latest, and not later than 10 weeks after the supply of goods to the construction site.

### Site Installation

The installation of Roof and Wall cladding on a particular building must be planned carefully to ensure the work can proceed in safety. The contractor normally prepares a method statement for his client, which indicates who is responsible for safety, what equipment and particularly what safety equipment, will be used for each stage of the work, and the sequence of installation.

The actual technique for fixing roof and wall Kingspan panels is described, but a number of general principles apply:

- Ensure that the purlins or cladding rails have been installed to provide a level fixing plane for the panels.
- Fasten the first panel at the edge of the roof or wall area to be clad, ensuring it is correctly aligned and the right way round for lapping etc, and then fix as indicated in the construction details.  
It is desirable to arrange the panels so that any side laps are not exposed to the prevailing wind.
- Install the recommended fasteners in their correct positions to fix the panel to the steelwork. Note that the number of fasteners may have to vary depending on the wind suction load. Fasteners should be installed in the direction of lay.
- The fasteners must be installed correctly in order to weather seal correctly, and any drilling swarf must be removed from the panel to prevent damage to the coating.
- When sealants are applied at laps or joints, ensure surfaces are clean and dry, apply the tape seal to the surface before removing backing paper, and cut (do not tear) the sealant at the end of a run.
- If the panels have to be cut on site always use a reciprocating type saw (jigsaw or similar), do not use abrasive wheel cutters. After cutting remove swarf from the panel surface, and any burrs from the cut edges. Eye protection should always be worn when cutting or drilling.

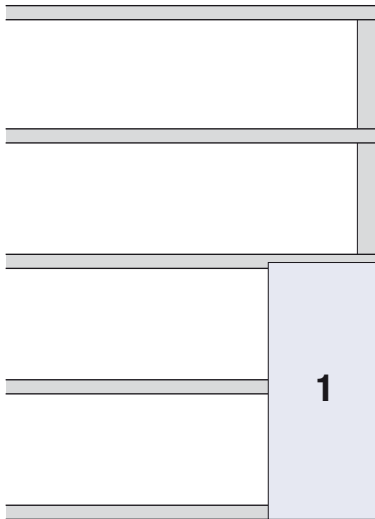
## Site Installation

### Roof & Wall Panels

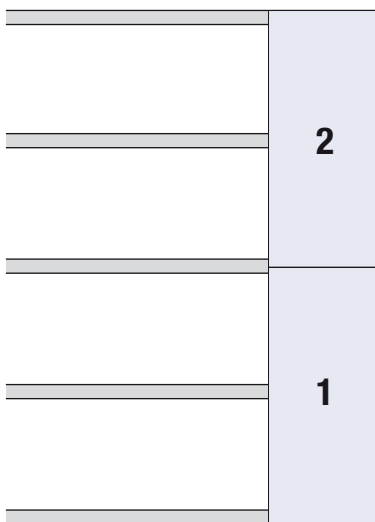
#### Installation Procedure KS1000 RW

These panels lap at the sides and ends, so they must be fixed in sequence to ensure reliable performance.

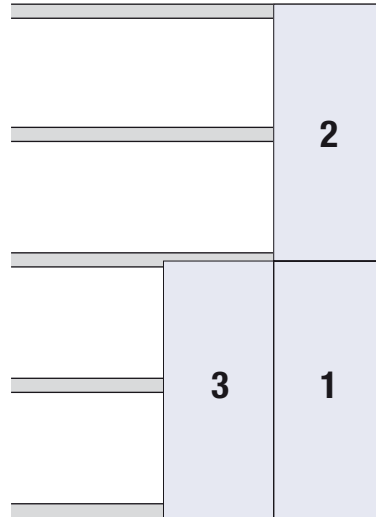
1. Start with the eaves (or bottom) corner panel, with the projecting side and end laps to the outside of the building. Install fasteners and apply sealant as specified.



2. Locate the second panel upslope or above, so that it overlaps the first, adjusting its position carefully before contacting the sealant. Repeat up to the ridge or eaves/gable.



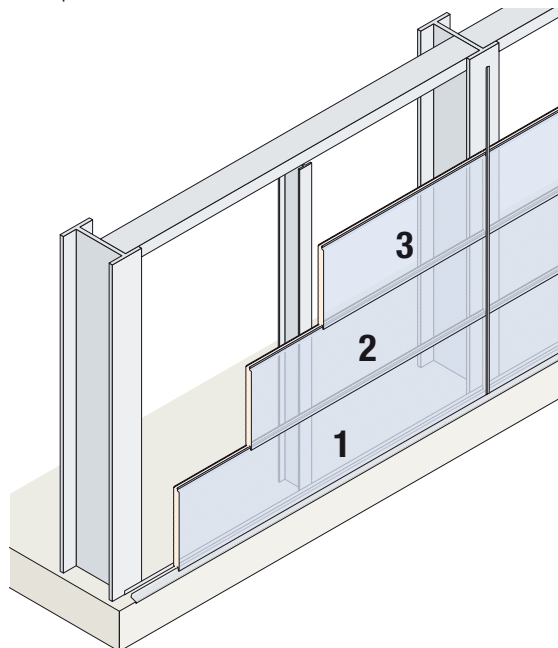
3. Start the second tier from the eaves (or bottom), side lapping the first panel, sealing and fixing, as specified. Repeat the procedure for the complete roof or wall.



### Wall System Installation Procedure

Wall panels horizontally laid

1. Fixing always starts at the lowest panel ensuring that the sill flashing and panel bearers (at max. 1.5 m centres) are level. Sit the panel on the bearers and fix the top edge to the rails using 1 or 2 fasteners depending on panel span and wind loading.
2. Sit the second panel on the tongue of the first, ensuring the ends are correctly aligned and sealed, and the joint width is parallel. Fix the panel to the steelwork as before. The side joint contains a factory applied seal and no further sealing is required.



## Site Installation

3. Continue the same procedure to the top of the wall, cutting the top panel along its length if necessary. The top edge of the top panel must be fixed to the steelwork at 500 mm centres maximum.
4. Where through fasteners are used at panel ends or edges, at corners or around doors, windows etc, they should be concealed by a flashing, to maintain a secret fix appearance.

Wall panels vertically laid

1. Ensure the bottom rail is permanently or temporarily supported, and level, along its full length before starting installation.
2. Fix the sill flashing to the bottom rail, ensuring it is straight and level.
3. Position the first panel with the groove side at a corner, making sure it is vertical before installing. Use concealed fasteners at the tongue edge and through fasteners at the corner. Use either 1 or 2 fasteners at each position depending on the panel span and wind loading.
4. Engage the side of the second panel into the tongue of the fixed panel, making sure the joint is parallel and consistent for the full height of the panel. Install fasteners into the leading edge at each rail position, using the specified number of fasteners.
5. Continue until the wall is completed.
6. Where necessary, panels can be cut down their length at openings and corners. In this case through fasteners must be used, but these should be concealed by the flashings/trims.

## Flashings/Trims

Flashings and trims must be carefully fixed, ensuring they are aligned, correctly sealed and their edges are straight and not distorted. (See construction details).

