





**MASTER PANEL S.L.** was created in 2007, based on our group's 40 years experience in the metal structure sector. We specialise in the manufacturing of polyurethane (PUR) and polyisocyanurate (PIR) insulating panels for the construction industry, and have extensive modern facilities with the most advanced technology in our sector.

Our panels bring together current architectural trends with the most demanding functional requirements, meeting the needs of any type of enclosure: roofs, walls, cold rooms, suspended ceilings and partitions. We have a wide range of over 30 panels suitable for different construction sectors: industrial, commercial, residential, modular, agricultural and the refrigeration industry (agri-food sector).

All our panels offer the highest technical specifications that meet the most demanding standards, without sacrificing the aesthetic demands and creative freedom of the project. This allows us to provide an accurate response in technical, aesthetic and functional terms.

We have implemented the most stringent controls in our production to ensure a high standard of quality, reflected in our ISO9001: 2015 certification, complemented by an exhaustive check of each production batch in our own laboratory.







Master Panel. Properties

6

A Master Panel for every  
requirement

16

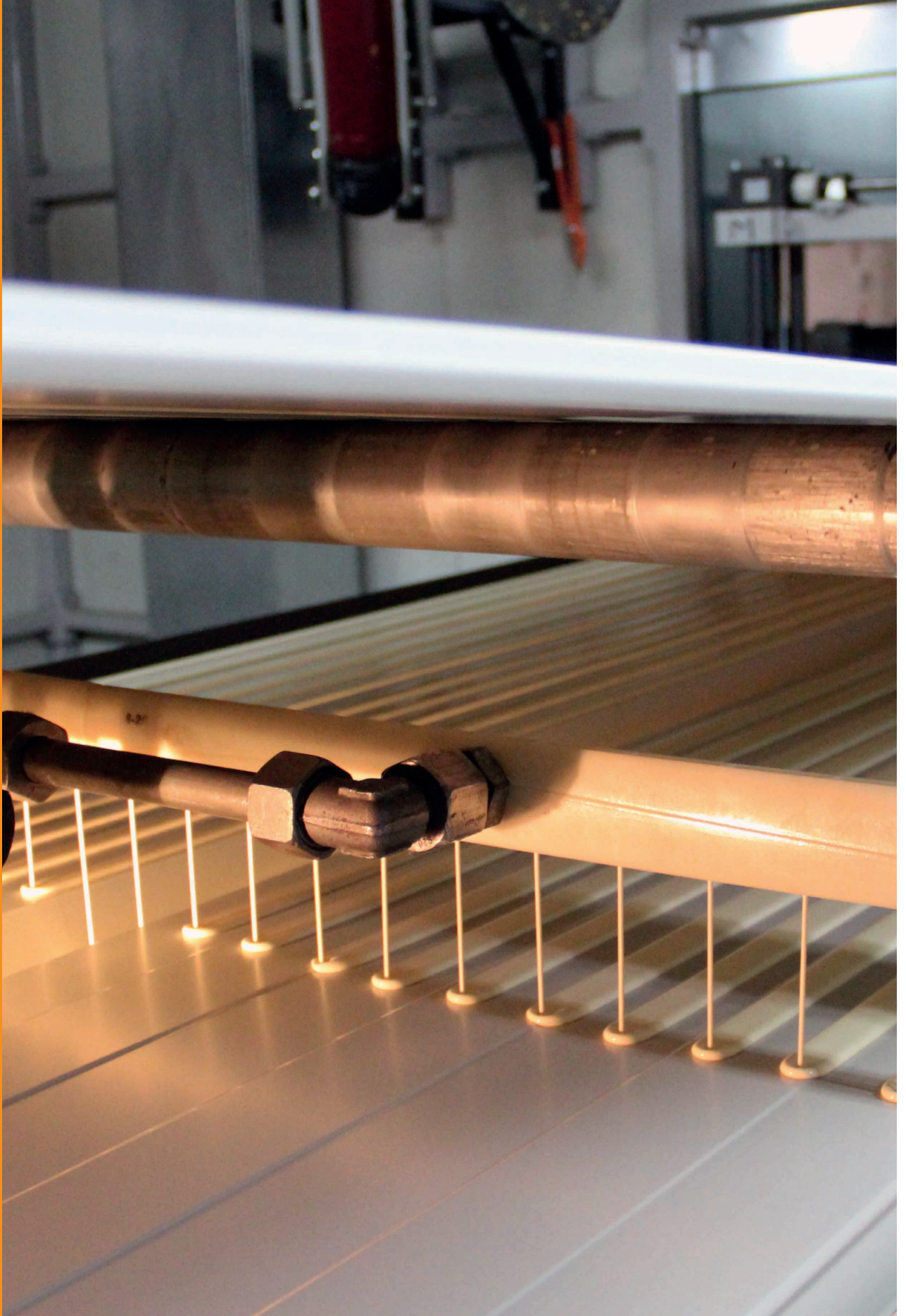
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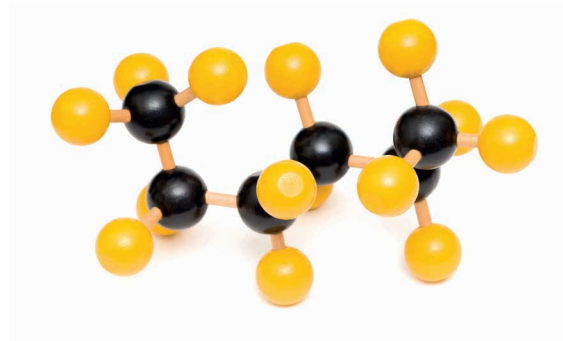
# PROPERTIES



## What is Polyurethane?

Polyurethane foam is a porous plastic material created by a condensation polymerization of two main components, a polyol and an isocyanate, to which pentane is added as a foaming agent. The mixing of the polyol and the isocyanate causes an exothermic reaction, in which the heat produced evaporates the pentane, a very low thermal conductivity gas that then forms bubbles.

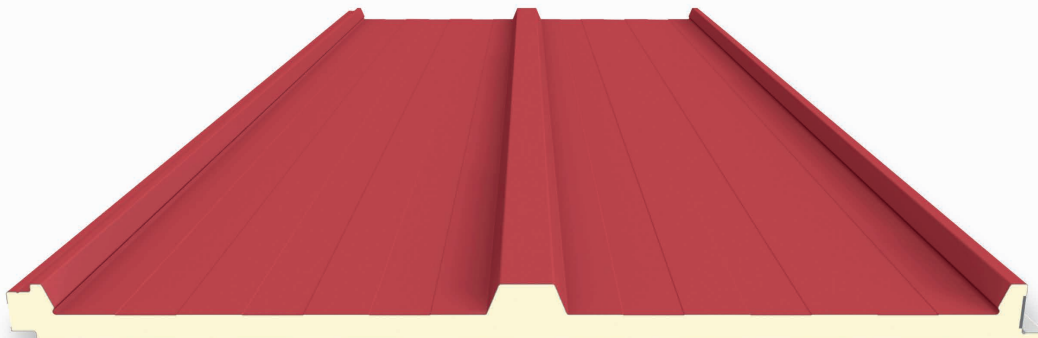
The polyurethane in our panels has a closed cell structure that gives it the characteristics of good thermal stability, high compressive strength and excellent insulating properties. Polyurethane has a very low thermal conductivity, which makes it one of the most effective insulating materials in the world.



## What are Master sandwich panels?

**Master** sandwich panels are created with a core of rigid polyurethane foam insulation bonded to two layers of metallic exterior covering, generally hot-dip galvanized steel, which are then prepainted in various qualities and finishes, depending on the needs of each project. During the manufacturing process, the insulating core expands, completely adhering to the covering layers without the use of any adhesive, so it may be considered that the combination forms a single product or construction element as far as its use and properties are concerned.

They are a unique solution for all types of building enclosures. Thanks to their mechanical and aesthetic properties they can serve a dual function, acting as both enclosure and cladding in a single system, achieving structural and insulation levels far superior to traditional products (blocks, wood, etc.), as well as being available in many finishes and colours to suit the aesthetics of every kind of project.

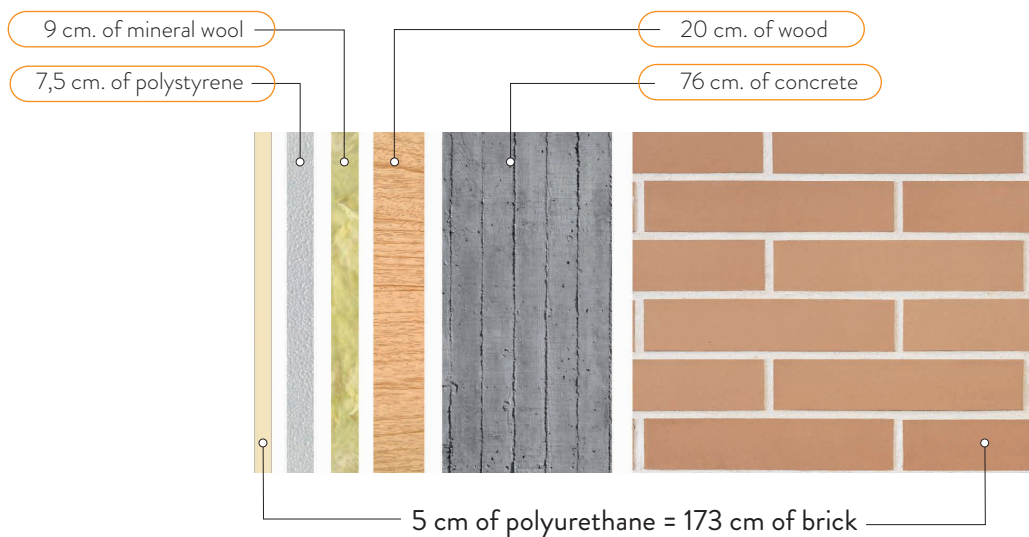


## Thermal insulation

In construction, the thermal performance of the wall panel, roof or floor is expressed as its “U” value, which is basically the amount of heat that can pass through the wall, roof or floor, expressed in watts per square meter ( $\text{W/m}^2$ ). The insulating core of **Master** panels has the lowest coefficient of thermal conductivity available.

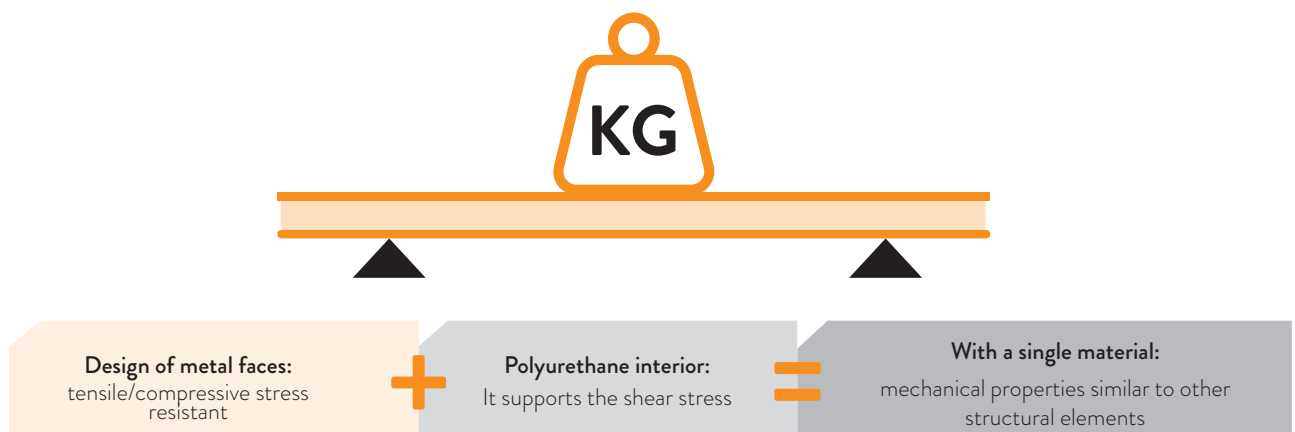
The use of **Master** panels makes it easier to keep buildings at a comfortable temperature throughout the year. They create a barrier that stops the flow of heat through the building walls, allowing a better control of the indoor temperature.

As you can see in the illustration below, insulating with Master panels achieves the same “U” value as other materials with considerably less thickness.



## Mechanical properties

Master panels have high resistance to bending and twisting, the result of a perfect combination of the inherent rigidity of the outer layers and the excellent physical and mechanical properties of the foam. The different layers which make up the panels are bonded, forming a self-supporting product, giving rise to the so-called “sandwich effect”.



## Durability

There is data to show that polyurethane sandwich panels have proved themselves in construction over the past 40 years. Thanks to the excellent chemical and biological resistance of polyurethane, its high stability even in special conditions (extreme temperatures, high humidity) and the wide range of steel coatings to suit any environmental condition, polyurethane panels may offer the best guarantee of durability.

2012
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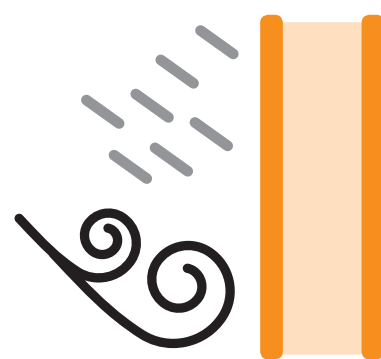
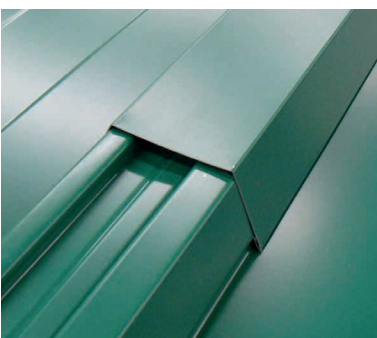


## Watertightness

Master sandwich panels, due to their system of design and assembly, make their buildings windproof and watertight. Additionally, the closed cell structure of the rigid polyurethane foam prevents the penetration of water and moisture which could affect the foam insulating properties and durability. This closed cell structure also prevents the panel from being attacked by microorganisms, making it ideal for the food industry.

According to **ASTM E 2140**, Standard test method which measures water penetration of metal roofing panel systems by static water pressure head, **Master-C** panels are classified as watertight by sealing and maintaining a column of 15 cm of water for 6 hours.

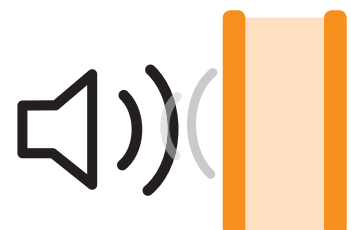
According to **ASTM E 331**, Standard test method for water penetration of exterior windows, skylights, doors and curtain walls by uniform static air pressure difference, **Master-F** panels are classified as watertight with a pressure difference of 12 PSF.



## Acoustic insulation

In terms of acoustic insulation, with an acoustic frequency value of 125- 750HZ, a medium-thick polyurethane sandwich panel can reach an acoustic reduction index of 25-35 dB and a weighted sound absorption coefficient of 0,1.

By complementing it with other products, the panel can reach higher insulation values



## Sustainability

Insulation is one of the cheapest and easiest ways to improve the energy efficiency of a building, whether old or new. Greater energy efficiency means that less energy is required to heat or cool buildings. In turn, this results in lower fuel consumption and lower emissions of environmentally harmful carbon dioxide. In addition, the waste from the panel can be used, since the steel sheets can be recycled and the rigid polyurethane foam can be incinerated, which allows the energy generated to be harnessed. During their life cycle, Master panels save 100 times the energy used in their production.



To reduce environmental impact, **Master** panels offer:



**Excellent energy efficiency:** saving energy and reducing CO<sub>2</sub> emissions

**The panels save 100 times the energy used in their production.**

**Minimum thickness:** reducing the building's footprint and land use.

**A reduction in structural size:** lower environmental impact of the building structure.

**Transport:** being very light and thin, the insulation requires less transportation for delivery, resulting in low environmental impact.

**No greenhouse gases:** our Processes and Products are CFC and HCFC free.

**Our waste:** 95% of our waste is recyclable.

### Recycling sandwich panels:

The metal cover of injected polyurethane sandwich panels can be recycled following standard procedures for this type of material.

The insulating core of the panel is not affected by any European directives on dangerous products. Three recycling techniques can be used. The choice of one or another depends on the characteristics of the polyurethane foam used in the core of the panel, the after use and the cost:



- **Mechanical Recycling.** Using processes of crushing, granulating, grinding or pulverisation, particles of recyclable material are obtained that will be used for new polyurethane products.
- **Chemical Recycling.** This is based on the application of various chemical and thermal processes which decompose the foam into low molecular weight fractions. These are used to regenerate the diisocyanate which, together with the polyol, allows the production of new pieces of polyurethane.
- **Energy assessment.** Energy recovery through incineration. This technique obtains thermal and/or electrical energy from panel core waste. Current incineration technology ensures that emissions are controlled, thus minimizing their potential environmental impact.



PROPERTIES

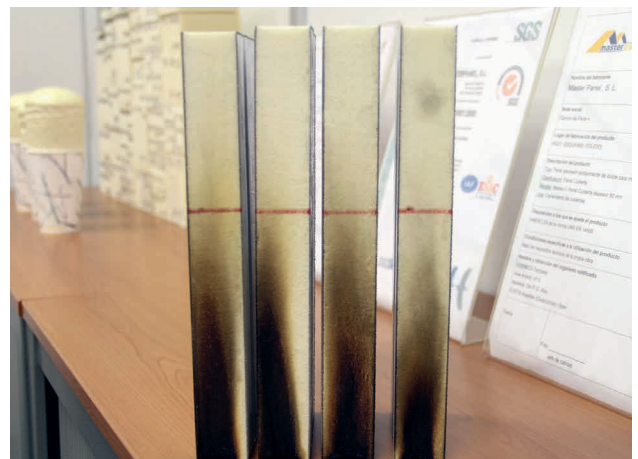
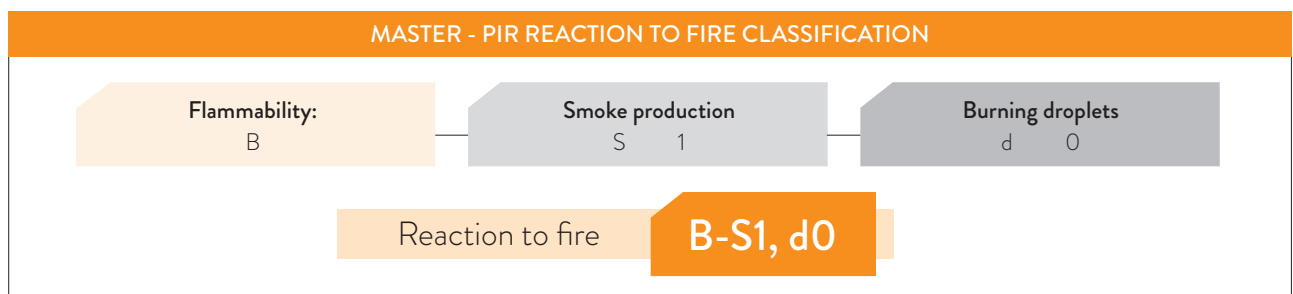
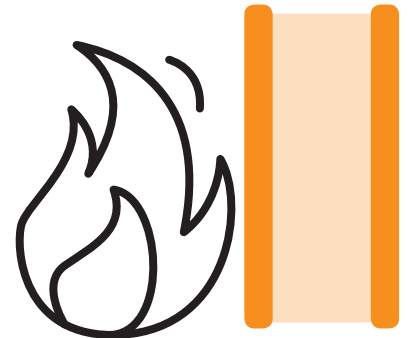
## Reaction to fire

In the last decade, polyurethane foams have evolved into construction elements with an excellent reaction to fire. In this context we should emphasize the polyisocyanurate foams (PIR), which are modified polyurethane foams whose molecules, unlike the linear chains of other polyurethanes (PUR), have a network structure that gives them fire-resistant properties. These foams have resulted in a new generation of panels called **Master-PIR**.

These panels are mainly characterized by their reaction to fire, and may be called self-extinguishing, which greatly reduces fire propagation and consequent smoke emissions. The polyurethane does not melt or drip when heated, and can help a building to resist the spread of fire. **Master-PIR** panels exceed fire safety standards and insurance requirements for a wide range of applications.

European legislation classifies the reaction to fire of construction products according to UNE- EN 13501 standard: Euroclass, which measures combustibility, quantity and opacity of smoke and inflamed particle fall. **Master-PIR** panels get the best fire reaction rating for polyurethane and polyisocyanurate foams, which is B-s1,d0.

In order to confirm the excellent fire reaction properties of Master-PIR panel foam, Masterpanel has tested **Master-PIR** foam according to ASTM E-84: Standard Test Method for Surface Burning Characteristics of Building Materials, by measuring flame propagation and smoke production. The results of these tests confirm the excellent fire reaction rating of **Master-PIR** panel foam by obtaining the best classification, i.e. Class A.



## UNE-EN 13501

## COMBUSTIBILITY


A1	No contribution to fire
A2	No contribution to fire
<b>B</b>	<b>Very limited contribution to fire</b>
C	Limited contribution to fire
D	Moderate contribution to fire
E	High contribution to fire
F	Unclassified, with undetermined performance

## SMOKE OPACITY: Amount and speed of emission

s1	Low
s2	Medium
s3	High

## FALL OF BURNING PARTICLES

d0	No fall in 600 sec
d1	No fall in more than 10 sec
d2	No d0, no d1



**AFITI LICOF**

**Classification Report n° C3066T16**

Classification obtained in the laboratories of the Association for the promotion of research and technology of security against fires (AFITI), experts in the study of fire performance of multiple products used in construction.

**Certificado de ensayo**  
Nº: C3066T16

**Solicitante:** MASTERPANEL, S.L.  
C/ Santa de Toledo, s/nº  
45021 - ESQUINAS (Valencia)

**Tipo de muestra:** Panel sándwich metálico con alma de PIR  
Fabricante: Masterpanel, S.L.

**Referencia:** "MASTER PIR"

**Ensayo/s:**

- Ensayo según norma UNE-EN 13823-2012, "Ensayos de reacción al fuego de productos de construcción- Productos de construcción excluyendo revestimientos de suelos expuestos al ataque directo provocado por un arco voltaico ardiente"
- Ensayo según norma UNE-EN ISO 13823-2:2011 "Ensayos de Reacción al Fuego de los materiales de construcción, Informabilidad de los productos de construcción cuando se someten a la acción directa de la llama. Parte 2: Ensayo con una fuente de llama única ISO 13823-2"

**Fecha Ensayo/s:** 22-jul-16

**Certificado de los informes:**

- Informe de ensayo n° 3066T16 (limitado por AFITI LICOF en fecha 14-sep-16).
- Informe técnico EXAP n° EXAP-3066T16 (limitado por AFITI LICOF en fecha 14-sep-16).
- Informe de clasificación n° 3066T16-2 (limitado por AFITI LICOF en fecha 14-sep-16).

**Clasificación de la Reacción al Fuego:** **B-s1, d0**


Quedando sujeto a la norma UNE-EN 13823-2:2011 (EN 13823-2) "Ensayos de Reacción al Fuego de los productos de construcción, Informabilidad de los productos de construcción cuando se someten a la acción directa de la llama. Parte 2: Ensayo con una fuente de llama única ISO 13823-2"

**Tratado, 14 de septiembre de 2016**

**Fdo: David Sáez García**  
Director Técnico del Laboratorio de Reacción al Fuego

Los resultados incluidos en este Certificado tienen validez técnica y conforman parte de la información técnica, y no de producto o servicio.  
En los términos establecidos en el presente certificado, se garantiza la veracidad de los datos que se han presentado en la información de datos de clasificación de la Reacción al Fuego. Este Certificado no garantiza la conformidad de los productos con la información de datos de clasificación de la Reacción al Fuego.  
La información y clasificación de datos técnicos sujetos a cualquier modificación por el fabricante o proveedor.

AFITI LICOF es una asociación sin ánimo de lucro, fundada en 1997, con el objetivo de promover la investigación y el desarrollo tecnológico en el campo de la protección de construcción y garantizar la seguridad.



**intertek**

**Classification Report**  
**n° 102643891SAT-001A REV1**

ASTM E84  
Flame spread index: 20  
Smoke developed index: 300  
Class A

Project No: 102643891SAT-001A Rev1  
Master Panel SL

February 6, 2016  
Page 2 of 9

**ABSTRACT**

Specimen I. D. "Master-PIR Panel"

Test Standard: ASTM E84-15b TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (UL 723, UBC 8-1, NFPA 255)

Test Date: July 5, 2016

Client: Master Panel SL

Test Results:

FLAME SPREAD INDEX	20
SMOKE DEVELOPED INDEX	300

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**Reviewed and approved:**

Joseph Martinez  
Technician III

Servando Romo  
Project Manager

Rick Curkley, PE  
Chief Engineer-Building & Hearth Products

July 11, 2016  
July 11, 2016  
July 11, 2016

**WISCONSIN**  
FREDERICK D. CURKLEY  
E 65509  
BLACK EARTH  
WI  
PERSONAL ENGINEER

**Intertek**

# Quality

At **Masterpanel** we have implemented the most rigorous controls in our production process to guarantee our clients a high standard of quality, endorsed by a ISO9001:2015 certification, and supplemented by an exhaustive verification carried out on each production batch in our own laboratory.



All our products are CE marked, which certifies that our panels comply with the current European legislation.



<b>CE</b>	<b>MASTER PANEL</b>	C/ Camino de Toledo s/n, 45221 Esquivias (Toledo) España	Panel sándwich aislante autoportante de doble cara metálica
UNE EN 14509			
<b>Características del producto:</b> Alisamiento: ... Densidad: ... kg/m³ (10%) Espesor: ... mm		<b>Características del acondicionamiento:</b> Tipo: Acero (EN 10168) Acabado: ... Espesor cara exterior: ... mm Espesor cara interior: ... mm Masa: ... kg/m²	
<b>Propiedades térmicas:</b> Coeficiente de transmisión térmica U: ... W/m²·K			
<b>Resistencia mecánica:</b> Resistencia a tracción: ... MPa Resistencia a compresión: ... MPa Resistencia a esfuerzo cortante: ... MPa Resistencia a esfuerzo cortante (núcleo): ... MPa Resistencia a esfuerzo cortante a largo plazo: ... MPa Coeficiente de fluencia (t=10000h): ... MPa		<b>Resistencia mecánica:</b> Tensión de arugamiento (cara exterior): - En vano: ... MPa - En vano a temperatura elevada: ... MPa - En el apoyo central: ... MPa Tensión de arugamiento (cara interior): - En vano: ... MPa - En el apoyo central: ... MPa	
<b>Resistencia a fuego:</b> Resistencia a fuego: ... MPa Resistencia a propagación de la llama: ... MPa Resistencia a succión a temperatura elevada: ... MPa Resistencia a succión a temperatura elevada: ... MPa		<b>Comportamiento ante el fuego:</b> Reacción al fuego: ... Resistencia al fuego: ...	
<b>Otras propiedades:</b> Permeabilidad al agua: ... Permeabilidad al aire: ... Permeabilidad al vapor de agua: ... Absorción acústica: ... Durabilidad: ...			

**MASTER PANEL** DECLARACIÓN DE PRESTACIONES N° \_\_\_\_\_

LOTE: \_\_\_\_\_

- Nombre y código del producto**  
Referencia: Master: \_  
Espesor: \_  
Características de la chapa: Espesor: \_ mm / Acabado: \_  
Características del núcleo: Alisamiento: \_ / Densidad: \_ kg/m³ (±10%)
- Nombre y dirección del fabricante**  
Master Panel, S. L.  
Camino de Toledo, s/n Polig. Industrial La Cardena 45221 Esquivias (Toledo) - España
- Uso previsto**  
Panel sándwich aislante autoportante de doble cara metálica
- Sistema de evaluación y verificación de la constancia de las prestaciones**  
Sistema 3
- Disposición a los que se ajusta el producto**  
ANEXO ZA de la norma UNE-EN 14509
- Nombre y dirección del organismo notificado**  
CIDEMCO-Tecnalia  
Área Anardi, nº 5 Apartado 134 P.O. Box E-20730 Azpetia (Guipúzcoa) España
- Prestaciones declaradas**

Características esenciales	Prestaciones	Espec. técnicas armonizadas
Coeficiente de transmisión térmica	... W/m²·K	EN 14509

Características esenciales	Prestaciones	Espec. técnicas armonizadas
Resistencia a tracción	... Mpa	EN 14509
Resistencia a compresión	... Mpa	
Resistencia a esfuerzo cortante	... Mpa	
Módulo a esfuerzo cortante (núcleo)	... Mpa	
Resistencia a esfuerzo cortante a largo plazo	... Mpa	
Coeficiente de fluencia (t=2000h)	...	EN 14509
Coeficiente de fluencia (t=10000h)	...	

Características esenciales	Prestaciones	Espec. técnicas armonizadas
Reacción al fuego	...	EN 13501
Resistencia al fuego	...	EN 13501

**Otras propiedades**

Características esenciales	Prestaciones	Espec. técnicas armonizadas
Permeabilidad al agua	...	EN 14509
Permeabilidad al aire	...	
Permeabilidad al vapor de agua	...	
Absorción acústica	...	
Durabilidad	...	

Las prestaciones del producto identificado en el punto 1 son conformes con las prestaciones declaradas en el punto 7.

La presente declaración de prestaciones se emite bajo la sola responsabilidad del fabricante identificado en el punto 2

**Responsable de Calidad** 01-01-2017



## DIMENSIONAL TOLERANCE TABLE

DIMENSION	MAXIMUM TOLERANCE
Panel thickness	$E \leq 100 \text{ mm} \pm 2 \text{ mm}$ $E \geq 100 \text{ mm} \pm 2 \%$
Deviation from flatness	Deviation from flatness 1.5 mm
Panel length	$L \leq 3 \text{ m} \pm 5 \text{ mm}$ $L > 3 \text{ m} \pm 10 \text{ mm}$
Panel Coverage	$\pm 2 \text{ mm}$
Non-squareness	6 mm
Deviation from straightness	1 mm per meter, maximum 5 mm
Warping	2 mm per meter in length, maximum 10 mm 10 mm in panel width
Profiling design	$\pm 3 \text{ mm}$

## APPLICABLE REGULATIONS

EN 14509	Self-supporting double skin metal faced insulating panels.
EN 10143	Continuous hot-dip metal coated steel sheets and strips.
EN 10169	Continuously organic coated (coil coated) steel flat products.
EN 10346	Continuously hot-dip coated steel flat products.
EN 13501	Classification based on fire resistance of construction products and building elements.



A Master Panel for  
every requirement



Master-C roofing panels 18

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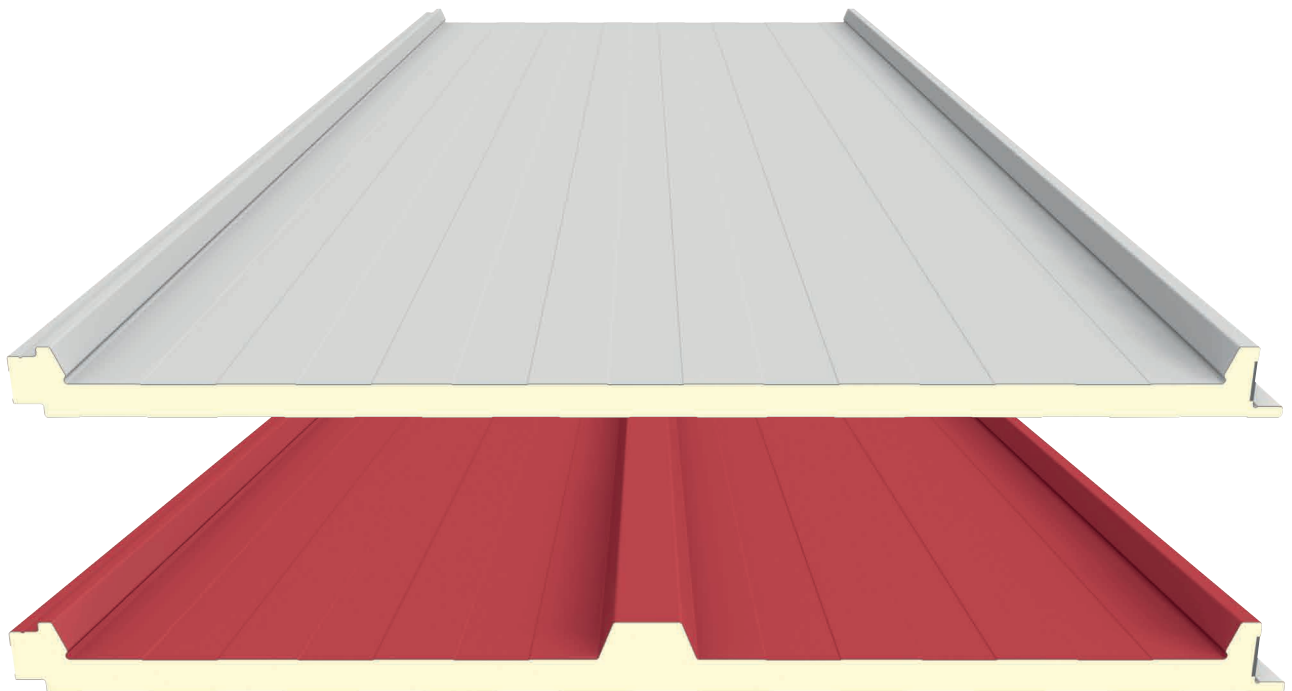
Finishes 52

# Master-C roofing panels

**MASTER-C** panels are continuous production line prefabricated panels, and are composed of two faces of prepainted galvanized steel, bonded to a core of rigid polyurethane (PUR) or polyisocyanurate (PIR) foam, forming a sandwich type element with tongue and groove joints.

**MASTER-C** panels are specially designed for use in all types of roofs, both for industrial construction and for modular or commercial buildings.

Installation is very simple, and provides total watertightness (roof slopes of over 4%).



**MASTER-C** panels have a tongue and groove jointing system with a steel cover cap that hides and protects the fasteners and ensures the watertightness of the system. Regarding the external profile of the panel, there are two different designs, with a choice of two-rib panels and three-rib panels, both available in seven different thicknesses, with two different interior rib designs and a wide range of colours. Additionally, **MASTERPANEL** also offers the option of panels manufactured with PIR (polyisocyanurate) self-extinguishing foam with a B-s1, d0 certification under Euroclasses (UNE-EN 13501).



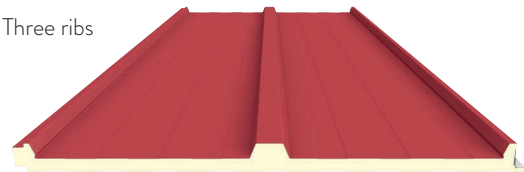
## Master-C roofing panels

### TECHNICAL SPECIFICATIONS

Two ribs

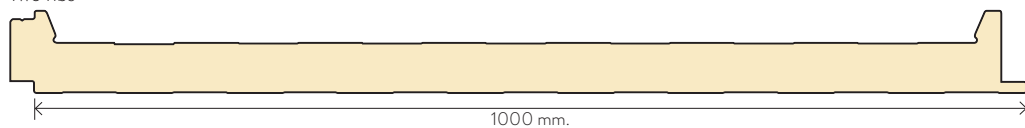


Three ribs

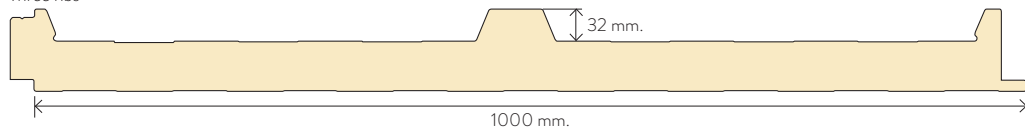


	Values
Panel thickness	30, 40, 50, 60, 80, 100, 120 mm.
Cover Width	1.000 mm.
Length	Up to 16,000 mm (max. recommended 13,000 mm)
Field of application	Roofing
Outer face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Inner face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Coatings (see section on Finishes)	Polyester 25um PVDF 25um / 35um PU 55um (Granite® HDX/PUPA 55) Imitation wood (inner face) PVC 120um (foodsafes)
Outer ribbing	Two ribs / Three ribs
Inner ribbing	Standard / Flat
Core type	Polyurethane (PUR) Polyisocyanurate (PIR)
Core Density	40 kg/m <sup>3</sup> (+/- 10%)
Tensile strength	> 0.060 Mpa
Compressive strength	> 0.100 Mpa
Flexural strength	> 0.100 Mpa
Reaction to fire	Cs3d0 / Bs1d0

Two ribs

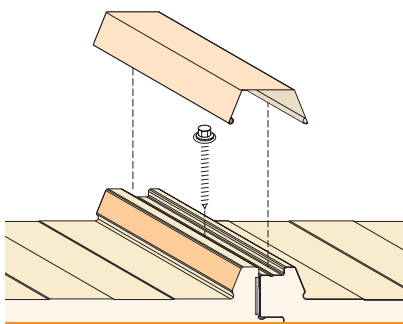


Three ribs



Joint detail.

Other fixing options: see p. 65



Panel thickness	Weight	Thermal transmittance (U-value)		Thermal resistance (R-value)	
mm	kg/m <sup>2</sup>	w/m <sup>2</sup> k	Kcal/m <sup>2</sup> h °C	m <sup>2</sup> k/w	Hr ft <sup>2</sup> °F/BTU
30	9,61	0,67	0,58	1,50	8,49
40	10,00	0,51	0,44	1,95	11,06
50	10,39	0,41	0,36	2,42	13,74
60	10,78	0,35	0,30	2,90	16,45
80	11,56	0,26	0,22	3,85	21,84
100	12,34	0,21	0,18	4,80	27,20
120	13,12	0,17	0,15	5,74	32,55

Calculations according to EN14509, measuring the surface resistance according to horizontal flow and omitting the influence of the profiled faces. Losses in bolted connections must be calculated by the designer.

## FUNCTIONS AND BENEFITS OF MASTER-C PANELS

- Efficient thermal insulation capacity
- High mechanical strength
- The fasteners are hidden and protected
- Exceptional dimensional stability
- Watertight against water vapor
- Resistant to aggressive environments
- A versatile material that allows any configuration
- Quick to install and easy to maintain (easy to clean)
- Easily removable and can be reused
- Made-to measure, avoids waste
- Made with recyclable materials

## REACTION TO FIRE



**C-s3 d0**  
N° 3406T18

**B-s1 d0**  
N° 3066T16

**intertek**

ASTM E84 (MASTER-PIR) Class A

Flame Spread Index: **20**

Smoke developed index: **300**



### Permissible overloads (kg/m2)

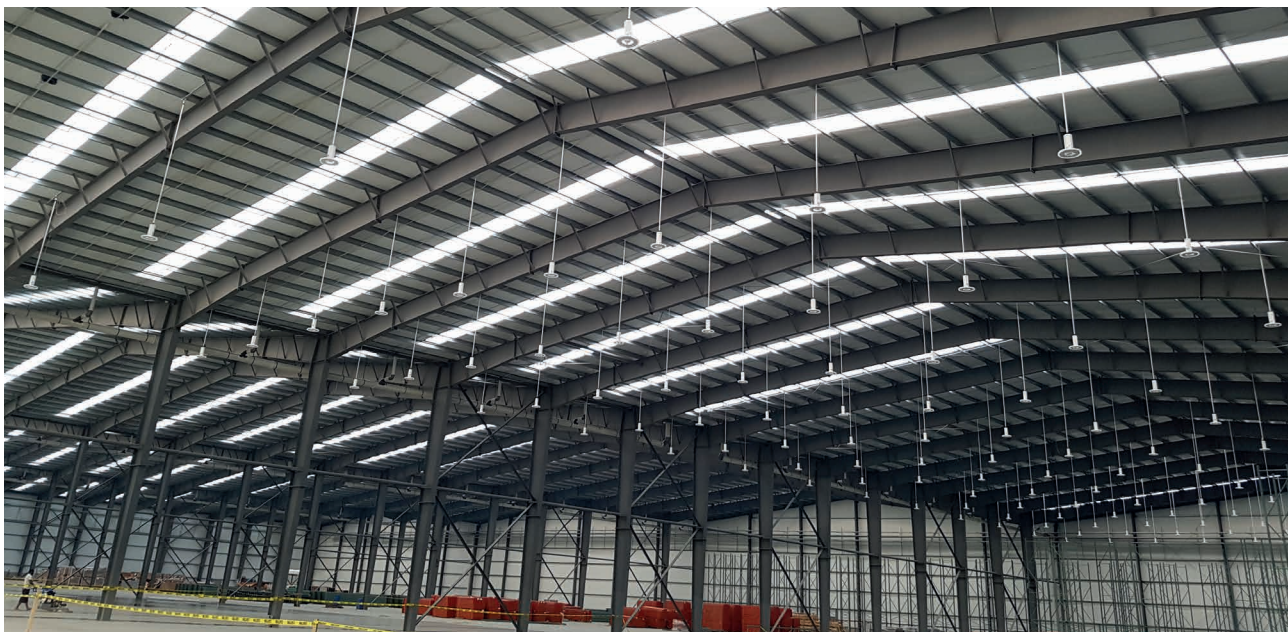
Panel thickness mm	(L) span distance in cm. Calculations made on 0.50 mm / 0.50 mm panel.											
	150	175	200	225	250	275	300	325	350	375	400	450
30	331	233	172	168	137							
40	409	297	225	213	176	149	127	109				
50	489	364	281	260	218	186	160	139	122	107		
60		432	339	309	261	224	194	170	150	133	119	96
80			458	410	350	304	266	235	209	187	168	138
100					442	386	340	302	271	243	220	182
120						470	416	371	334	301	274	228

Evenly distributed pressure overload for 2 spans (3 supports).

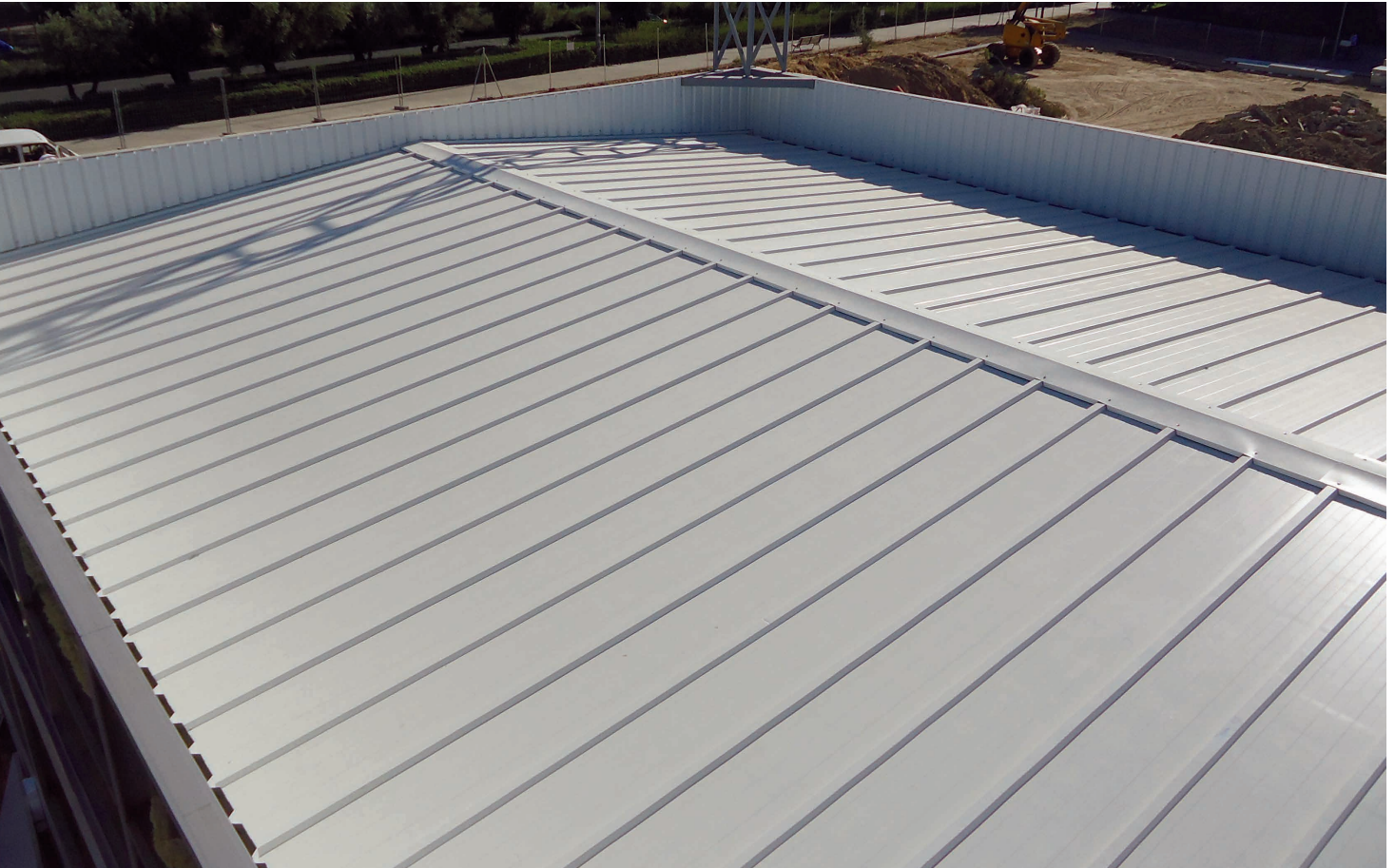
Calculated for a Service Limit State of deformations  $L / 200$ . According to EN14509.

Overloads not factored. The designer must carry out the calculations in accordance with the applicable regulations.

Admissible overloads valid for three-rib profile. For admissible overloads of the two-rib profile, consult our technical department.



## Master-C roofing panels

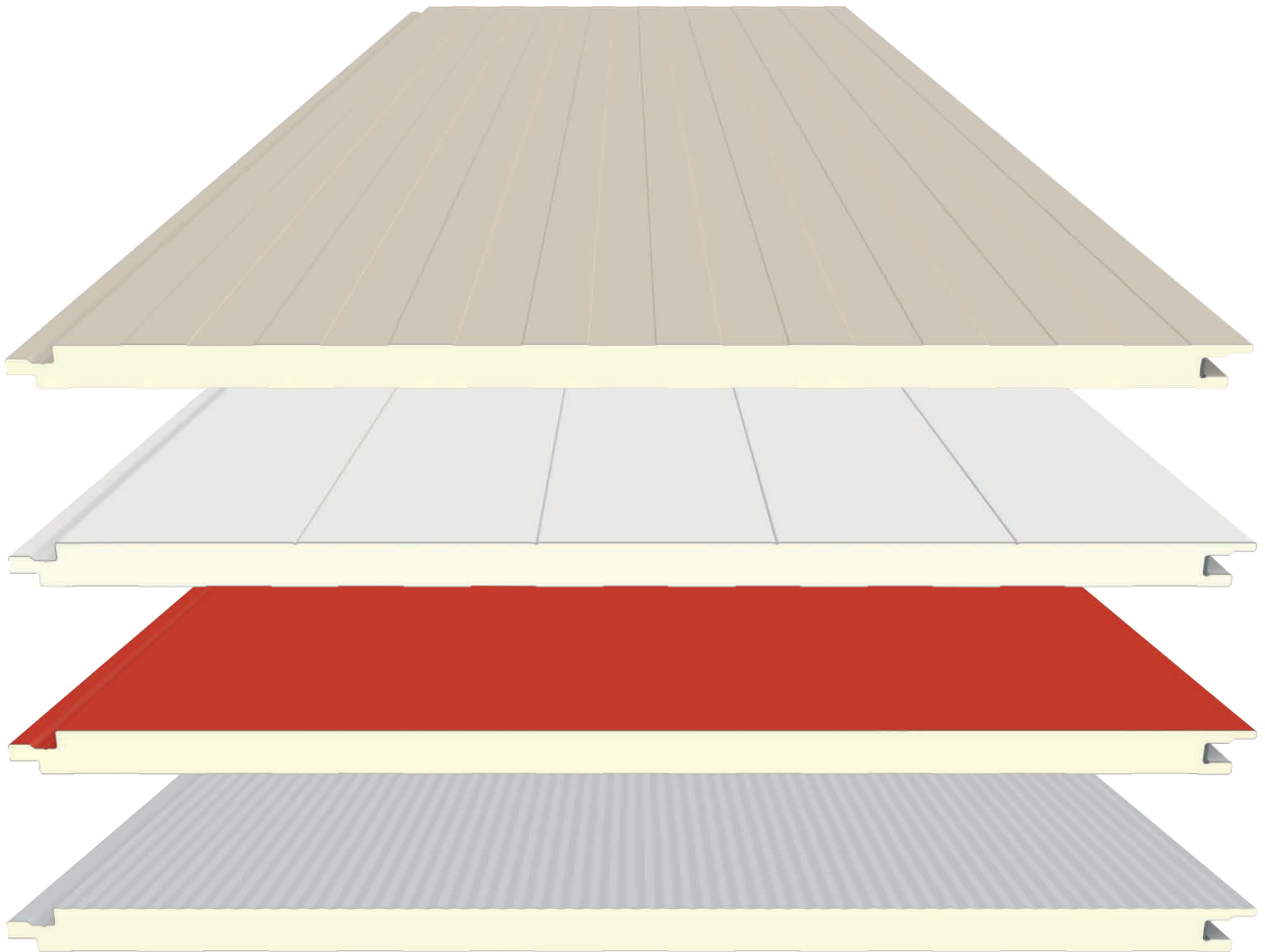




# Master-F wall panels

**MASTER-F** panels are continuous production line prefabricated panels and are composed of two layers of prepainted galvanized steel bonded to a core of rigid polyurethane or polyisocyanurate, forming a sandwich type element, with a tongue and groove joints.

**MASTER-F** panels are specially designed for use in all types of facings, for industrial projects as well as for commercial or residential projects. They can be installed in both vertical and horizontal positions, and always ensure total watertightness. The joint design is designed to hide and protect the fixings, which gives an excellent aesthetic appearance.

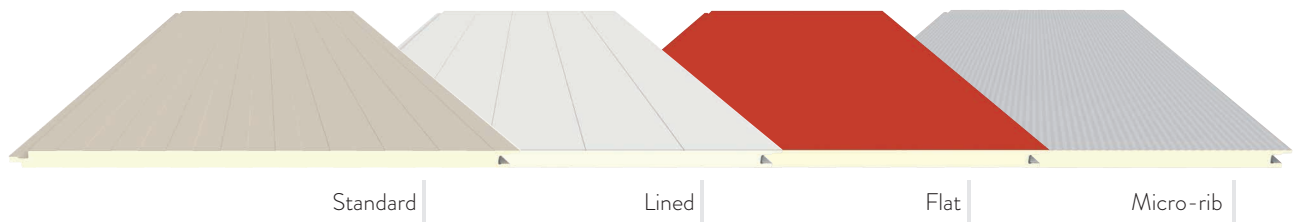


They come in four different exterior finishes (standard, lined, flat, micro-rib) and two different inner ribbings (standard and flat), as well as a wide range of available colors. Additionally, **MASTERPANEL** also offers the option of panels manufactured with PIR (polyisocyanurate) self-extinguishing foam with a B-s1, d0 certification under Euroclasses (UNE-EN 13501).

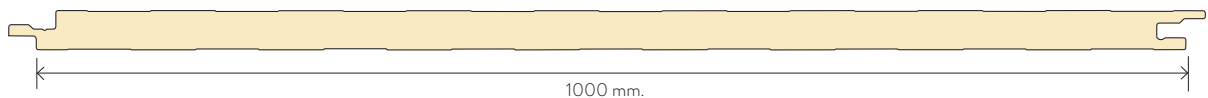


## Master-F wall panels

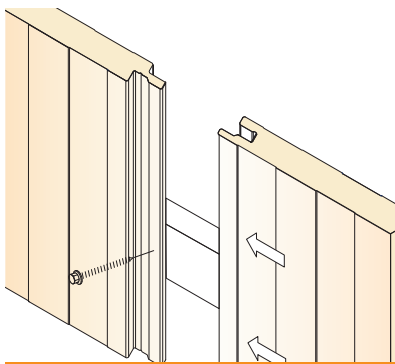
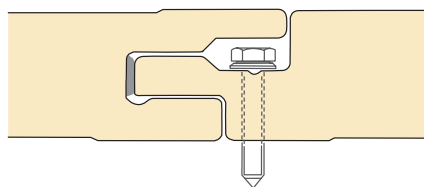
### TECHNICAL SPECIFICATIONS



	Values
Panel thickness	35, 40, 50, 60, 80, 100 mm.
Cover Width	1.000 mm.
Length	Up to 16.000 mm. (max. recommended 9,000 mm)
Field of application	Wall panels
Outer face thickness	0,5 / 0,6 / 0,7 mm
Inner face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Coatings (see section on Finishes)	Polyester 25um PVDF 25um / 35um PU 55um (Granite® HDX/PUPA 55) Imitation wood (inner face) PVC 120 um (foodsafef)
Outer ribbing	Standard / Lined / Flat / Micro-rib
Inner ribbing	Standard / Flat
Core type	Polyurethane (PUR) Polyisocyanurate (PIR)
Core Density	40 Kg/m <sup>3</sup> (+/- 10%)
Tensile strength	> 0,060 Mpa
Compressive strength	> 0,100 Mpa
Flexural strength	> 0,100 Mpa
Reaction to fire	Cs3d0 / Bs1d0



Joint detail.  
Other fixing options: see p. 81



Panel thickness	Weight	Thermal transmittance (U-value)		Thermal resistance (R-value)	
mm	kg/m <sup>2</sup>	w/m <sup>2</sup> k	Kcal/m <sup>2</sup> h °C	m <sup>2</sup> k/w	Hr ft <sup>2</sup> °F/BTU
35	9,08	0,62	0,53	1,62	9,20
40	9,28	0,54	0,46	1,86	10,53
50	9,67	0,43	0,37	2,34	13,28
60	10,06	0,35	0,30	2,85	16,17
80	10,84	0,26	0,23	3,80	21,59
100	11,62	0,21	0,18	4,76	26,99

Calculations according to EN14509, measuring the surface resistance according to horizontal flow and omitting the influence of the profiled faces. Losses in bolted connections must be calculated by the designer.

## FUNCTIONS AND BENEFITS OF MASTER-F PANELS

- Aesthetically appealing
- Efficient thermal insulation capacity
- High mechanical strength
- Exceptional dimensional stability
- Watertight against water vapor
- Resistant to aggressive environments
- A versatile material that allows any configuration
- Quick to install and easy to maintain (easy to clean)
- Easily removable and can be reused
- Made-to-measure, avoids waste
- Made with recyclable materials

## REACTION TO FIRE



**C-s3 d0**  
N° 3406T18

**B-s1 d0**  
N° 3066T16

**intertek**

ASTM E84 (MASTER-PIR) Class A

Flame Spread Index: **20**

Smoke developed index: **300**



### Permissible overloads (kg/m²).

Panel thickness mm.	(L) Span distance in cm. Calculations made on 0.50 mm / 0.50 mm panels											
	100	150	175	200	225	250	275	300	325	350	375	400
35	399	240	195	161	135	115	98	85				
40	462	281	229	190	160	137	118	102	89			
50		363	298	249	211	182	157	137	120	106	94	
60			368	309	264	227	198	174	153	136	121	108
80				431	370	322	282	249	222	198	178	160
100					479	418	368	327	292	262	237	214

Evenly distributed pressure overload for 2 spans (3 supports).

Calculated for a Service Limit State of deformations  $L / 200$ . According to EN14509.

Overloads not factored The designer must carry out the calculations in accordance with the applicable regulations.



## Master-F wall panels



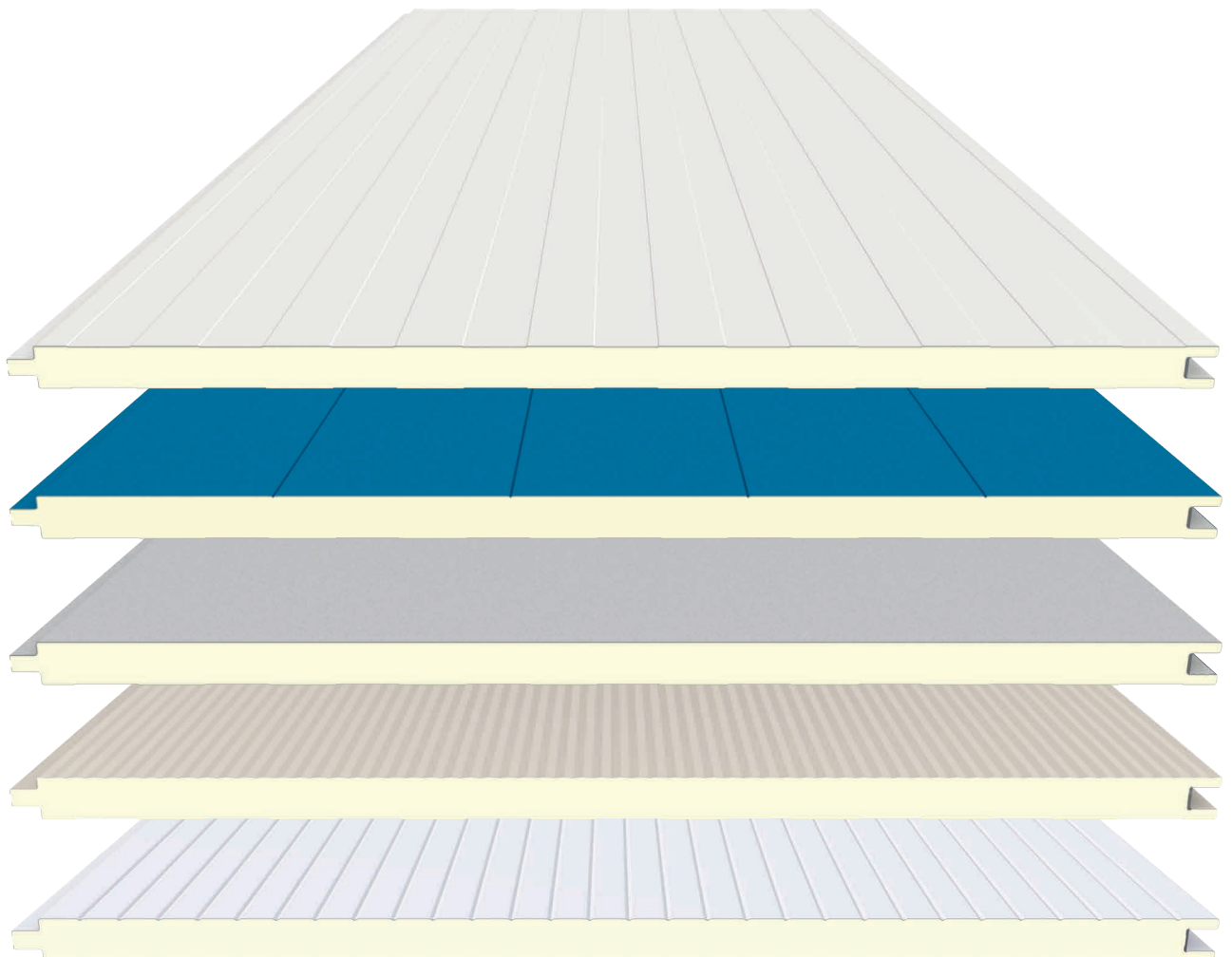


# Master-Modul

## modular construction panels

**MASTER-MODUL** panels are continuous production line prefabricated panels, and are composed of two faces of prepainted galvanized steel, bonded to a core of rigid polyurethane (PUR) or polyisocyanurate (PIR) foam, forming a sandwich type element with tongue and groove joints.

**MASTER-MODUL** panels are specially designed for use in modular constructions, prefabricated housing, false ceilings and interior partition walls.

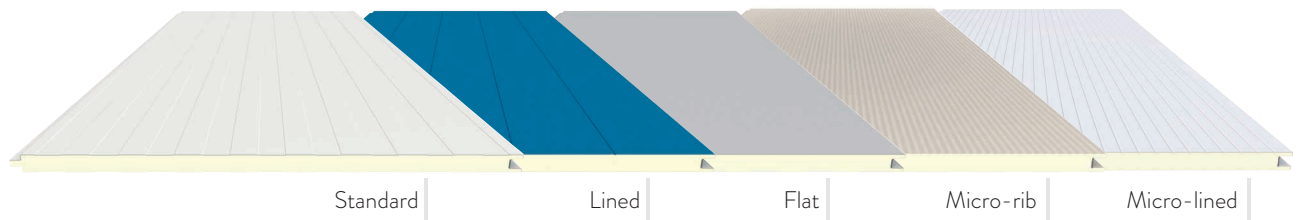


**MASTERPANEL** offers various different configurations according to the project they will be used in, it comes in three different thicknesses, five outer ribbing designs and three inner ribbing designs, as well as a wide range of available colours. Additionally, **MASTERPANEL** also offers the option of panels manufactured with PIR (polyisocyanurate) self-extinguishing foam with a B-s1, d0 certification under Euroclasses (UNE-EN 13501).

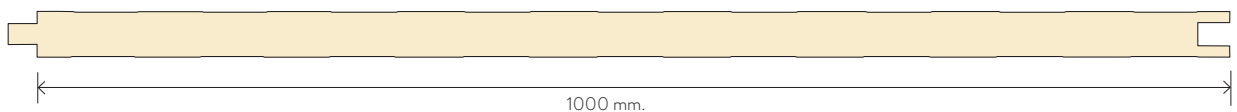


## Master-Modul modular construction panels

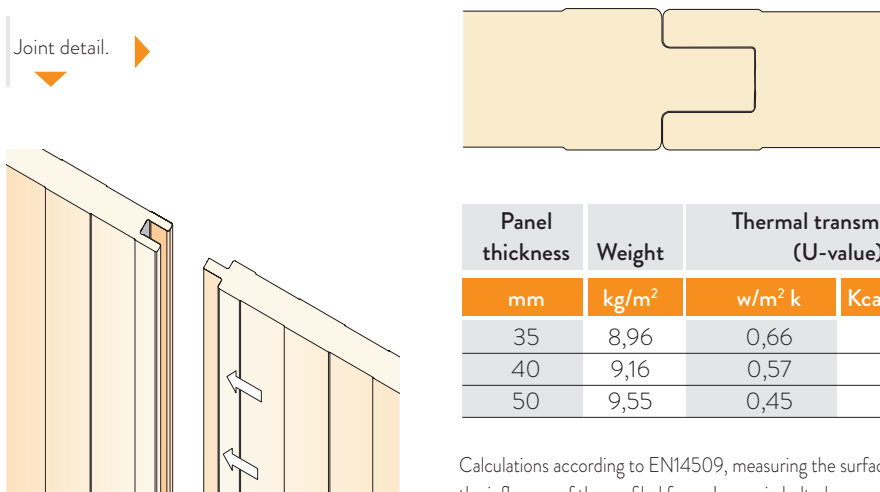
### TECHNICAL SPECIFICATIONS



	Values
Panel thickness	35, 40, 50 mm.
Cover Width	1.000 mm.
Length	Up to 16,000 mm. (max. recommended 9,000 mm)
Field of application	Modular Construction
Outer face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Inner face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Coatings (see section on Finishes)	Polyester 25um PVDF 25um / 35um PU 55um (Granite® HDX/PUPA 55) Imitation wood (inner face) PVC 120um (foodsafef)
Outer ribbing	Standard / Lined / Flat / Micro-rib / Micro-lined
Inner ribbing	Standard / Flat / Micro-lined
Core type	Polyurethane (PUR) Polyisocyanurate (PIR)
Core Density	40 Kg/m <sup>3</sup> (+/- 10%)
Tensile strength	> 0,060 Mpa
Compressive strength	> 0,100 Mpa
Flexural strength	> 0,100 Mpa
Reaction to fire	Cs3d0 / Bs1d0



Joint detail.



Panel thickness	Weight	Thermal transmittance (U-value)		Thermal resistance (R-Value)	
mm	kg/m <sup>2</sup>	w/m <sup>2</sup> k	Kcal/m <sup>2</sup> h °C	m <sup>2</sup> k/w	Hr ft <sup>2</sup> °F/BTU
35	8,96	0,66	0,56	1,53	8,65
40	9,16	0,57	0,49	1,76	9,96
50	9,55	0,45	0,38	2,24	12,72

Calculations according to EN14509, measuring the surface resistance according to horizontal flow and omitting the influence of the profiled faces. Losses in bolted connections must be calculated by the designer.

## FUNCTIONS AND BENEFITS OF MASTER-MODUL PANELS

- Efficient thermal insulation capacity
- High mechanical strength
- Exceptional dimensional stability
- Watertight against water vapor
- Resistant to aggressive environments
- A versatile material that allows any configuration
- Quick to install and easy to maintain (easy to clean)
- Easily removable and can be reused
- Made-to-measure, avoids waste
- Made with recyclable materials

## REACTION TO FIRE



**C-s3 d0**  
N° 3406T18

**B-s1 d0**  
N° 3066T16

**intertek**

**ASTM E84 (MASTER-PIR) Class A**

Flame Spread Index: **20**

Smoke developed index: **300**



### Permissible overloads (kg/m²).

Panel thickness mm.	(L) Span distance in cm. Calculations made on 0.50 mm / 0.50 mm panel										
	150	175	200	225	250	275	300	325	350	375	400
35	207	162	129	104	84	69	58	48			
40	245	193	155	126	103	85	71	60	51		
50	284	226	182	149	123	102	86	73	62	53	46

Evenly distributed pressure overload for 1 span (2 supports).

Calculated for a Service Limit State of deformations  $L / 200$ . According to EN14509.

Overloads not factored. The designer must carry out the calculations in accordance with the applicable regulations.



## Master-Modul modular construction panels





# Master-Frigo cold-room panels

**MASTER-FRIGO** panels are continuous production line prefabricated panels, and are composed of two faces of prepainted galvanized steel, bonded to a core of rigid polyurethane (PUR) or polyisocyanurate (PIR) foam, forming a sandwich type element with tongue and groove joints.

**MASTER-FRIGO** panels are specially designed for use in all types of projects related to the agri-food industry, from transport, handling and storage through to the freezing and deep-freezing of foods.



**MASTERPANEL** offers various different configurations according to the project they will be used in, and it comes in five different thicknesses, two outer ribbing designs and two inner ribbing designs, as well as a wide range of available colours. Additionally, MASTERPANEL also offers the option of panels manufactured with PIR (polyisocyanurate) self-extinguishing foam with a B-s1, d0 certification under Euroclasses (UNE-EN 13501).

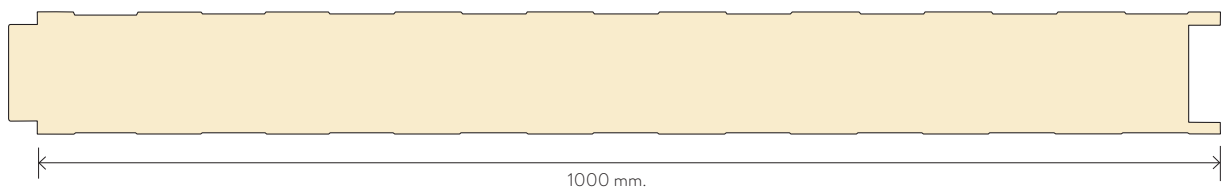


## Master-Frigo cold-room panels

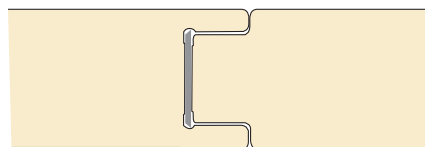
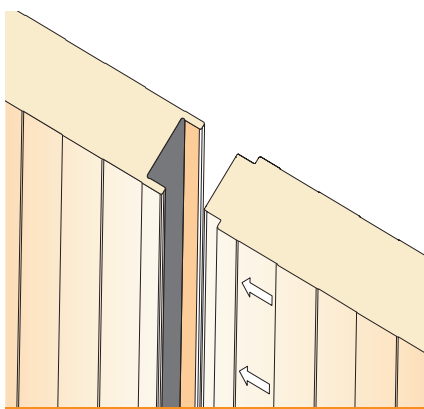
### TECHNICAL SPECIFICATIONS



	Values
Panel thickness	60, 80, 100, 120, 150 mm
Cover Width	1.000 mm.
Length	Up to 16.000 mm. (max. recommended 9,000 mm)
Field of application	Cold room
Outer face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Inner face thickness	0,4 / 0,5 / 0,6 / 0,7 mm
Coatings (see section on Finishes)	Polyester 25um PVDF 25um / 35um PU 55um (Granite® HDX/PUPA 55) Wood imitation PVC 120um (foodsafes)
Outer ribbing	Standard / Flat
Inner ribbing	Standard / Flat
Core type	Polyurethane (PUR) Polyisocyanurate (PIR)
Core Density	40 Kg/m <sup>3</sup> (+/- 10%)
Tensile strength	> 0,060 Mpa
Compressive strength	> 0,100 Mpa
Flexural strength	> 0,100 Mpa
Reaction to fire	Cs3d0 / Bs1d0



Joint detail. ▶



Panel thickness	Weight	Thermal transmittance (U-value)		Thermal resistance (R-value)	
		w/m <sup>2</sup> k	Kcal/m <sup>2</sup> h °C	m <sup>2</sup> k/w	Hr ft <sup>2</sup> °F/BTU
60	9,94	0,36	0,31	2,76	15,66
80	10,72	0,27	0,23	3,75	21,26
100	11,50	0,21	0,18	4,71	26,73
120	12,28	0,18	0,15	5,67	32,15
150	13,45	0,14	0,12	7,09	40,21

Calculations according to EN14509, measuring the surface resistance according to horizontal flow and omitting the influence of the profiled faces. Losses in bolted connections must be calculated by the designer.

## FUNCTIONS AND BENEFITS OF MASTER-FRIGO PANELS

- Aesthetically appealing
- Efficient thermal insulation capacity
- High mechanical strength
- Exceptional dimensional stability
- Watertight against water vapor
- Resistant to aggressive environments
- A versatile material that allows any configuration
- Quick to install and easy to maintain (easy to clean)
- Easily removable and can be reused
- Made-to-measure, avoids waste
- Made with recyclable materials

## REACTION TO FIRE



**C-s3 d0**  
N° 3406T18

**B-s1 d0**  
N° 3066T16

**intertek**

**ASTM E84 (MASTER-PIR) Class A**

Flame Spread Index: **20**

Smoke developed index: **300**



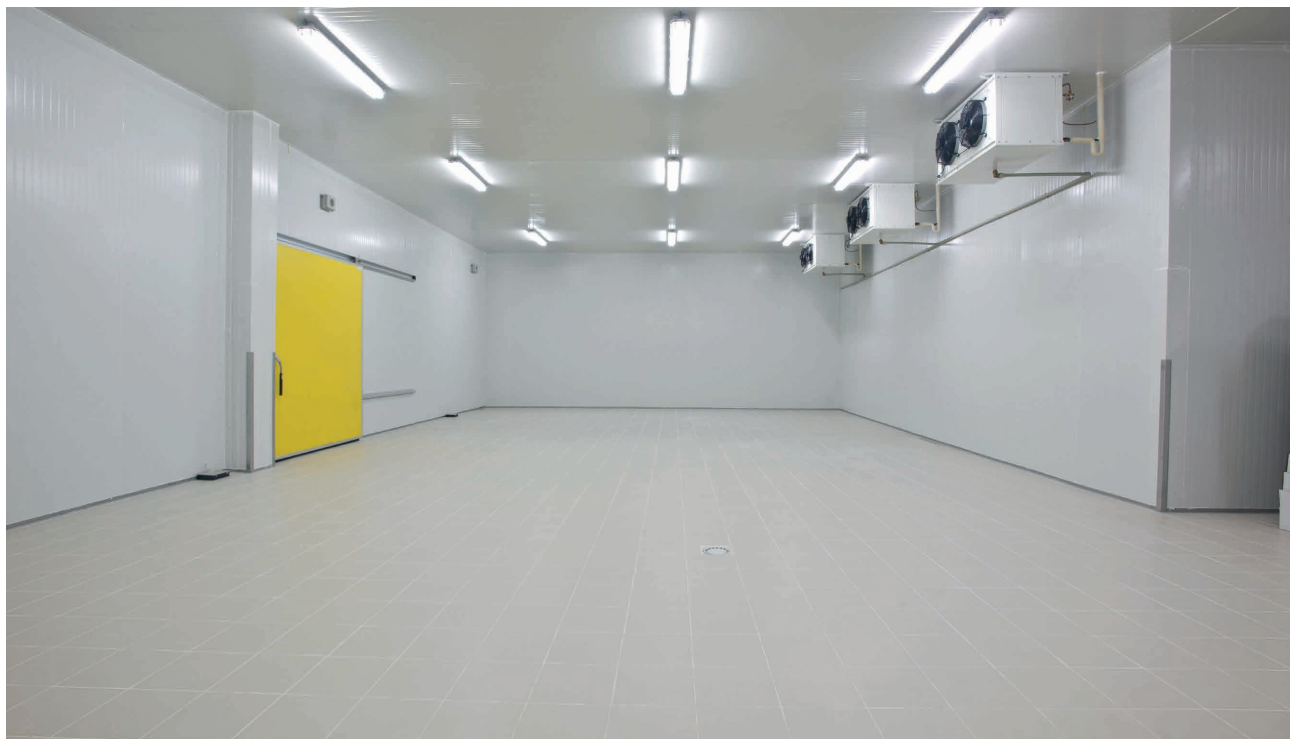
### Permissible overloads (kg/m²).

Panel thickness mm.	(L) Span distance in cm. Calculations made on 0.50 mm / 0.50 mm panel												
	150	175	200	225	250	275	300	325	350	375	400	450	500
60	413	332	272	225	188	159	135	115	99	85	74	57	
80		471	391	328	278	237	204	176	153	133	117	91	
100				433	371	319	277	241	211	186	164	129	103
120					466	404	352	309	272	241	214	171	138
150						533	469	415	368	328	294	237	194

Evenly distributed pressure overload for 1 span (2 supports).

Calculated for a Service Limit State of deformations  $L / 200$ . According to EN14509

Overloads not factored. The designer must carry out the calculations in accordance with the applicable regulations



## Master-Frigo cold-room panels

### ASSEMBLY AND ERECTION OF COLD ROOMS

#### Basic assembly instructions:

- The ground on which the sandwich panels are to be set up should be completely flat, clean and smooth.
- Once the panels are installed, the verticality (walls) and horizontality (ceilings and roofs) should be checked, and any deviations corrected.
- The system of vertical jointing between panels is effected by pressure on the tongue and groove joint, with the panels being brought flush to each other.
- The wall–ceiling junction should be carried out strictly following the instructions provided (see technical details on page 88), with special attention being paid to cuts that are made, when these may be necessary, to create the junction.
- When the joint between panels does not by itself have sufficient capacity to prevent the formation of condensation or ice, a sealant is applied in that area; this could be silicone (for air and water tightness), butyl (for water vapour tightness) or foam injected on site (to reduce the thermal bridge between the panels).
- The fixing of roof panels attached to building structures should be performed using connector rods or guy wires. The building structure must be designed to withstand both its usual loads and those due to the weight of the panels themselves.
- The maximum length of the vertical or horizontal spans, as well as the maximum permissible loads on the panels, should comply with those specified (see table on admissible loads page 39) for the type of panel to be used.
- Refrigerating equipment and accessories must not be directly hung from the panels, but require a separate support system.
- Avoid the use of cutting discs, as these may produce metal shavings which can stick to the panel surfaces and cause oxidation problems. If cutting discs must be used, ensure the complete removal of all metal shavings.
- Check that appropriate screws for the required structure are used.
- Remove the protective plastic film from the panels.
- Ensure that any possible scratches that may occur on the outer face are correctly repaired.
- Check that individual points are properly sealed.

Table of minimum recommended thicknesses for insulation

Type of cold room	Range of temperature °C	Interior cold room			Exterior cold room		
		Floor	Wall	Ceiling	Floor	Wall	Ceiling
Cold store	+15 to +4	NO	60 mm	60 mm	NO	60 mm	60 mm
	+4 to -4	50 mm	60 mm	60 mm	60 mm	80 mm	80 mm
Freezer	-4 to -10	60 mm	80 mm	80 mm	60 mm	80 mm	100 mm
	-10 to -18	80 mm	100 mm	100 mm	80 mm	100 mm	100 mm
	-18 to -26	100 mm	100 mm	100 mm	100 mm	120 mm	120 mm
	-26 to -40	100 mm	120 mm	120 mm	120 mm	150 mm	150 mm
Blast freezer	-40 to -46	120 mm	150 mm	150 mm	120 mm	150 mm	150 mm

## MAINTENANCE GUIDELINES FOR COLD ROOM

- The condition and tension of the ceiling fastenings tensors must be checked as well as cleaned every six months.
- The panel surfaces can be washed with a mixture of tap water and a neutral agent, then rinsed with running water and dried.
- Check the water collection channels once a year, ensuring that they are clean and in good condition.
- Check the condition of the sealing elements once a year.



## Master-Frigo cold-room panels





# Master-Basic insulation boards

Insulating boards prefabricated in a continuous production line, composed of two sheets of paper (on request there is the possibility of other finishes different from paper) and joined together by a core of Polyisocyanurate (PIR) foam forming a sandwich type element.



## TECHNICAL SPECIFICATIONS

	Values
Panel thickness	50, 80, 100 mm.
Cover Width	1.200 mm.
Length	Standard 2,285 m (other lengths on request)
Field of application	Insulation in floors, walls and false ceilings
Face composition	Multilayer kraft paper-aluminum complex
Core type	Polyisocyanurate (PIR)
Thermal conductivity coefficient	0,020 W/mk
Compressive strength	250 ± 50 kPa
2% Compressive strength deformation	150 ± 20 kPa
Product's reaction to Fire	F

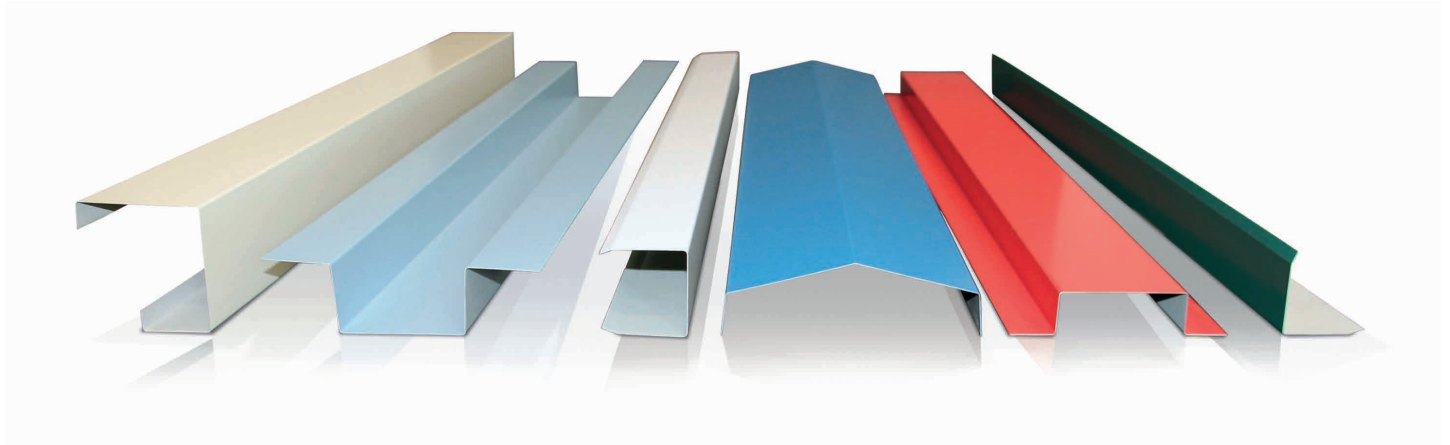


Panel thickness	Thermal Resistance
mm	m <sup>2</sup> k/w
50	2,3
80	3,7
100	4,65

# Flashings

**MASTER PANEL** offers a wide range of flashing pieces that can provide solutions to all kinds of construction details, achieving the functionality and aesthetics to suit the requirements of every project.

We can adapt to the design requests of our customers, and are able to carry out any cutting or folding job, whatever your requirements.



Our flashings are made from coated steel sheet according to the following standards:

- Galvanized steel according to UNE-EN 10346
- Prepainted steel according to UNE-EN 10169

We use only quality raw materials; the flashings can be manufactured in lengths up to 8.00 metres, with thicknesses from 0.50 mm to 3.00 mm and with a variety of different finishes:

- Galvanized
- Prepainted
- Aluminum
- Copper
- Stainless steel.
- Magnelis®

	Espesores disponibles (mm)
Galvanized	0,60 / 0,80 / 1,00 / 1,20 / 1,50 / 2,00 / 2,50 / 3,00
Prepainted	0,50 / 0,60 / 0,80
Wood imitation	0,60
Aluminum	Available on request
Copper	
Stainless steel	
Magnelis®	

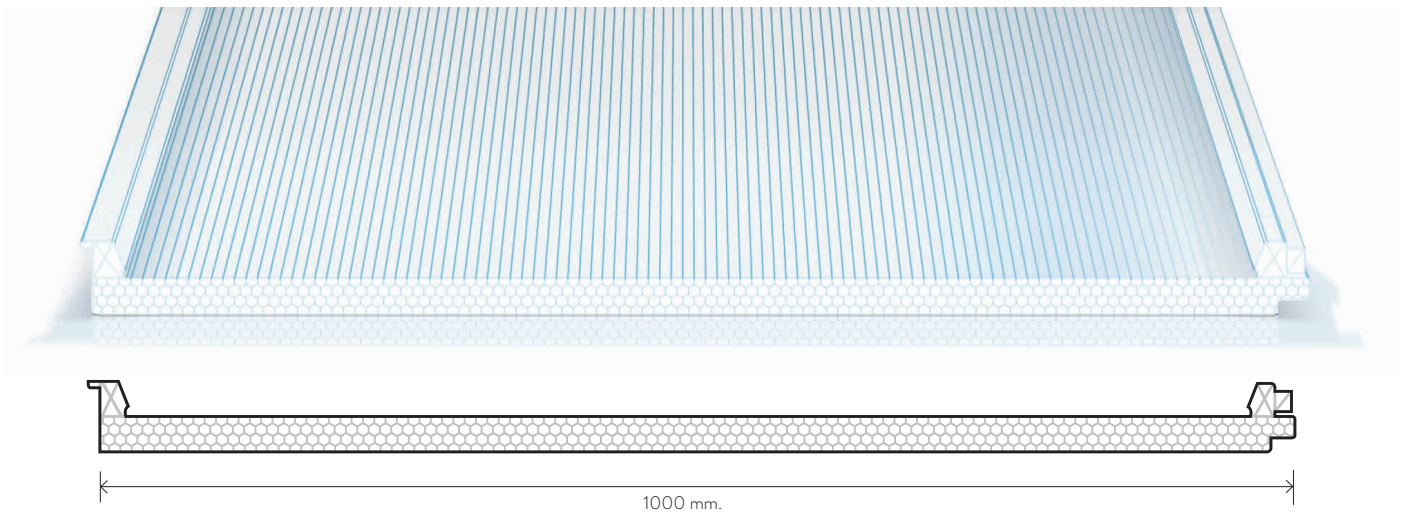
\* Consult with our sales department to learn more about the latest developments in the types and dimensions of materials.

\* For more construction details about flashings, please see page 64 of this catalogue. Information is also available on our website [www.magon.es](http://www.magon.es)

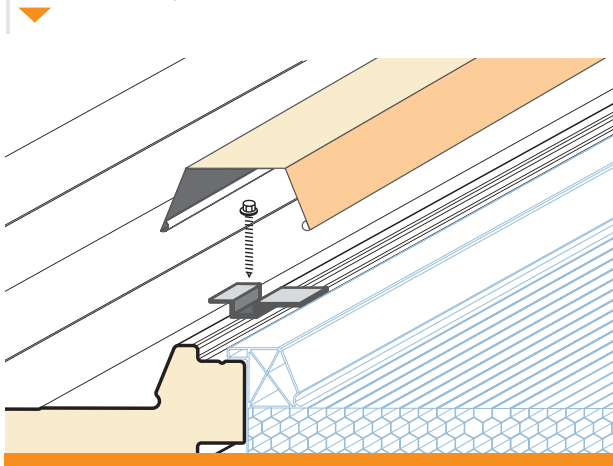
- Available colours: see colour chart.

# Polycarbonate skylight roofing

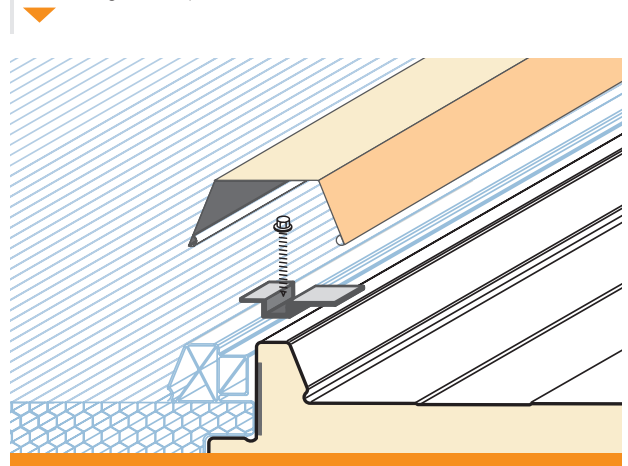
This is a perfectly waterproof solution, 100% effective, providing total watertightness. Its composition makes it a product that has high mechanical strength and durability. **Danpalon®** Polycarbonate provides good thermal insulation and does not require any special maintenance.



Detail of left overlap:



Detail of right overlap:



Thanks to its geometry, installation is quick and easy, since the overlap of the metal panel on the polycarbonate panel is easy to carry out, being similar to the process used for overlapping normal metal panels. These sheets are designed to be sandwiched between metal sandwich panels, creating bands of light at the right intervals, in order to achieve the percentage of light required.

When used with panels of greater thickness, the straps or supports that correspond to the skylight panels must be wedged or supplemented, so that the upper layer of the sandwich panel and that of the polycarbonate sheet are at the same level: the cover cap must stay horizontal.

The sheets are supplied in 30 mm thickness and in opal finish (check with us for other options).



## FUNCTIONS AND BENEFITS OF POLYCARBONATE PANELS

- Lightweight
- Resistance to breakage and aging
- Protection against ultraviolet radiation
- Brightness, allows the passage of natural light



## TECHNICAL SPECIFICATIONS

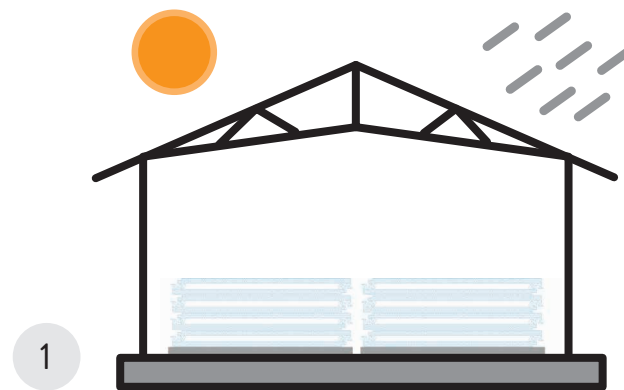


	Values
Length	Máx. transportable
Polycarbonate coverage	1.000 mm.
Weight	4,15 Kg/m <sup>2</sup>
Thickness	30 mm.
Structure	Honeycomb
Min. cold bending radius	5,500 mm.
Standard colors	Light Opal
Light transmission	39 %
Solar factor	0,46
U.V. protection	Yes
Linear expansion	0,065 mm / °Cm
Thermal insulation	1,60 W / m <sup>2</sup> °C
Acoustic insulation	24 dB
Fire reaction classification	B s1 d0
Warranty	Limited 10 years

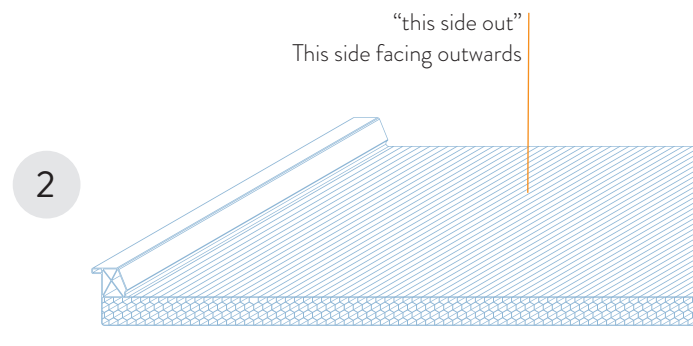
## Polycarbonate skylight roofing

### STANDARDS FOR THE USE AND FITTING OF POLYCARBONATE

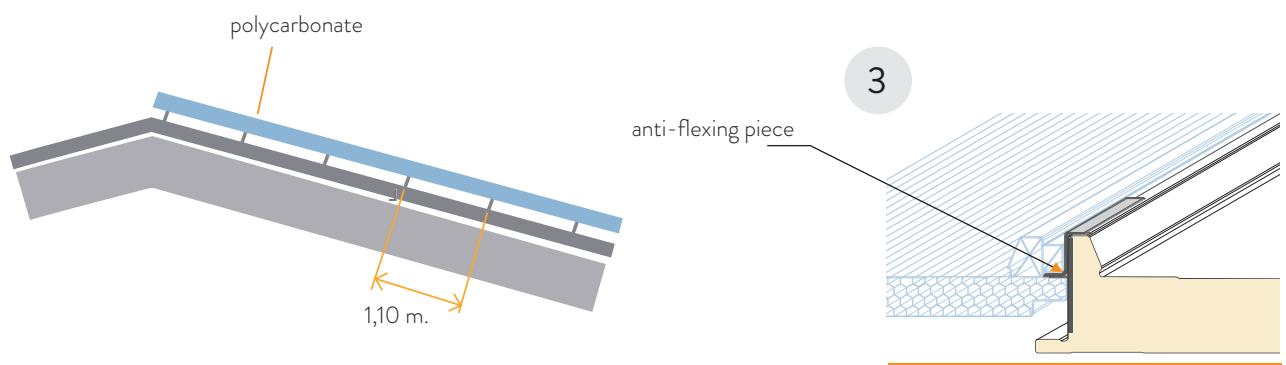
- **Store** the sheets in the shade on a nonabrasive, dry, flat, continuous surface. DO NOT STORE the sheets outdoors, exposed to sun or rain, so that you avoid possible deformation and deterioration of the sheets and sticking of the protective film (**pict.1**).
- **Take care** that the sheets do not come into contact with chemicals that can attack the polycarbonate. AVOID the sheets coming into contact with plasticised PVC roofing, solvent-based cleaning agents, sprays or any substance that can attack polycarbonate.



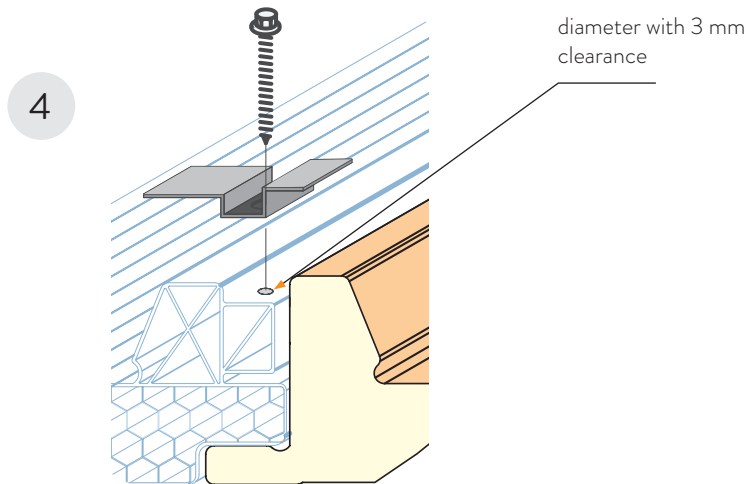
- **Install** the sheets with the side marked «this side out» or «UV protection side» facing towards the sun (**pict.2**).



- **We recommend** that polycarbonate sheets be fitted with a maximum span lengths of 1.100 mm for roofing enclosures; for spans greater than this it is advisable to use anti-flexing parts (**pict.3**). Check with our technical department for the minimum cold bending radii of this material.



- **Drill** the sheets with holes at least 3 mm larger than the screw body. **DO NOT SCREW DOWN** with excessive pressure, to allow movement of the sheet when expanding. **DO NOT** install sheets with induced stresses that can render them brittle or cause microcracks (**pict.4**).



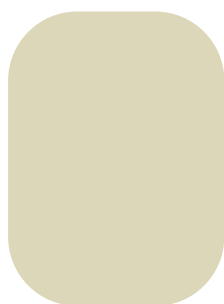
- **Only use** the approved soft washers of EPDM, neoprene or XLPE, compatible with polycarbonate. **NEVER USE P.V.C.** washers.
- **Only use** approved insulation materials such as neutral silicones. **DO NOT USE** incompatible unapproved insulation materials such as polyurethane sealant, polyurethane foam, incompatible silicones etc.
- **Remove** the protective film immediately after installation. **DO NOT** leave the protective film on the sheet after installation. Sunshine will make it adhere to the sheet (**pict.5**).



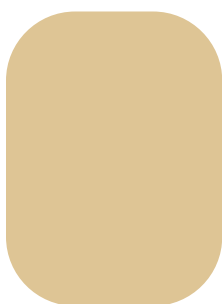
- **Paint the sheets** (only if unavoidable) exclusively with paints and coating systems approved by the manufacturer. Always consult us first.
- **Clean** the sheets with water and soap (or soft detergent) and a soft sponge. **NEVER CLEAN** sheets with solvents or using brushes that might scratch them.

# Colour chart





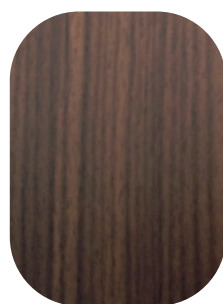
bidaso cream



sand



light wood



dark wood



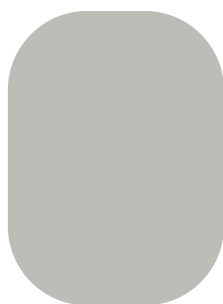
imitation corten



pyrenean white



oyster white



pearl grey



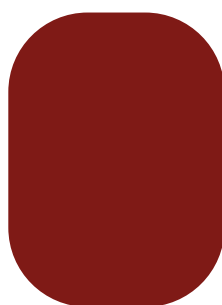
silver metallic



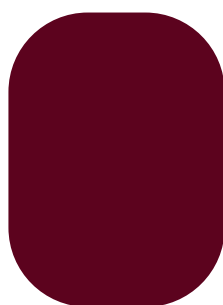
7016 anthracite grey



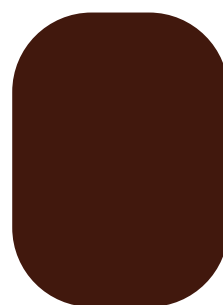
coral red



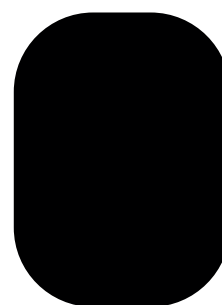
tile red



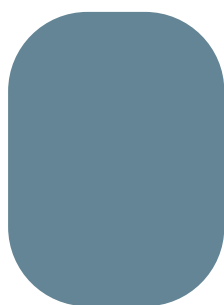
baztan red



tobacco



dextar black



sky blue



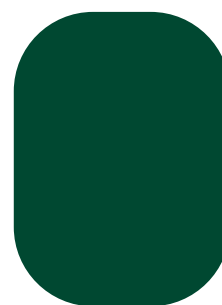
lake blue



sea blue



light green



navarra green



Embossed finish available for Master-F, Master-Modul and Master-Frigo. Both on the outer face and the inner face.

- Colours in this catalogue are approximate.
- Possibility of manufacturing in other colours on request.

# Guide to select the right finish:

In order to choose the right prepainted finish for each use, the planner responsible for the design of the project must take into account both the incidence of UV rays and the exposure to corrosive environments of the building or project.

- **Corrosion resistance of the paint system**

To determine the corrosion resistance of a paint system, it is subjected to the salt spray test. This test evaluates the appearance of corrosion after a number of hours in a saline mist chamber. The results provide each paint scheme with an RC corrosion resistance value, from RC1 to RC5, with RC1 being the lowest value. This means that those RC3 rated paint schemes have shown their suitability for environments rated C3 or lower.

- **Resistance to UV radiation of the paint system**

To determine the UV resistance of a paint system, it is subjected to the QUV accelerated aging test. This test evaluates the loss of gloss and colour over time due to UV rays. The results provide each paint scheme with a UV resistance value RUV, from RUV1 to RUV4, with RUV1 being the lowest value.

- **Classification of environments**

## DESCRIPTION OF CORROSIVE CATEGORIES FOR EXTERNAL ENVIRONMENTS

- C1** Very low
- C2** Low: Areas with low level of contamination. Mainly rural or industrial areas without incidence by sulphur dioxide.
- C3** Moderate: Urban and industrial areas with low sulphur dioxide (SO<sub>2</sub>) pollution and coastal areas with low salinity (from 10 km to 20 km from the sea).
- C4** High: Industrial areas with moderate contamination by sulphur dioxide (SO<sub>2</sub>) and coastal areas with moderate salinity (from 3 km to 10 km from the sea).
- C5 I** Very high: Industrial areas with very aggressive atmospheres and high contamination by sulphur dioxide (SO<sub>2</sub>)
- C5 M** Very high: Coastal and maritime areas with high salinity (from 1 km to 3 km from the sea).

Corrosive environment category	Environment type			
	Rural	Urban	Industrial	Marine
C1 - very low				
C2 - low				
C3 - moderate			SO <sub>2</sub> low	(10-20 km)
C4 - high			SO <sub>2</sub> moderate	(3-10 km)
C5 I - very high			SO <sub>2</sub> high	
C5 M - very high				(1-3 km)

## DESCRIPTION OF THE CATEGORIES OF UV RESISTANCE FOR EXTERNAL ENVIRONMENTS

- Area 1:** Areas not exposed to UV radiation. Indoor use without any radiation.
- Area 2:** Areas with low exposure to UV radiation or without special colour maintenance requirements.
- Area 3:** Areas with moderate exposure to UV radiation.
- Area 4:** Areas with high exposure to UV radiation or with special colour maintenance requirements.

### Choice of finishes for different environments

Once the category of the environment is known, the person responsible for the design must decide on the painting system:

- 1) The suitable paint system needs to be determined in terms of corrosion. The following table can be used as a guide.

				Poliéster	PVDF	PU55
Categoría de resistencia a corrosión				RC3	RC4	RC5
Exterior environment type	Rural		C2	✓	✓	✓
	Urban		C3	✓	✓	✓
	Industrial	Low contamination	C3	✓	✓	✓
		Moderate contamination	C4	X	✓	✓
		High contamination	C5	X	X	✓
	Marine	10 - 20 km	C3	✓	✓	✓
		3 - 10 km	C4	X	✓	✓
		1 - 3 km	C5	X	X	✓

- 2) The suitable paint system in terms of UV radiation have to be determined. The following table can be used as a guide.

				Polyester	PVDF	PU55
Categoría de resistencia UV				RUV2	RUV4	RUV4
Exterior environment type	Area 1			✓	✓	✓
	Area 2			✓	✓	✓
	Area 3			X	✓	✓
	Area 4			X	✓	✓

- 3) A suitable paint system should be chosen in terms of both corrosion resistance and UV resistance. The following cases can be used as a guide..

Corrosion resistance category	UV resistance category	Choice
C3	area 2	Polyester
C4	area 4	PVDF
C5	area 3	PU55

The data stated in the tables is informative and does not constitute a guarantee of the material. You should contact Masterpanel about any applications which require a guarantee for the steel in the panels.

## Guide to select the right finish:

FINISHES	POLYESTER	PVDF
MAIN PROPERTIES:	VERY HIGH RESISTANCE TO CORROSION	VERY HIGH RESISTANCE TO CORROSION
	HIGH RESISTANCE TO UV RADIATION	EXCELLENT RESISTANCE TO UV RADIATION
	GOOD FORMABILITY	GOOD FORMABILITY
	GOOD STABILITY OF COLOURS AND APPEARANCE	EXCELLENT STABILITY OF COLOURS AND APPEARANCE
	USO INTERIOR Y EXTERIOR	USO INTERIOR Y EXTERIOR
APPLICATION:	STANDARD FINISH FOR ALL TYPES OF ROOFING, WALL PANELS, COLD STORES AND ACCESSORIES	SPECIAL FINISH, WITH VERY HIGH RESISTANCE TO CORROSION AND HIGH STABILITY OF COLOURS, FOR ALL TYPES OF ROOFING, WALL PANELS, COLD STORES AND ACCESSORIES
SURFACE APPEARANCE:	SMOOTH	SMOOTH
THICKNESS:	25 MICRONS	25-35 MICRONS
OUTER FACE COMPOSITION:	5 MICRONS PRIMER + 20 MICRONS FINISH COAT	5-15 MICRONS PRIMER + 20 MICRONS FINISH COAT
GLOSS:	30UB +/- 5	30UB +/- 5
COATING ADHESION:	< 2 T	< 1 T
RESISTANCE TO CRACKING ON BENDING:	< 3 T	< 2 T
IMPACT RESISTANCE:	VERY GOOD	VERY GOOD
"PENCIL HARDNESS TEST":	BETWEEN HB AND H	BETWEEN HB AND H
SALT SPRAY TEST:	150 TO 360 HRS DEPENDING ON SUBSTRATE	500 HRS
CONDENSATION RESISTANCE:	1000 HRS	1500 HRS
RESISTANCE TO UV RADIATION CATEGORY:	RUV2	RUV4
RESISTANCE TO CORROSION CATEGORY:	RC3	RC4
RESISTANCE TO FIRE:	COMPLIES WITH EN 13501-1 (A1) STANDARD	COMPLIES WITH EN 13501-1 (A1) STANDARD
RESISTANCE TO ACIDS AND BASES:	GOOD	VERY GOOD
RESISTANCE TO ALIPHATIC AND ALCOHOLIC SOLVENTS:	VERY GOOD	VERY GOOD
RESISTANCE TO AROMATIC SOLVENTS:	LOW	VERY GOOD
RESISTANCE TO MINERAL OILS:	VERY GOOD	VERY GOOD

**Standard finish: Polyester 25 um. Other finishes available on request.**  
**Guide values to be taken as a reference. Consult for guarantees.**

## PU 55um (GRANITE® HDX/PUPA55)

## PVC 120um (FOODSAFE)

EXCELLENT RESISTANCE TO CORROSION

SUPERIOR RESISTANCE TO CORROSION

EXCELLENT RESISTANCE TO UV RADIATION

LOW RESISTANCE TO UV RADIATION

VERY GOOD FORMABILITY

EXCELLENT FORMABILITY

EXCELLENT STABILITY OF COLOURS AND APPEARANCE

GOOD STABILITY OF APPEARANCE

INTERIOR AND EXTERIOR USE

INTERIOR USE

RECOMMENDED FINISH FOR HARSH ENVIRONMENTS,  
COASTAL AREAS AND/OR SEVERE WEATHER CONDITIONS,  
DUE TO ITS EXCELLENT RESISTANCE TO CORROSION.

DUE TO SUITABILITY FOR CONTACT WITH FOOD,  
ANTISTATIC PROPERTIES AND EXCELLENT RESISTANCE TO  
HUMIDITY AND CHEMICALS, IT IS RECOMMENDED FOR  
CLEAN ROOMS AND CONTROLLED ENVIRONMENTS.

GRAINED

SMOOTH

55 MICRONS

120 MICRONS

25 MICRONS PRIMER + 30 MICRONS OF PUR COATING

120 MICRONS PVC FINISH COAT

30UB +/- 5

12UB

&lt;1T

&lt;1T

&lt;1,5T

&lt;1T

VERY GOOD

EXCELLENT

F a H

4H

700 HRS

500 HRS

1500 HRS

1500 HRS

RUV4

RC5

CPI 5

COMPLIES WITH EN 13501-1 (A1) STANDARD

COMPLIES WITH EN 13501-1 (A1) STANDARD

VERY GOOD

EXCELLENT

VERY GOOD

EXCELLENT

VERY GOOD

EXCELLENT

VERY GOOD

EXCELLENT



A Master Panel for  
every requirement



## Recommendations

58

Transportation and loading, handling, storage, panel cutting, coating repair and maintenance

## Technical assistance

64

Construction details and accessories for assembly

# Recommendations:

MasterPanel offers our clients a technical department to support your designers and Project Management. Our building system section provides support from the initial concept of the project to the installation and subsequent maintenance.

## This advice may include:

- Proposals for appropriate technical solutions for each project..
- Providing support regarding the cutting, quantifications of the panels and necessary accessories.
- Support and technical information for the training of fitters.
- We provide plans and sketches of the most common technical details.
- Technical support in the correct installation of our panels, forming a team with the Project Management.

## TRANSPORT AND LOADING

- Panels must always be transported on flatbed vehicles.
- Panels will always be packed with polystyrene blocks at the base to avoid damage **(pict. 1)**.
- Panel stacks should never exceed 2.60 m. high (including polystyrene blocks, accessories, cover caps, trims, etc) **(pict. 2)**.

### By truck:



1

2

&lt; 2,60 m.

### In containers:



20'DV

40'HC

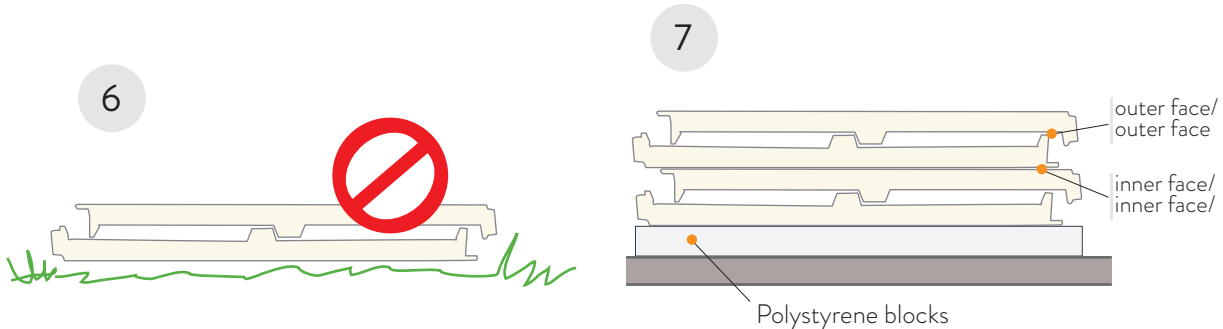
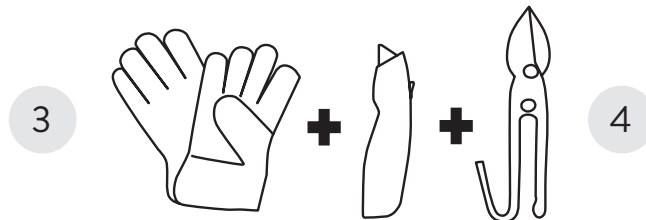


&lt; 2,30 m.

## HANDLING

### Manual unloading :

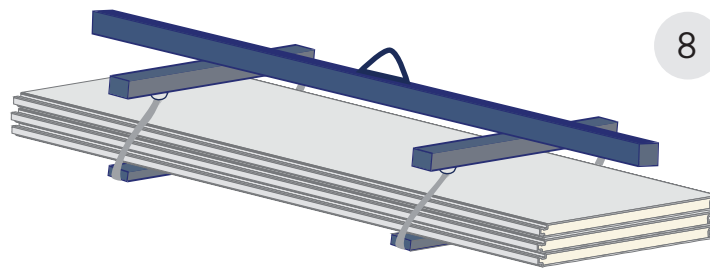
- The staff will always handle the panels with safety gloves (**pict. 3**).
- Appropriate tools should be used to remove the panel packaging. (**pict. 4**).
- The storage area must be defined in advance. Always store on a firm, level surface free of debris (see recommendations for storage).
- Always move panels one by one. The manipulation of the panel will be done by lifting them, they must never be dragged since the edges of the panel can cause damage to the next panel.
- Panels should always be moved while held in a vertical position. Auxiliary slings can be used (**pict. 5**).
- The packages should never be stacked directly on the ground, vegetation or earth (**pict. 6**).
- Panels will be stacked on site, one panel on top of the other and facing each other (**pict. 7**).



## Recommendations

### Crane unloading:

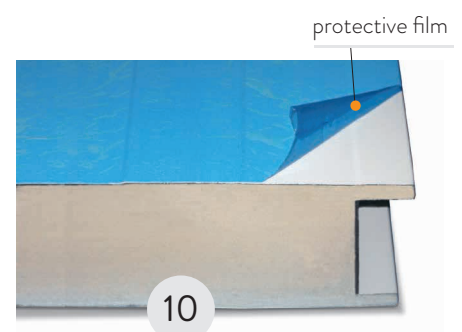
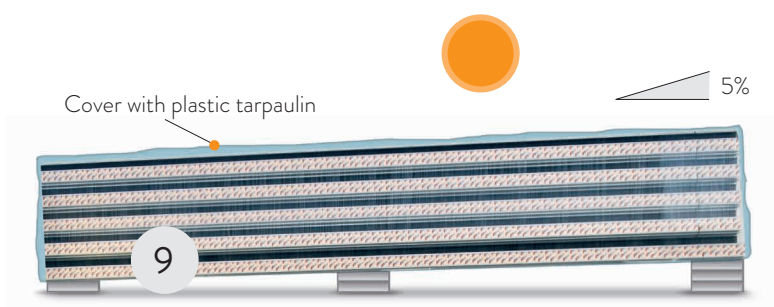
- Staff who handle panels should always wear safety gloves.
- The crane must be operated by a qualified person who holds the necessary permits and licences.
- We recommend you always use a balance beam cradle or unloading cradle. **(pict. 8).**
- Panels should be lifted when held with slings, ensuring there is a minimum of two supports along the pack.
- We suggest that you place protection on the edges of the pack at the points where it is held by the slings, rigid spacers may be used with a length greater than the panel width.
- It is recommended to unload with at least 4 supports on panels longer than 8.00 m to limit the arrow of the panels.
- Metal chains should never be used as they can mark and damage the panels.



## STORAGE:

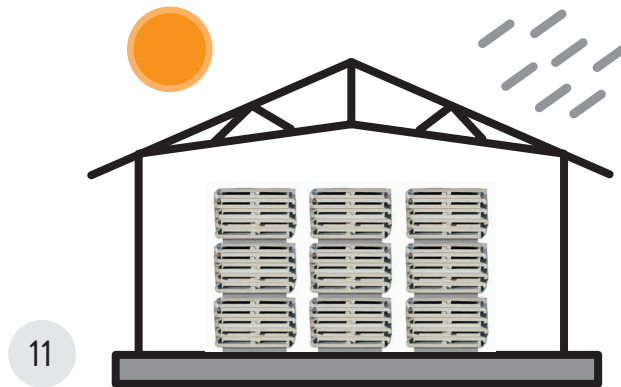
### Short term:

- Packs and panels should never be stacked directly in contact with the ground or vegetation **(pict. 7).**
- The storage area should be dry and ventilated.
- If covered storage is not possible, the panels should be stored with an inclination of 5% to avoid the accumulation of water in the package. Make cuts in the stretch plastic packaging so as to allow the escape of any water that may accidentally enter. Packages must be covered with waterproof material, canvas or plastic **(pict. 9).**
- The protective film must be removed from the surface of the panel in a period not exceeding 15 days from their exposure to the elements **(pict. 10).**
- Panel that are stored in packs are sensitive to moisture, condensation and rain. The water that accumulates between the panels could create zinc hydrocarbon on the surface, which in the case of prepainted panels will be seen as surface staining. To avoid this, place spacers between panels. Accumulated water can in turn damage the paint on the panels, causing it to peel.
- The stacking height should never exceed 2.20 meters.



### Long term:

- Follow the short-term storage recommendations (except the third recommendation in the previous section). The storage area should be dry, ventilated and covered. Under no circumstances should panels suffer long-term exposure to the elements (**pict. 11**).
- Remove the stretch plastic wrapping from the panel packaging to prevent the accumulation of moisture, or condensation inside the package.



## PANEL CUTTING:

### 1. Work tools::

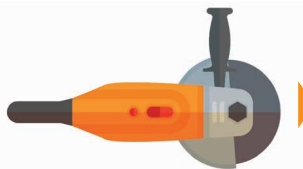
Operators must be equipped with the pertinent individual protection equipment (glasses, gloves, long sleeves...) Panel cutting must be done with the proper tools. Do not use tools that produce hot sparks. The use of inappropriate tools can cause delamination, causing long-term defects on the panel surface, such as blistering.

#### Suitable tools:



Fine tooth  
circular saw

#### Avoid the cut with:



Abrasive saws,  
grinders or similar



Jigs saw, saber or  
similar

### 2. Work surface

Panel cutting must be done on a flat surface.

The sandwich panel should never be used as a work surface for cutting another sandwich panel or other element. The remains of this cut can stay on the panel and lead to oxidation on the surface of the panel.

## Recommendations

### 3. Cutting procedure

Masterpanel advises against cutting panels on site and cannot guarantee the performance of panels cut on site. During the cutting of the panel, its technical characteristics are modified, as well as, stresses and vibrations being transmitted, which can lead to long-term defects on the surface, such as blistering.

If the client requires the cutting of the panel on site, it is advisable to follow the following steps to avoid damaging the panel surface:

- 3.1 Place the panel on a flat surface.
- 3.2 Clean the area to be cut.
- 3.3 Determine the line of the cut.
- 3.4 Placing adhesive tape on the line of the cut is recommended in order to protect the surface and avoid scratches on it. Such tape must be removed prior to panel installation.
- 3.5 Cut along the previously determined line.
- 3.6 Clean the cutting area of any impurities, chips, etc.
- 3.7 Polish the edges removing burrs.

If the width to be cut is less than 50% of the panel width, it is recommended to cut the full thickness of the panel and remove the cut part before installing the panel.

When the width to be cut is greater than 50% of the width of the panel or when areas that may compromise the stability of the panel are removed before installation, it is recommended to proceed as follows:

- First, it is recommended to cut the inner face sheet and the foam to a depth of about 5-6 mm.
- Then turn the panel over and cut the veneer on the outer side and the foam to a depth of about 5-6 mm.
- Without removing the cut area, install the panel, fixing it to the structure as it has been designed.
- Once installed, use a utility knife to cut the foam from the cut area and remove.

In any case, after cutting the panel, the core should never be exposed. Therefore, the core must be protected by sealing systems, collars, finials, etc.

## COATING REPAIR

When damage occurs during the handling of the panels that affects the coating, proceed as follows:

- **When the zinc coating is visible:**
  1. Clean the surface to be repaired
  2. Apply an epoxy-polyurethane type primer on the affected area
  3. Apply a coat of acrylic-polyurethane paint over the primer in the same shade as the repaired surface
- **When painting over pre-lacquered paint:**
  1. Clean the surface to be repaired.
  2. Apply a coat of acrylic-polyurethane paint in the same shade as the repaired surface

## MAINTENANCE

Once the panels have been fitted on-site, a general cleaning should be performed. Be sure to remove all metal chips or burrs and any objects, metallic or otherwise, that may be on the surface, so as to remove possible focal points for the formation of rust. If necessary, use a mild household detergent without caustic soda.

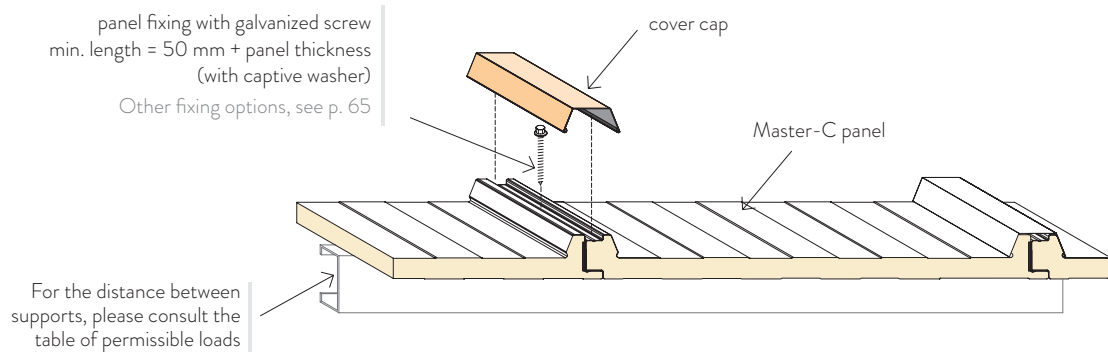
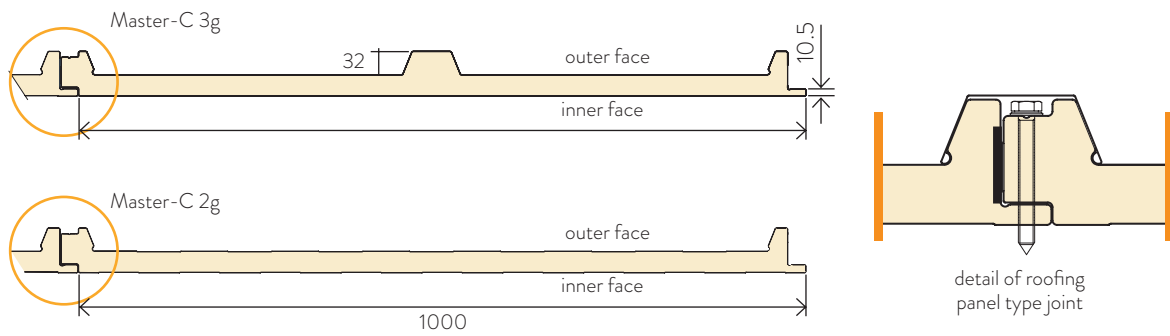
Before starting any maintenance work, please remember that our roofing is not designed for frequent heavy walking, but just for walking on occasionally; always avoid stepping on flashings, ridges and any installed trim, always wear rubber-soled shoes and safety gloves; do not drag equipment or tools along the surface of the roofing..

- Inspect gutters and downpipes semi-annually.
- Carry out a general cleaning annually, including the skylights. If necessary, use mild household detergent, without caustic soda. Do not use brushes, metal scouring pads or other abrasive materials.
- Make an annual check on the condition of mouldings and trims, sealants and screw fittings that are exposed to the elements.
- Inspect the areas of sheet overlaps, the state of the sealant and of the screw fittings and, if necessary, reseal.
- If lightning conductors are installed, make an annual inspection of the condition of the installation.
- On panels with a polyester type paint finish, check the condition of the paint every two years. In special finishes, the first paint check should be carried out starting on the fifth year

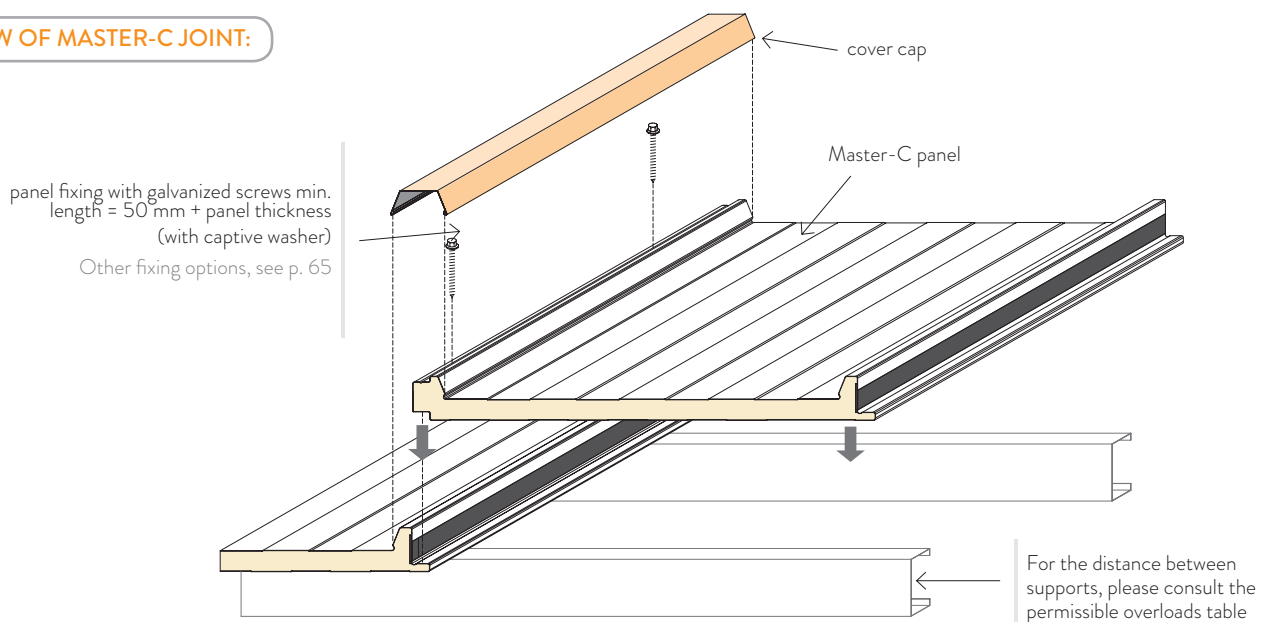


# Technical assistance:

## MASTER-C TYPE PROFILES AND JOINT:

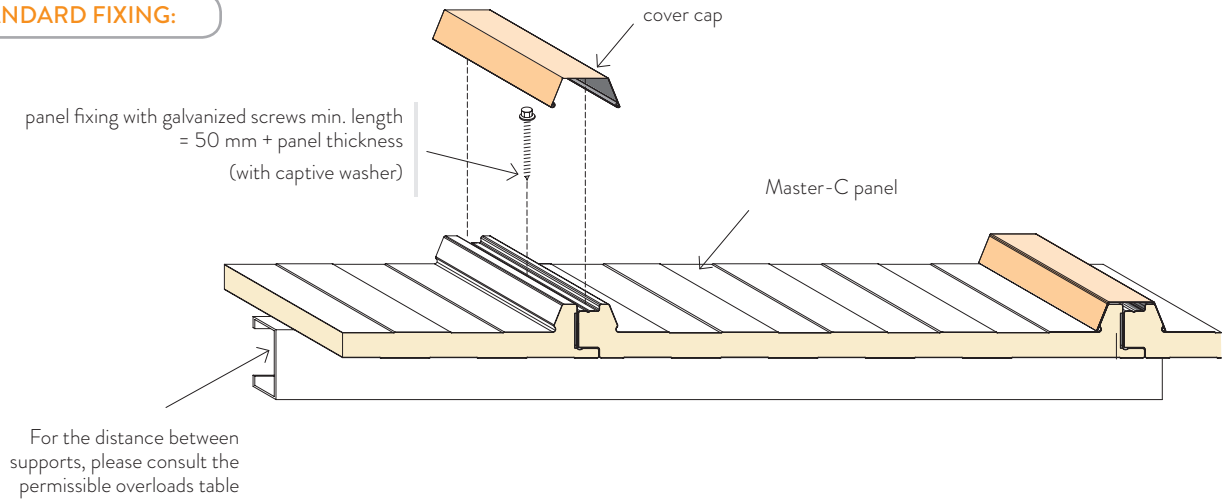


### VIEW OF MASTER-C JOINT:

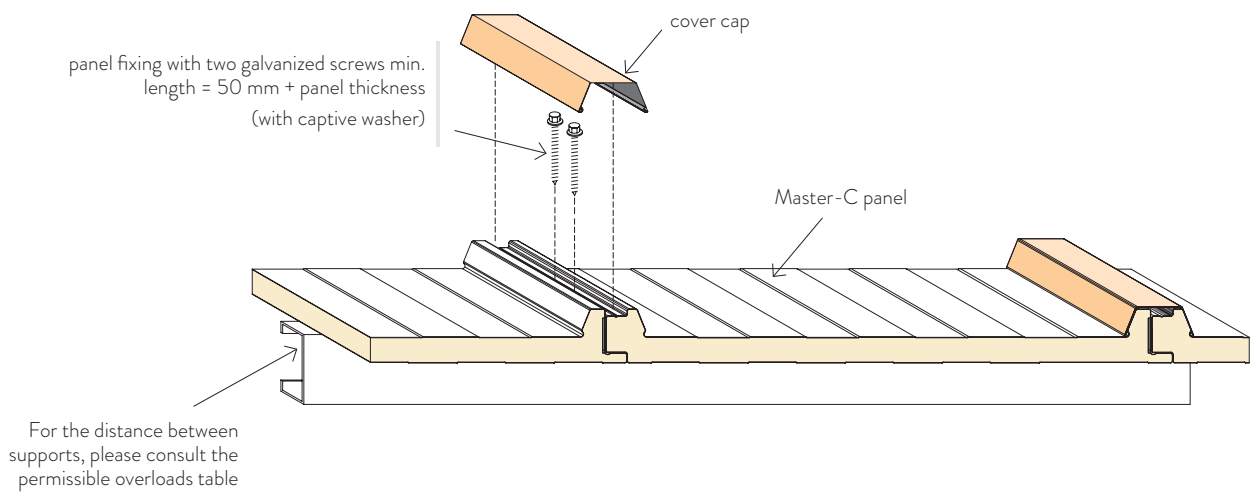


## MASTER-C FIXING OPTIONS:

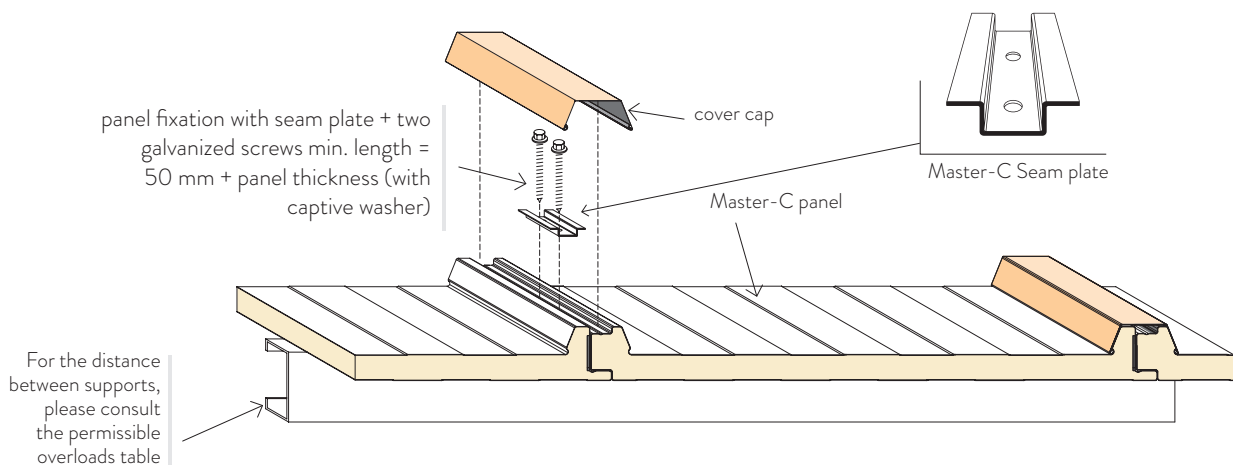
### STANDARD FIXING:



### FIXING WHEN THE SPANS BETWEEN SUPPORTS > 2.00 m

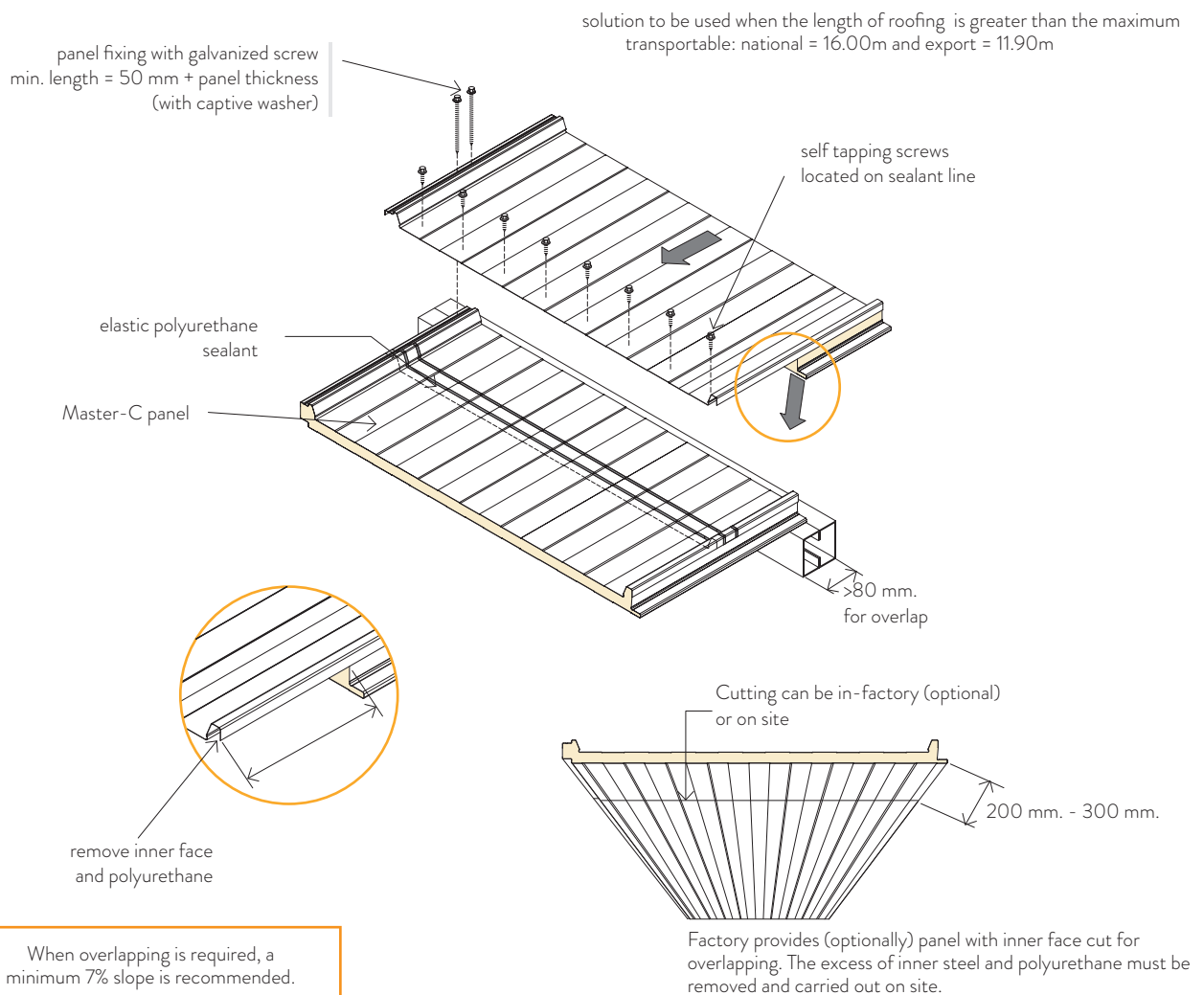


### FIXING FOR GEOGRAPHICAL AREAS WITH WIND SPEEDS OVER 150km/hr

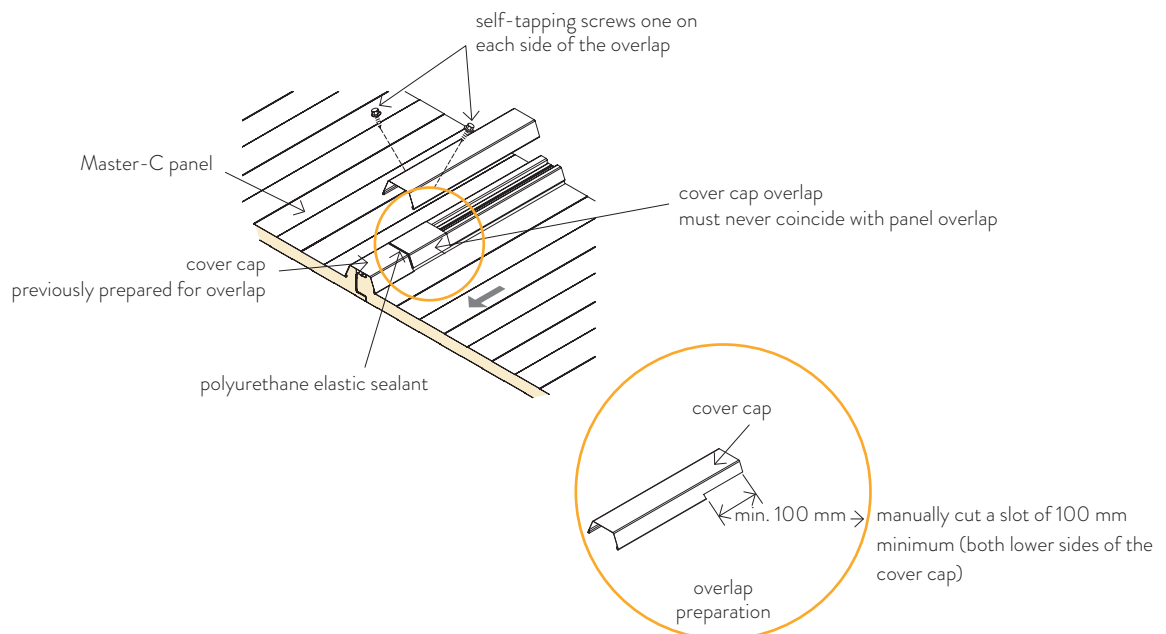


## Technical assistance:

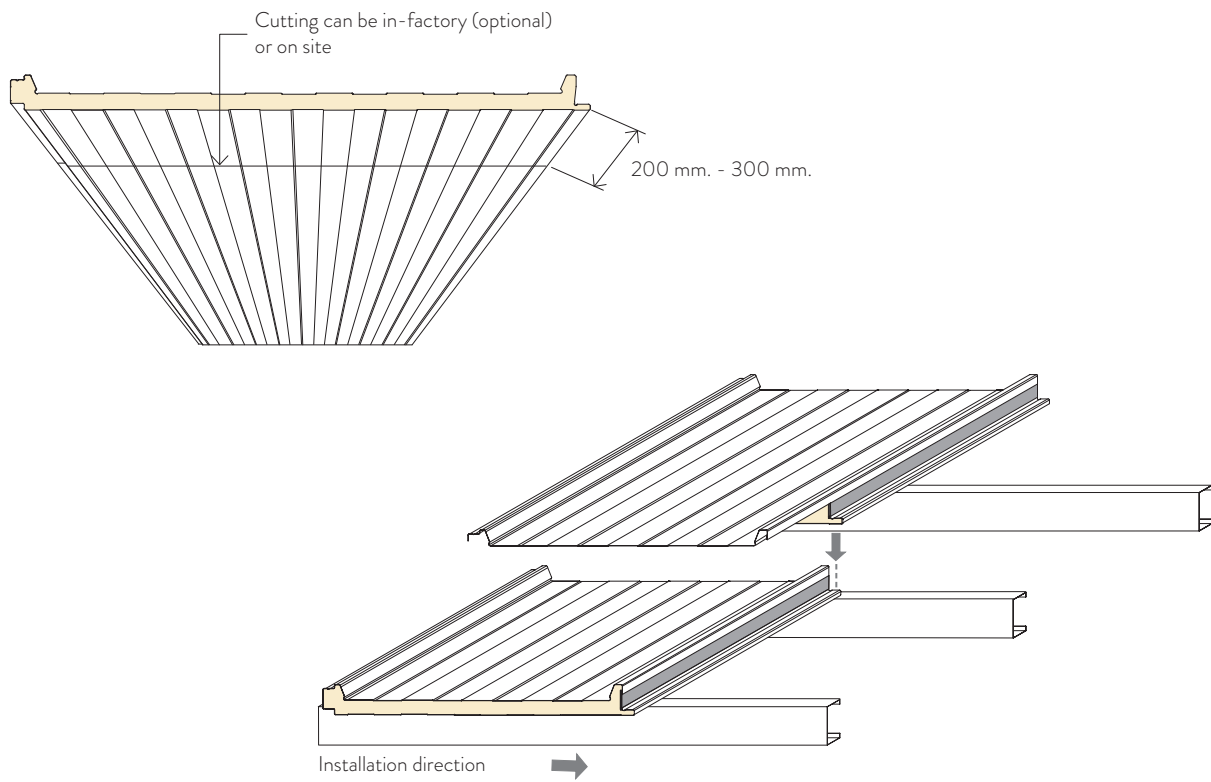
### PANEL OVERLAPS:



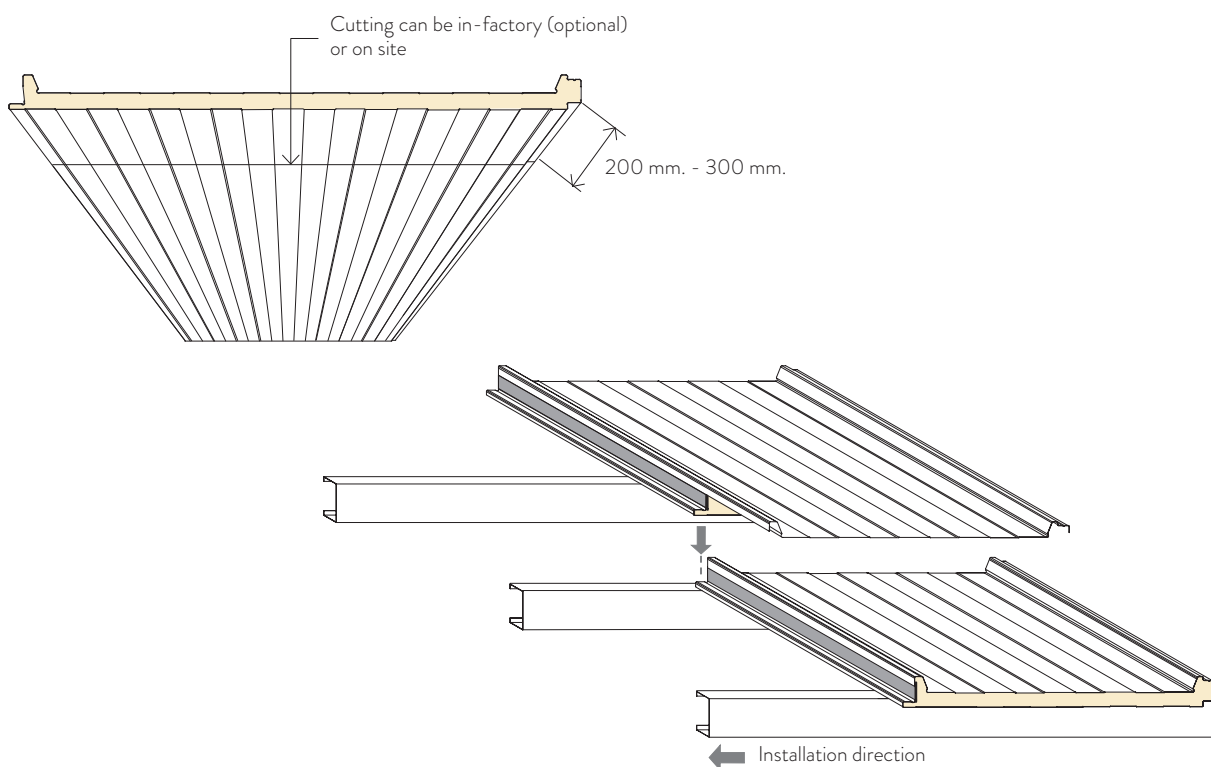
### COVER CAP OVERLAPS:



## RIGHT OVERLAP:



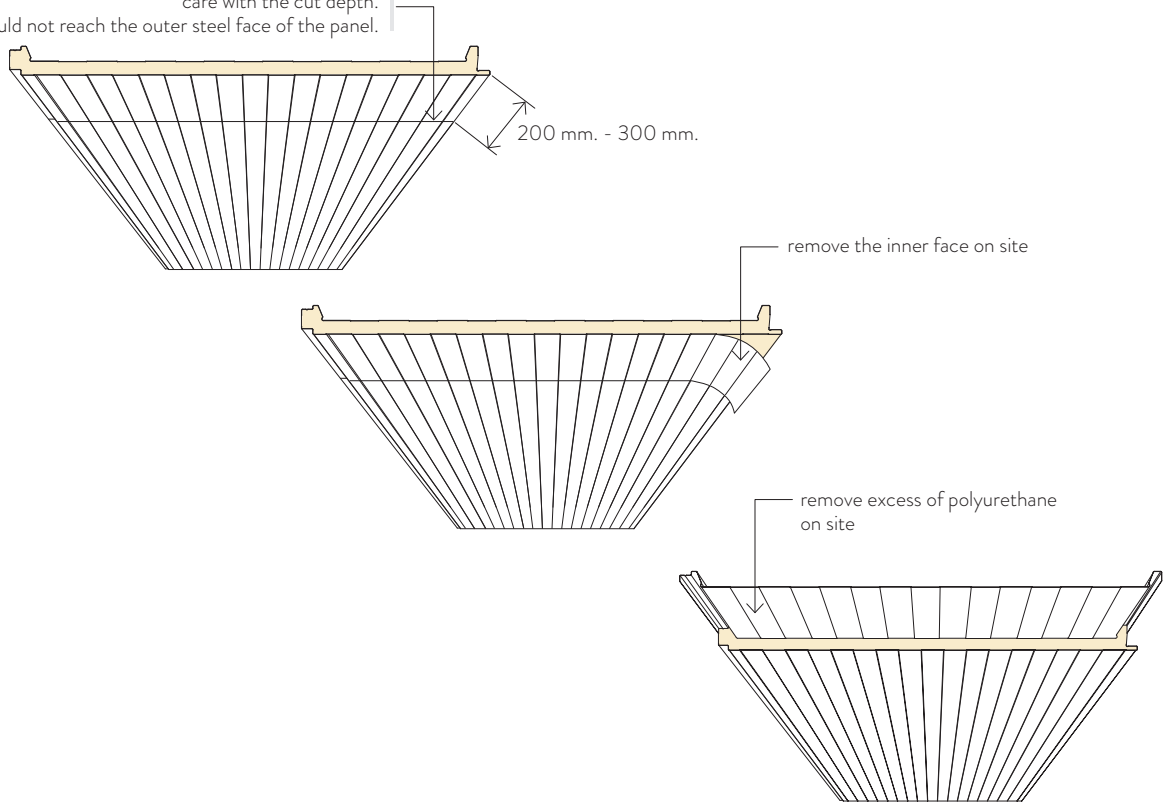
## LEFT OVERLAP:



## Technical assistance:

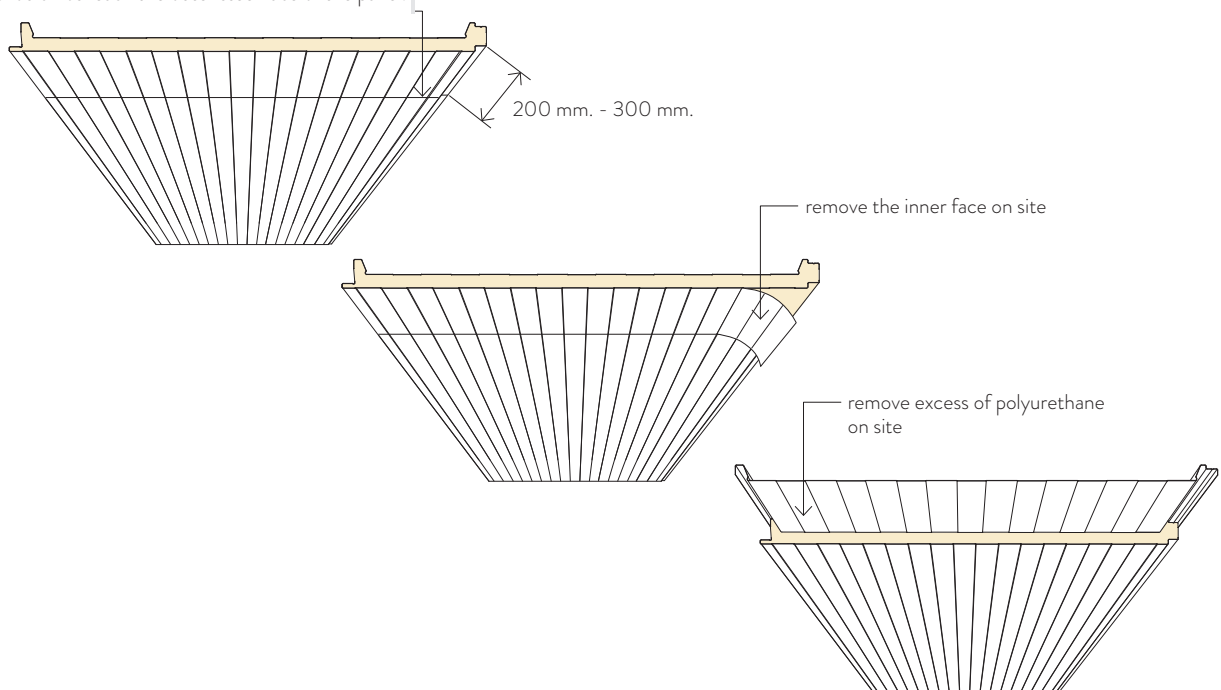
### PANEL PREPARATION FOR RIGHT OVERLAP:

Cutting can be made at the factory (optionally); if the cut is made on site, take special care with the cut depth. It should not reach the outer steel face of the panel.

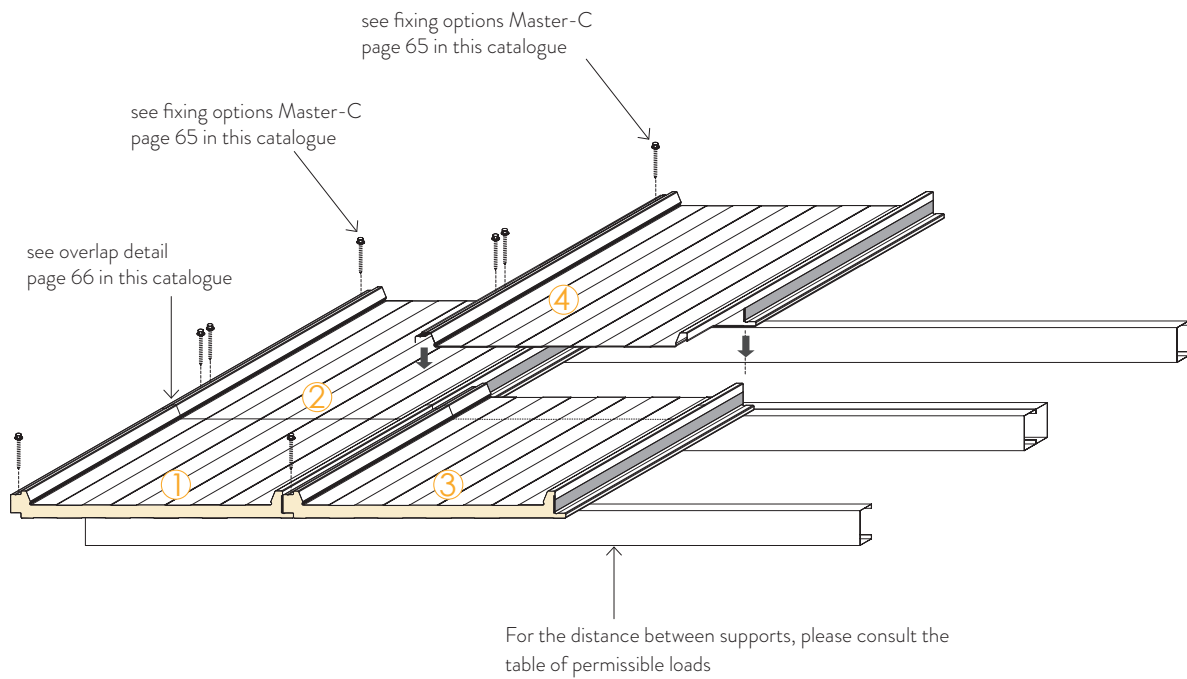


### PANEL PREPARATION FOR LEFT OVERLAP:

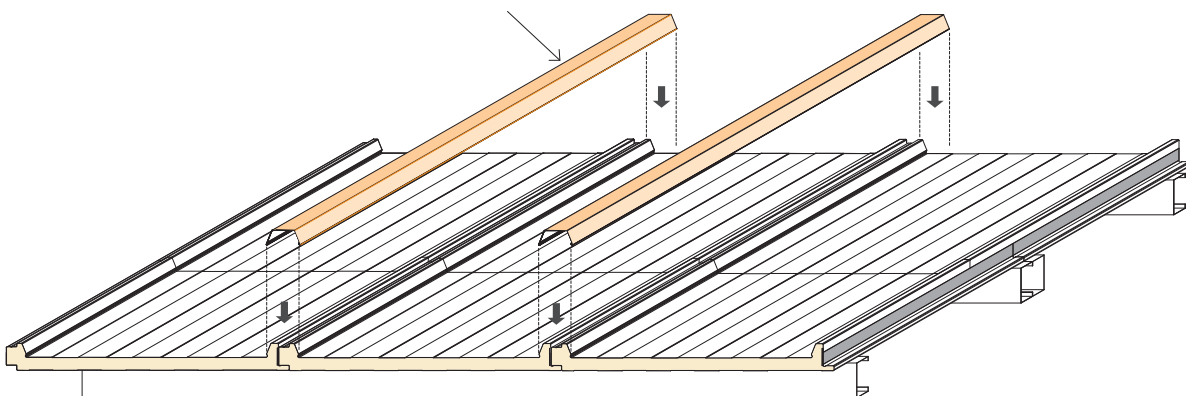
Cutting can be made at the factory (optionally); if the cut is made on site, take special care with the cut depth. It should not reach the outer steel face of the panel.



## PANEL INSTALLATION ORDER:



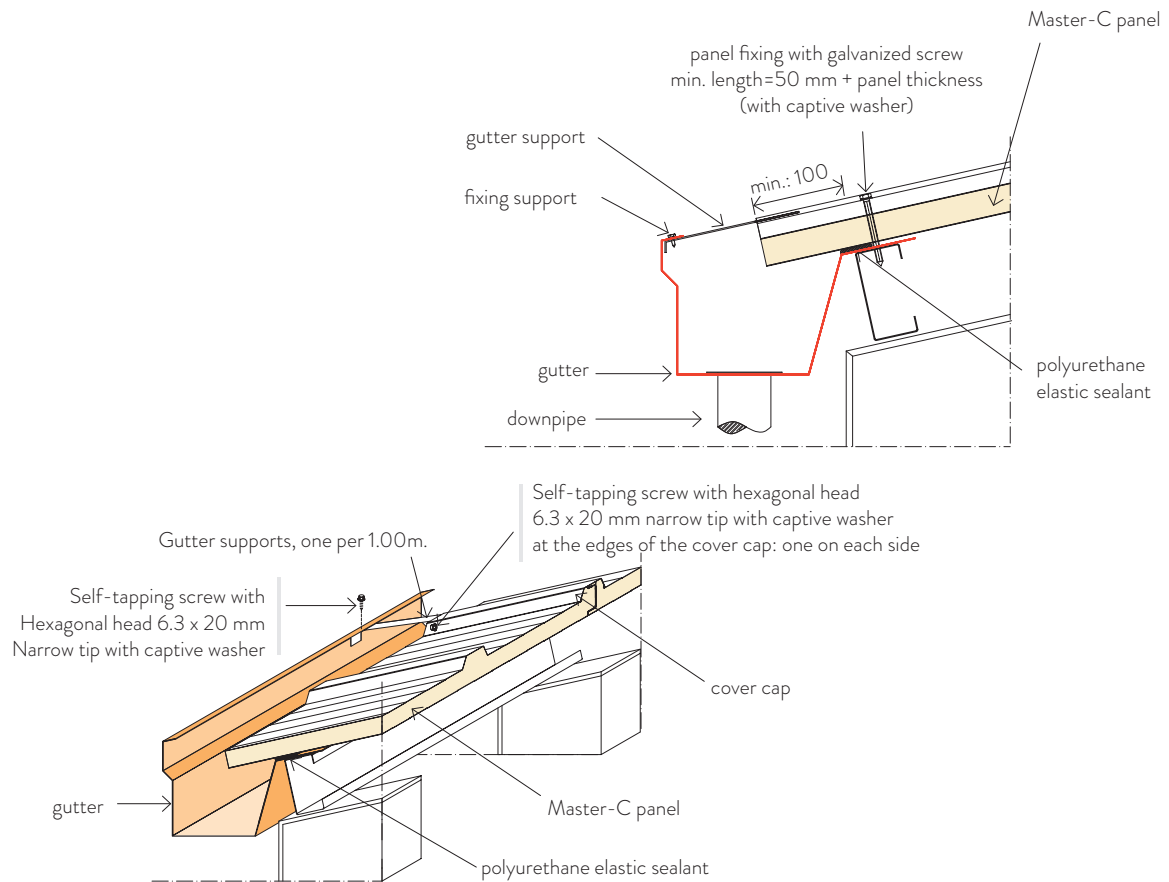
after installing Master-C panel lines  
cover caps must be installed.  
The cover cap overlap should never coincide with  
panel overlap  
for cover cap overlap detail see p. 66



Detail shows right-hand installation direction.

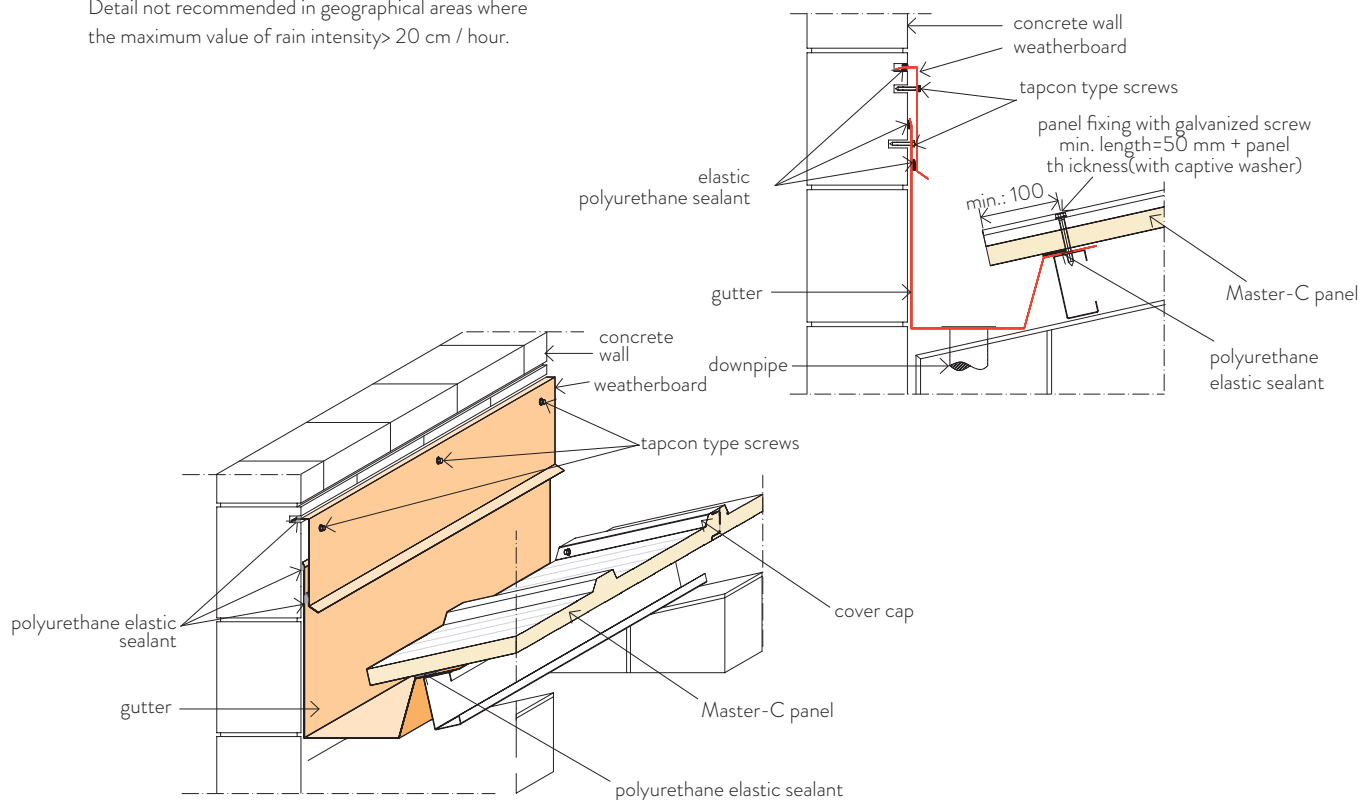
## Technical assistance:

### EXTERIOR GUTTERING:

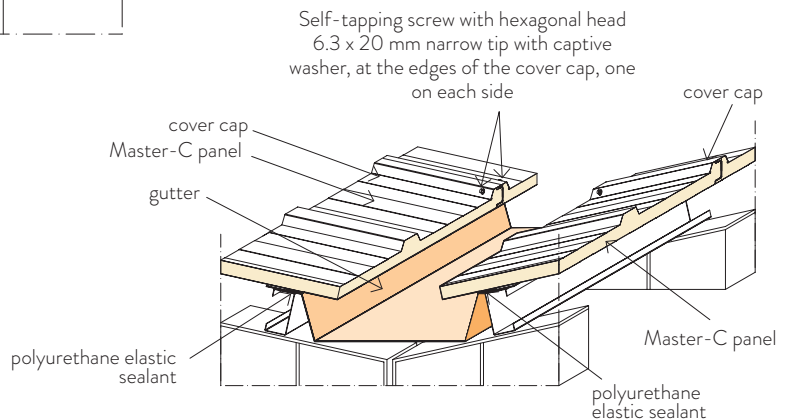
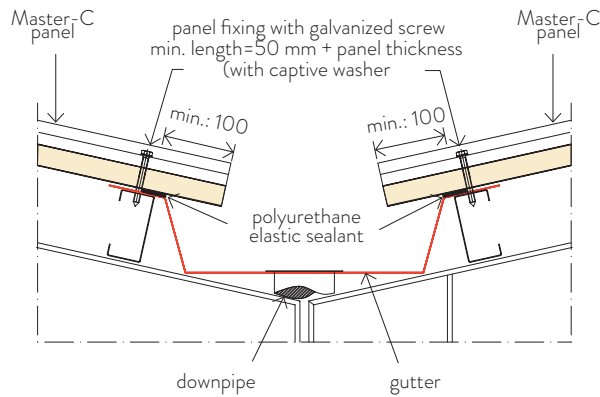


### INTERIOR GUTTERING ON CONCRETE WALLS:

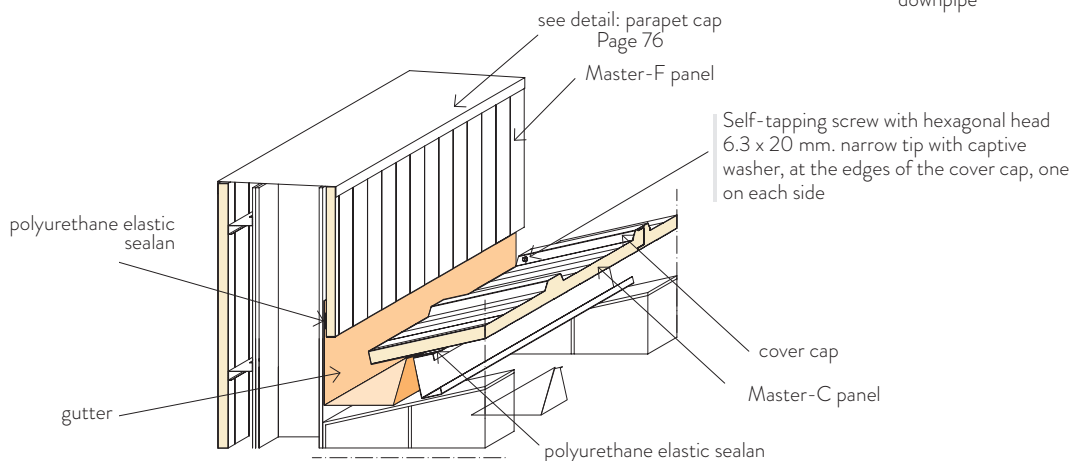
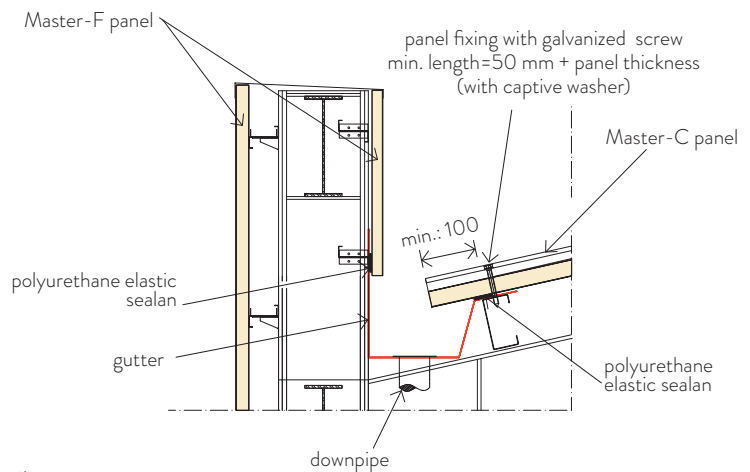
Detail not recommended in geographical areas where the maximum value of rain intensity > 20 cm / hour.



## CENTRAL GUTTERING:

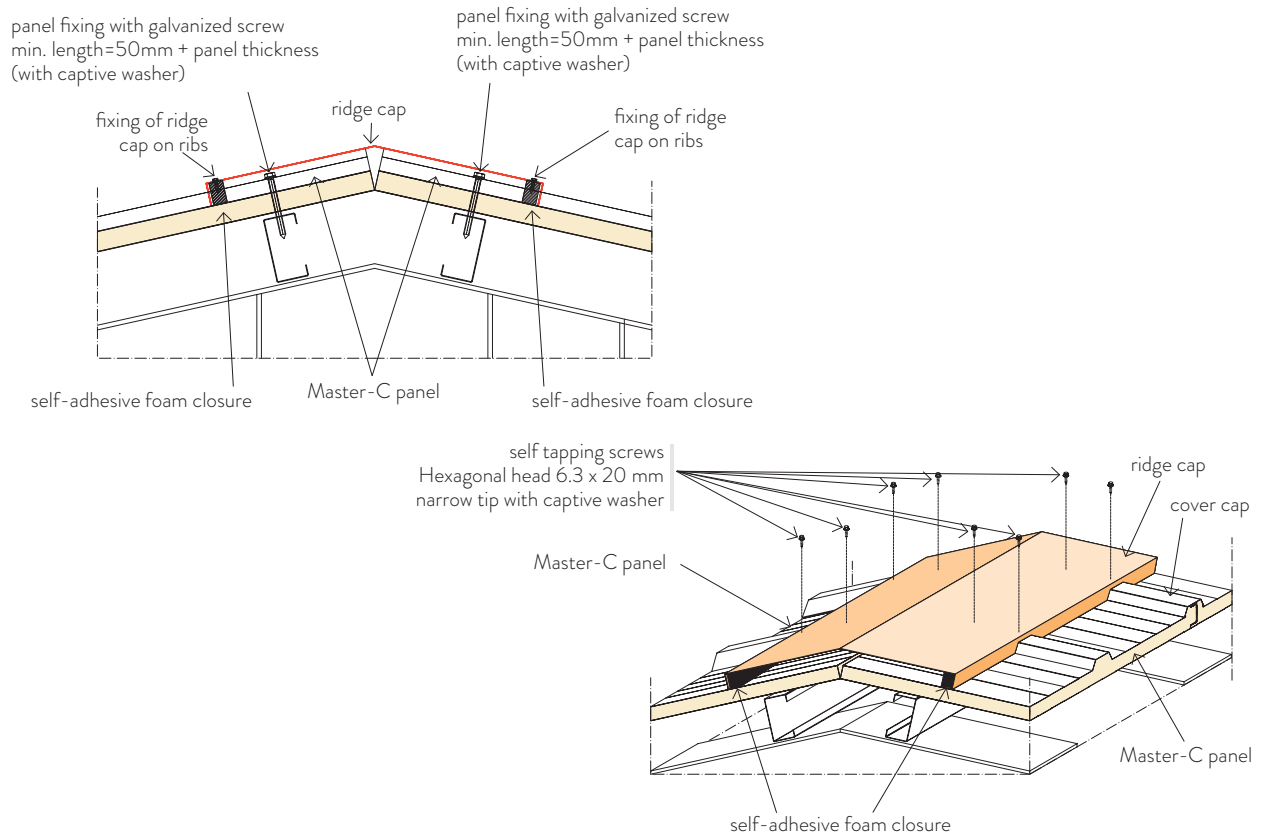


## INTERIOR SIDE GUTTERING

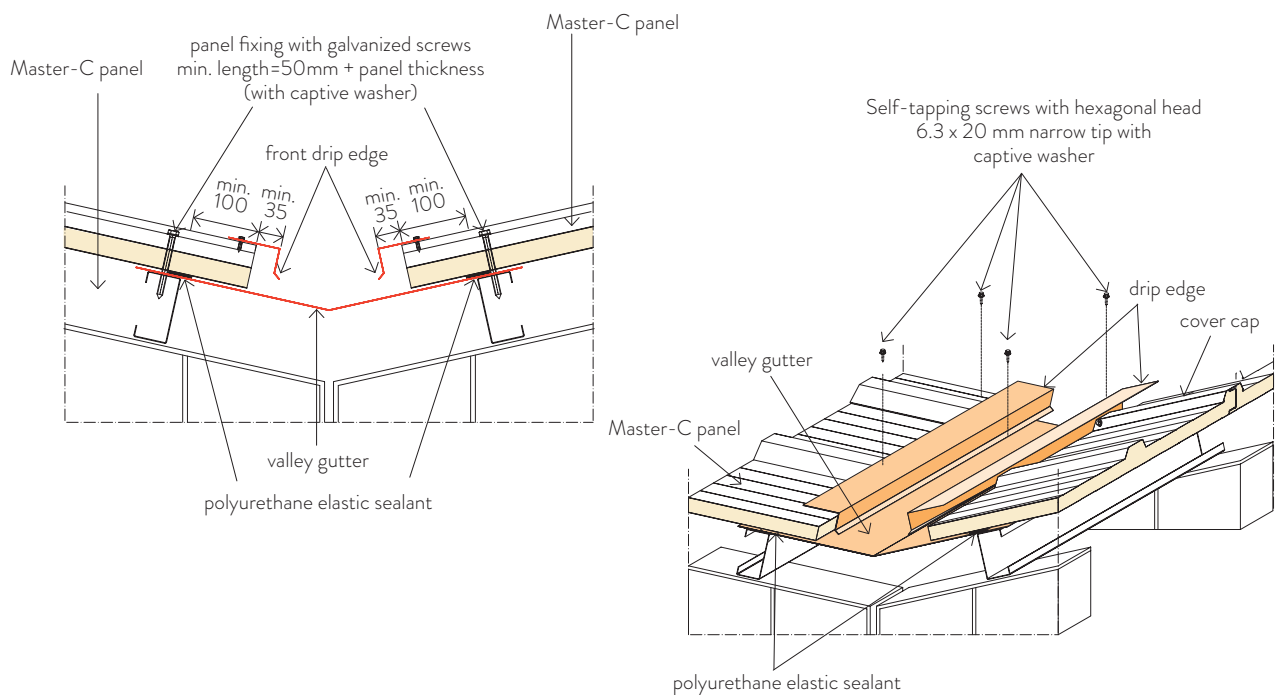


## Technical assistance:

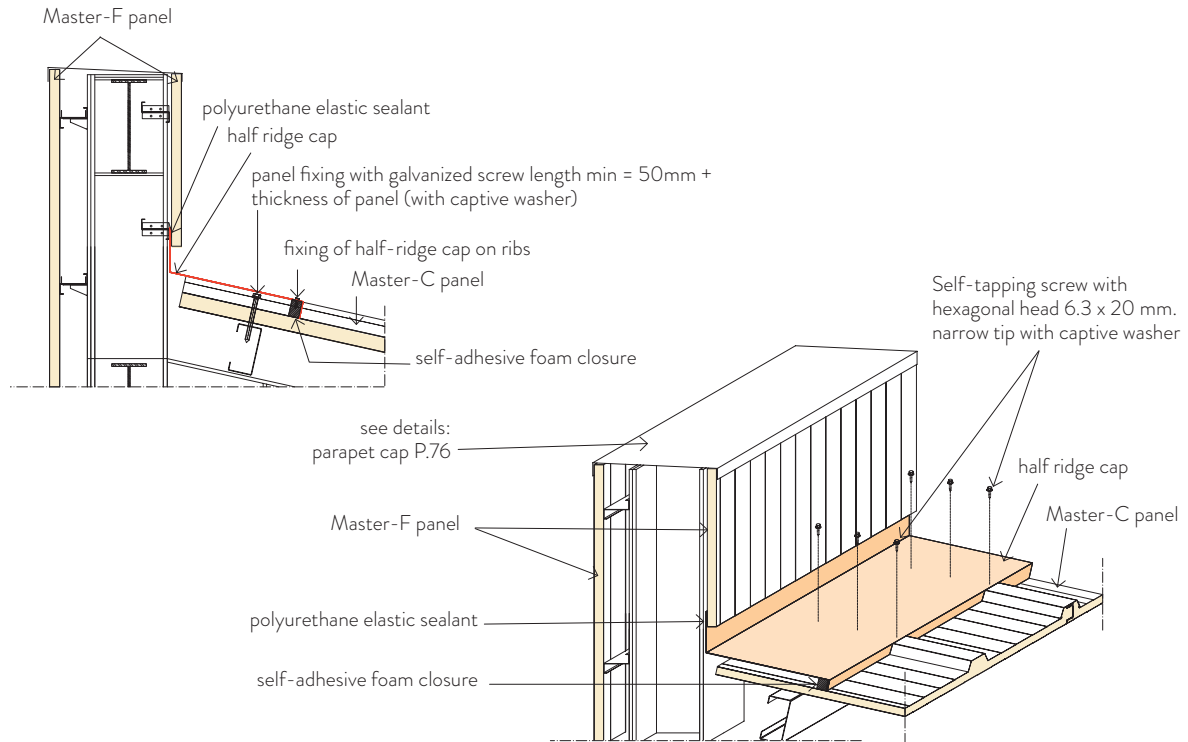
### RIDGE CAP:



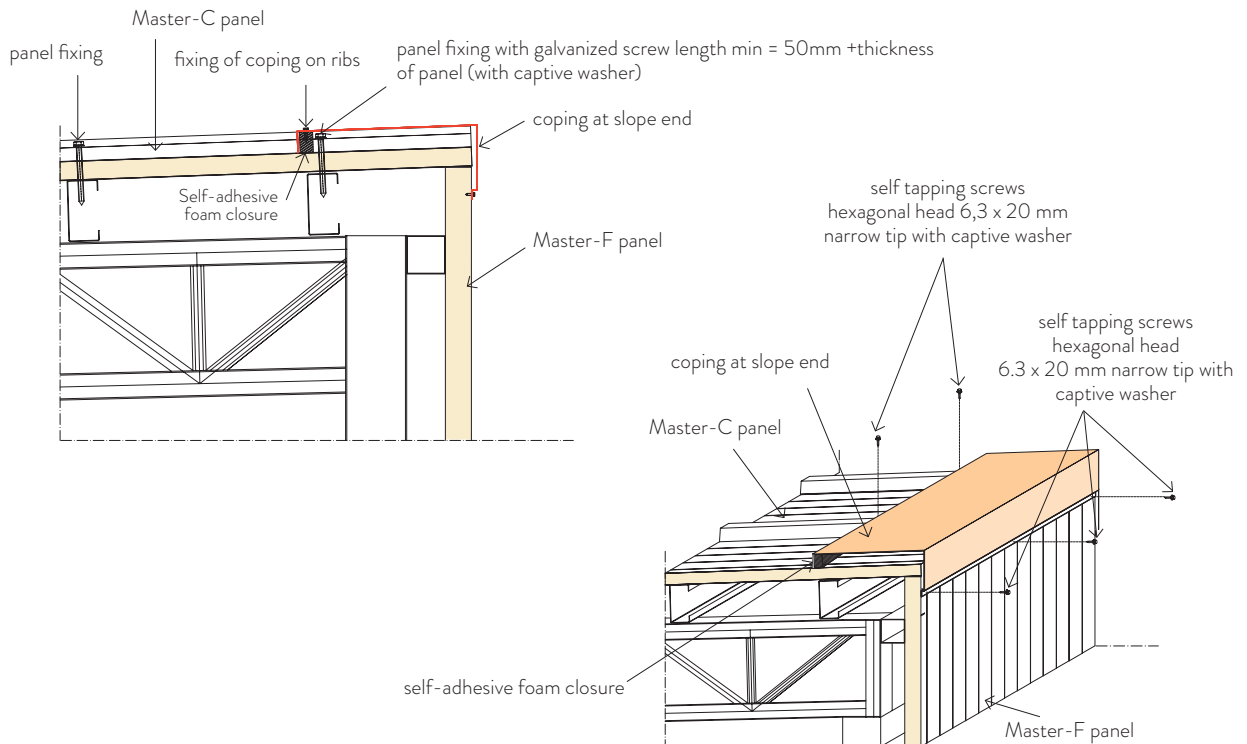
### VALLEY GUTTER



## TOP OF SLOPE TO WALL:

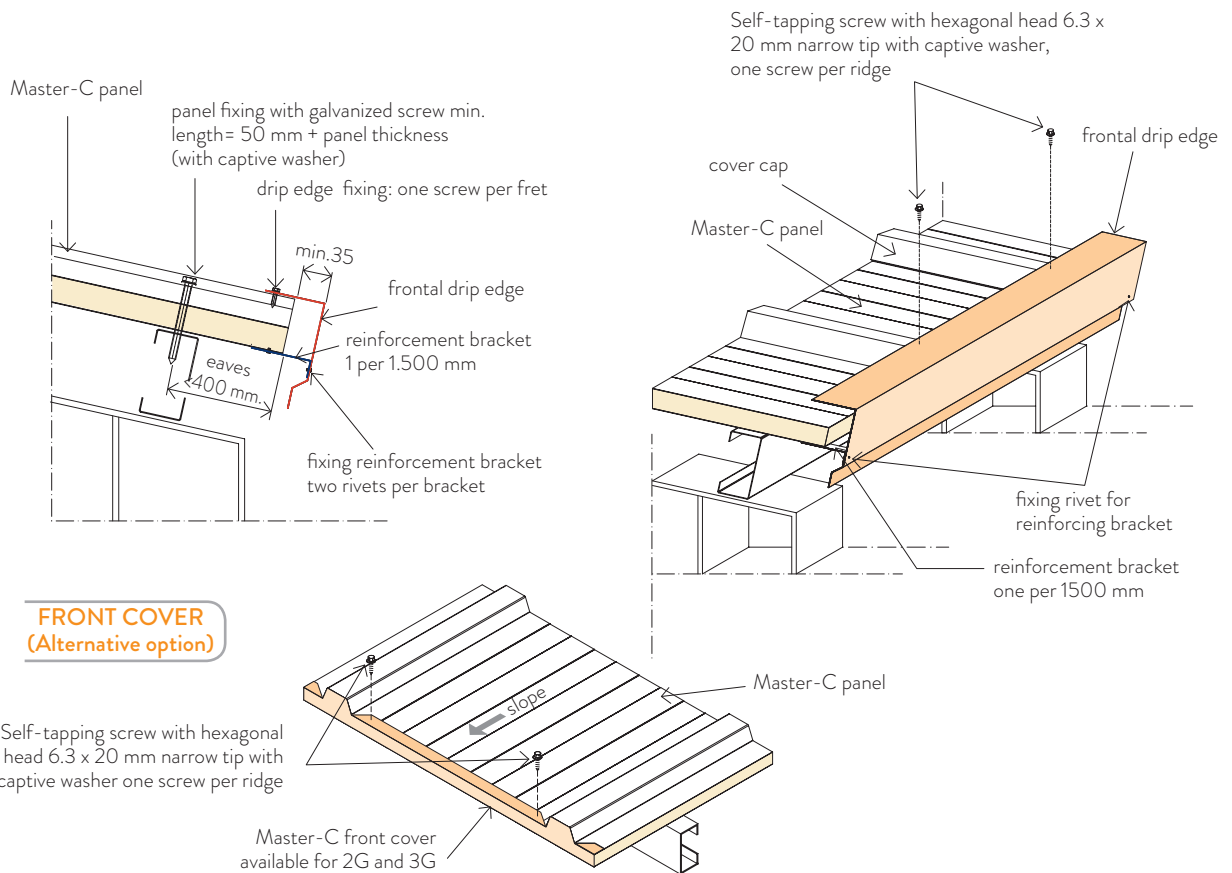


## COPING FOR SLOPE ENDS:

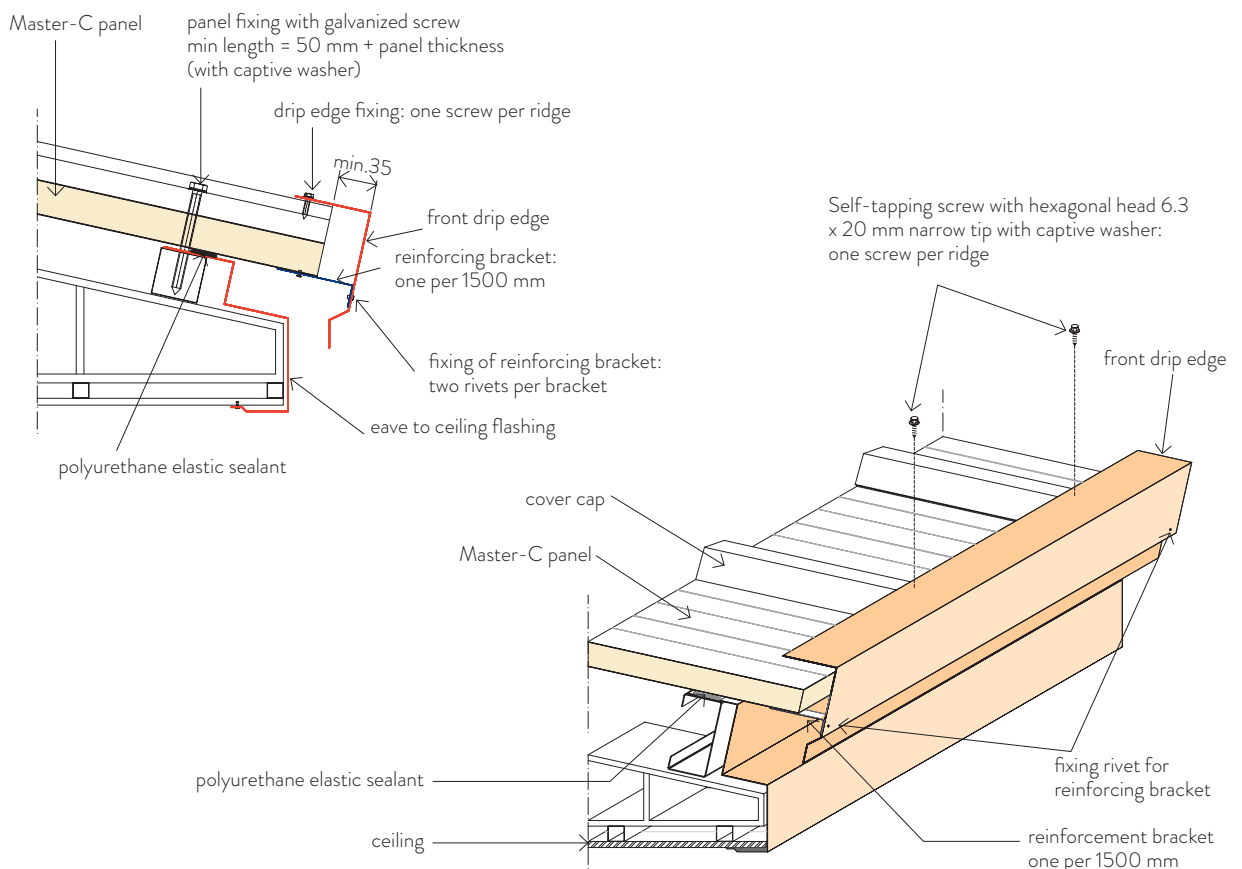


## Technical assistance:

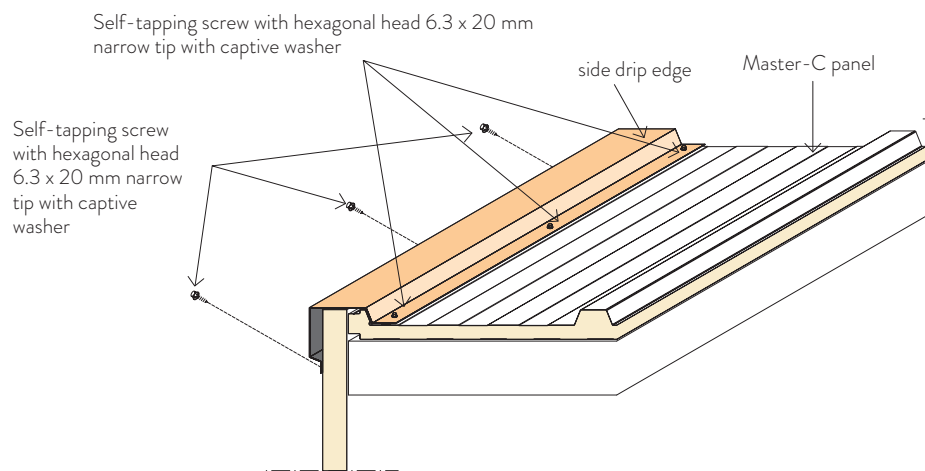
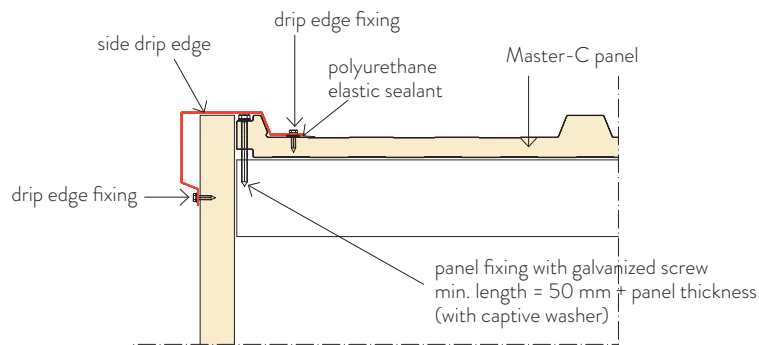
### FRONTAL DRIP EDGE:



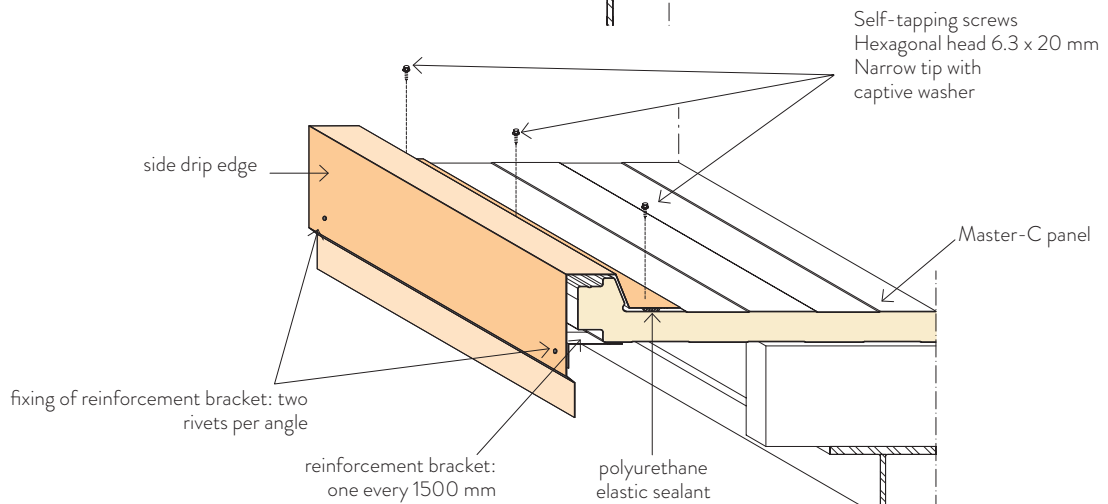
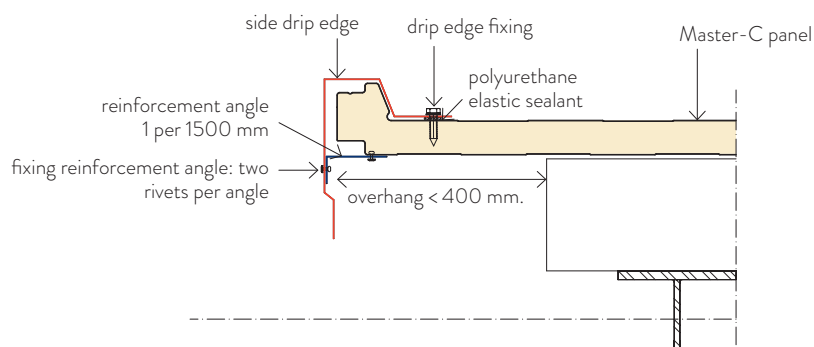
### EAVE DRIP TO CEILING:



## SIDE DRIP EDGE:

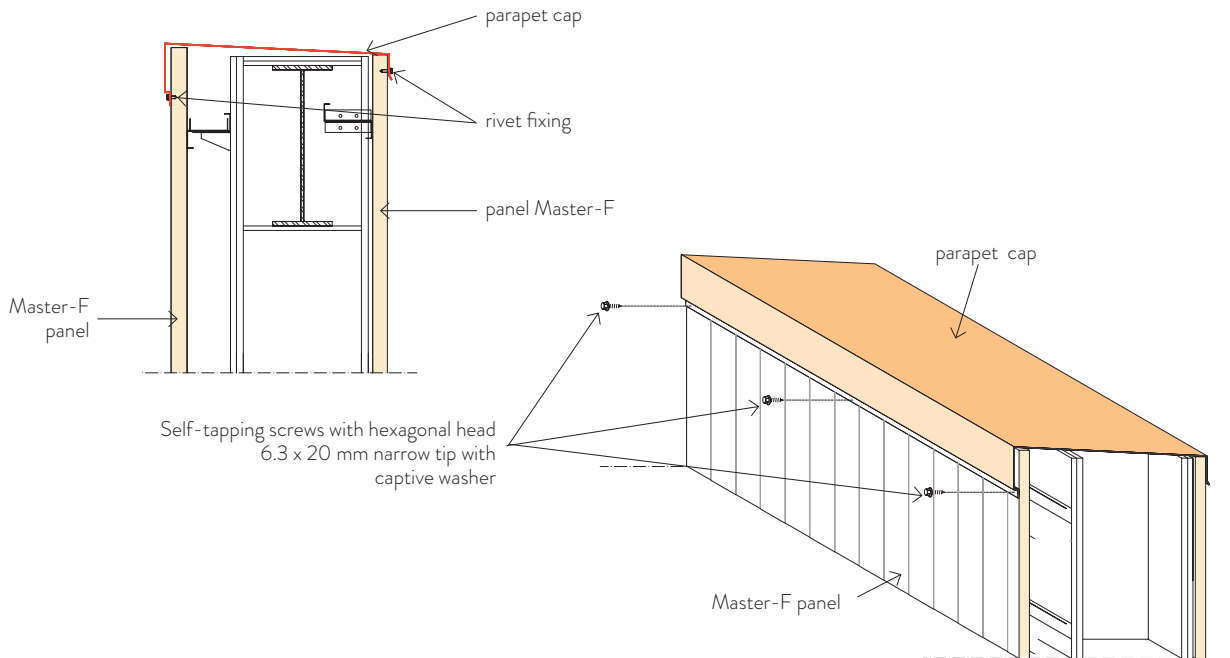


## OVERHANGING SIDE DRIP EDGE:

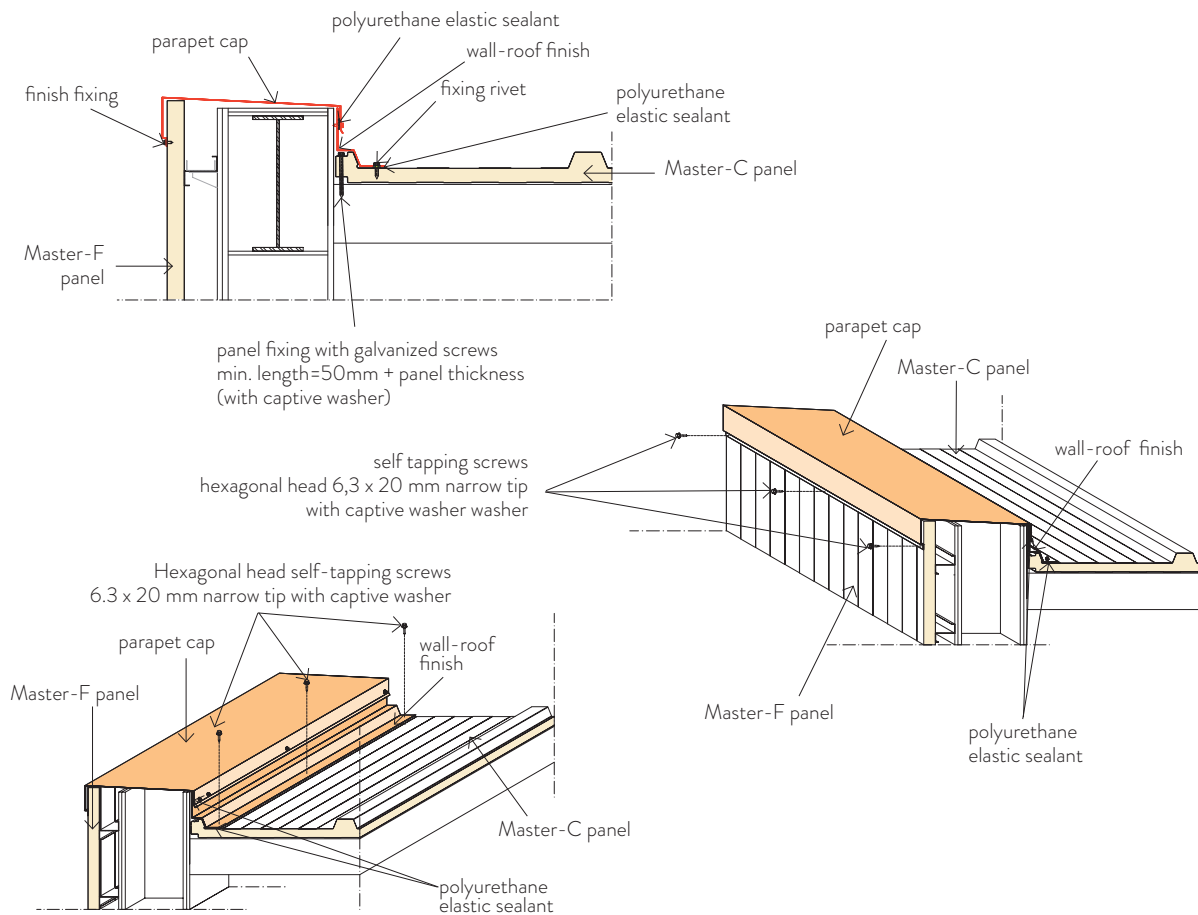


## Technical assistance:

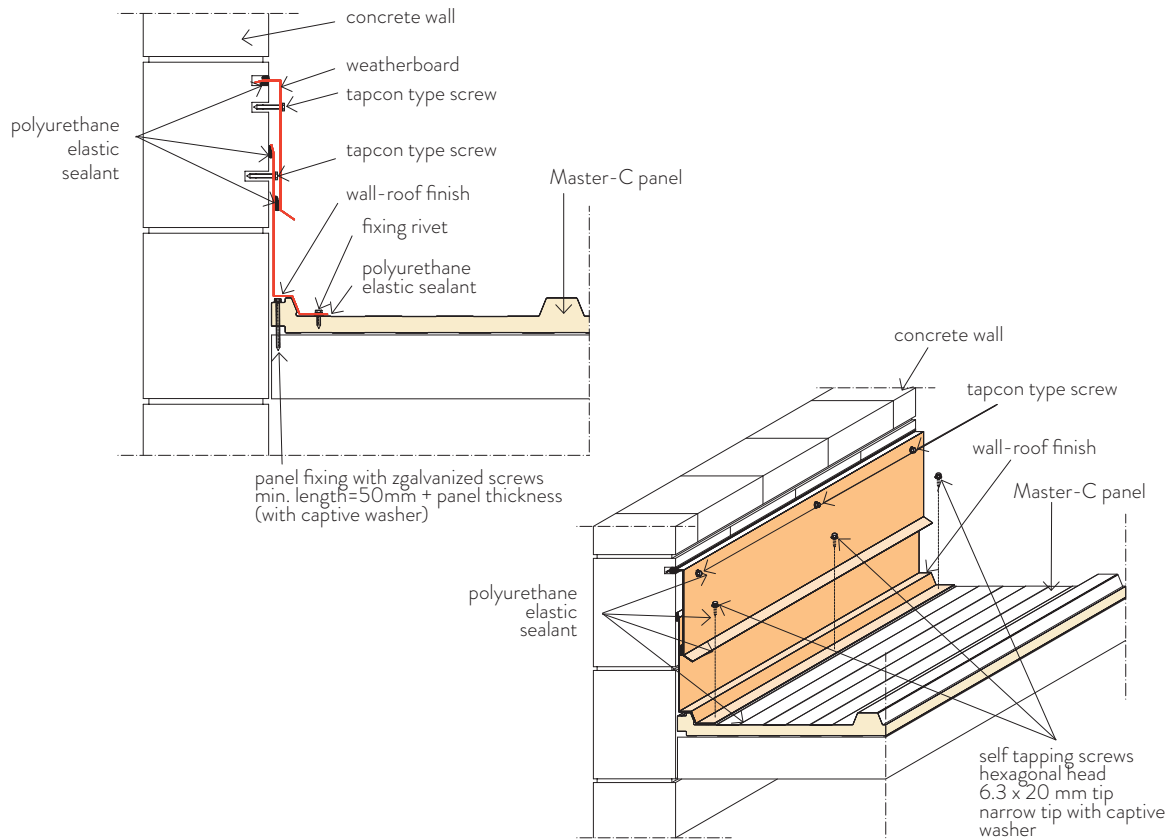
### PARAPET CAP:



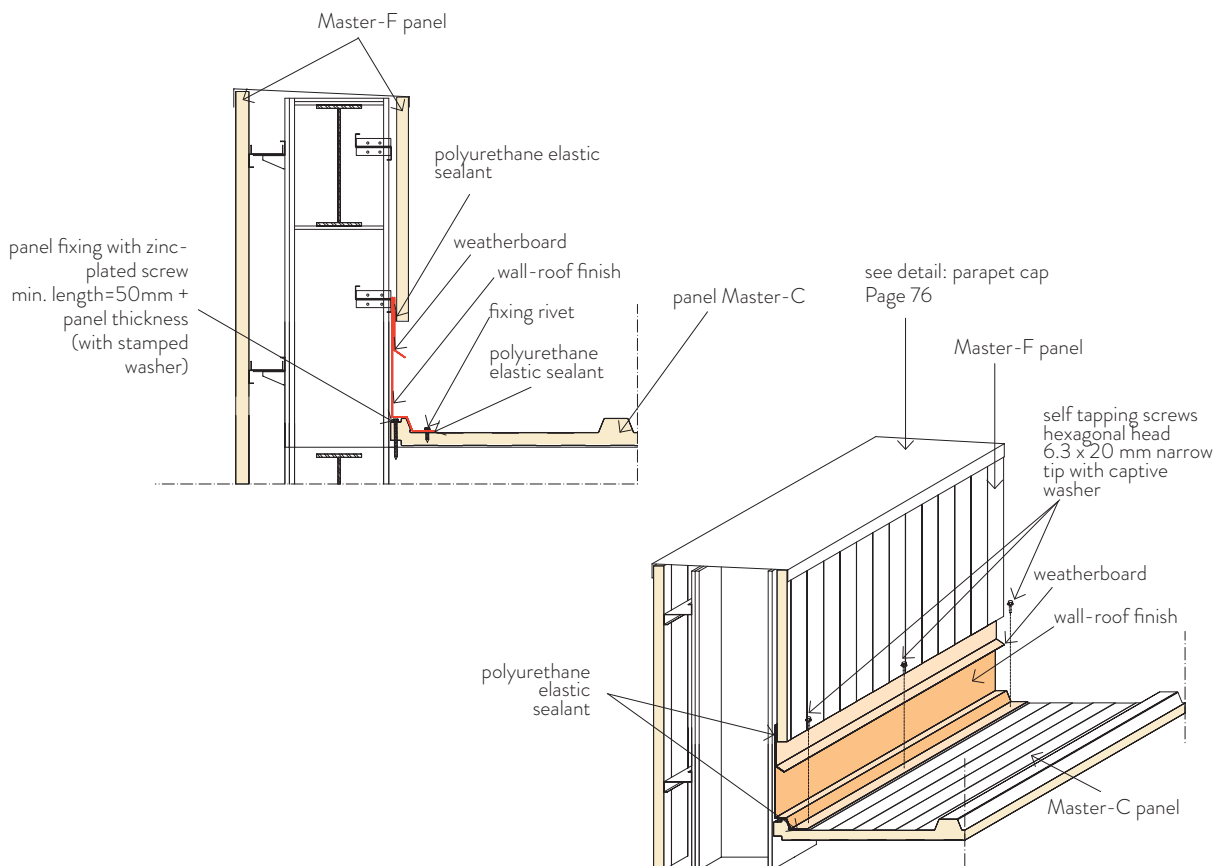
### SIDE SLOPE



## SIDE SLOPE TO WALL



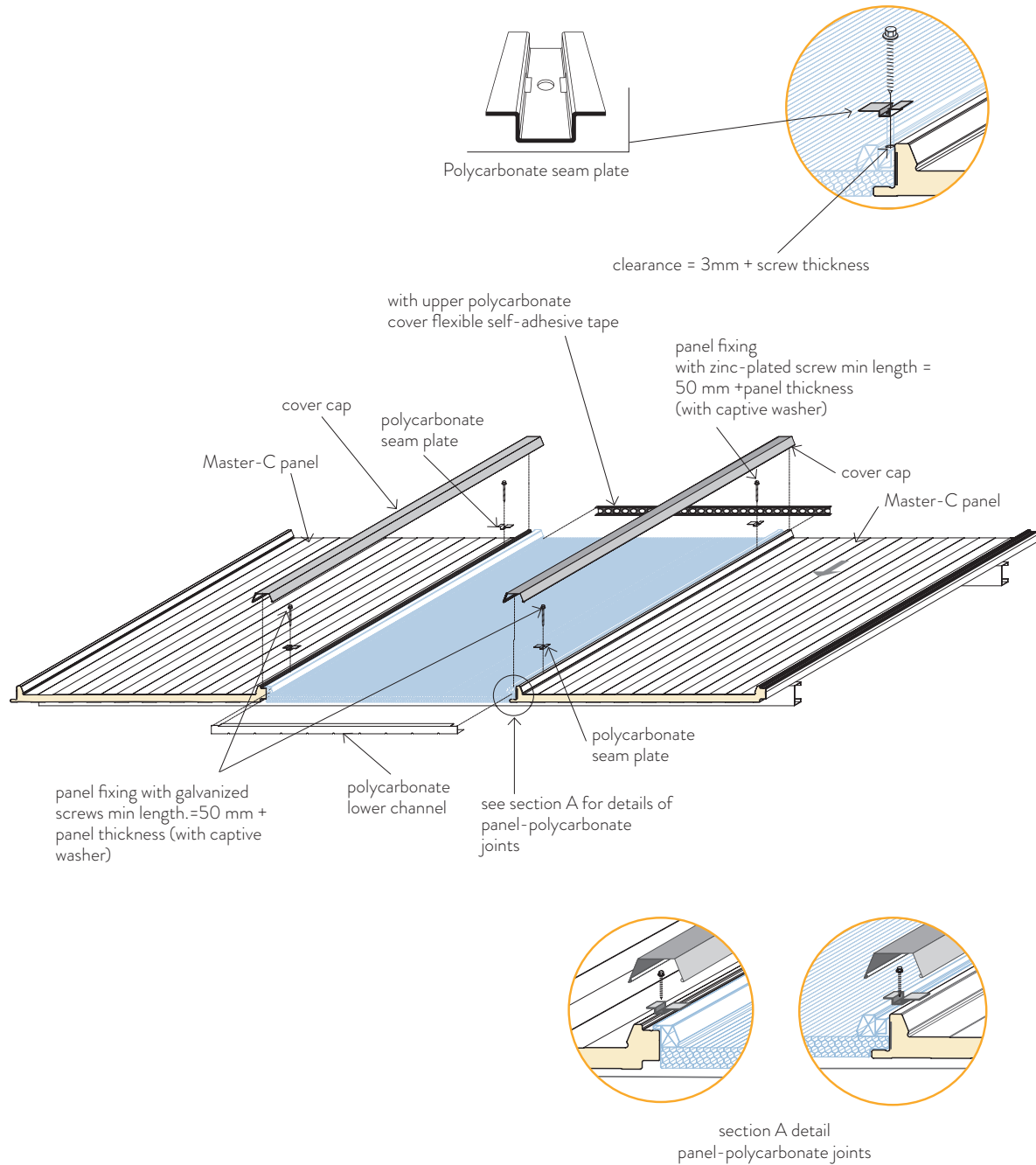
## SIDE OF SLOPE TO WALL



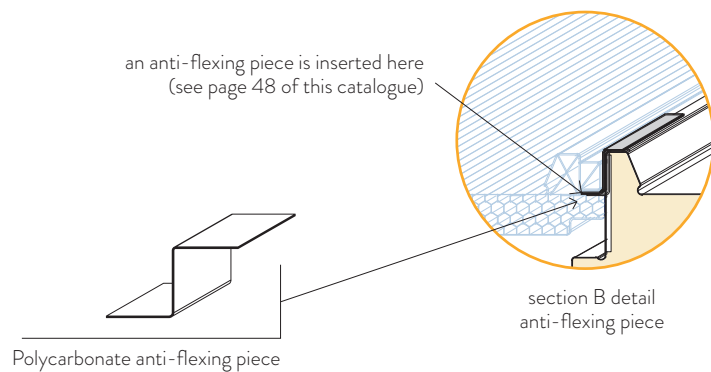
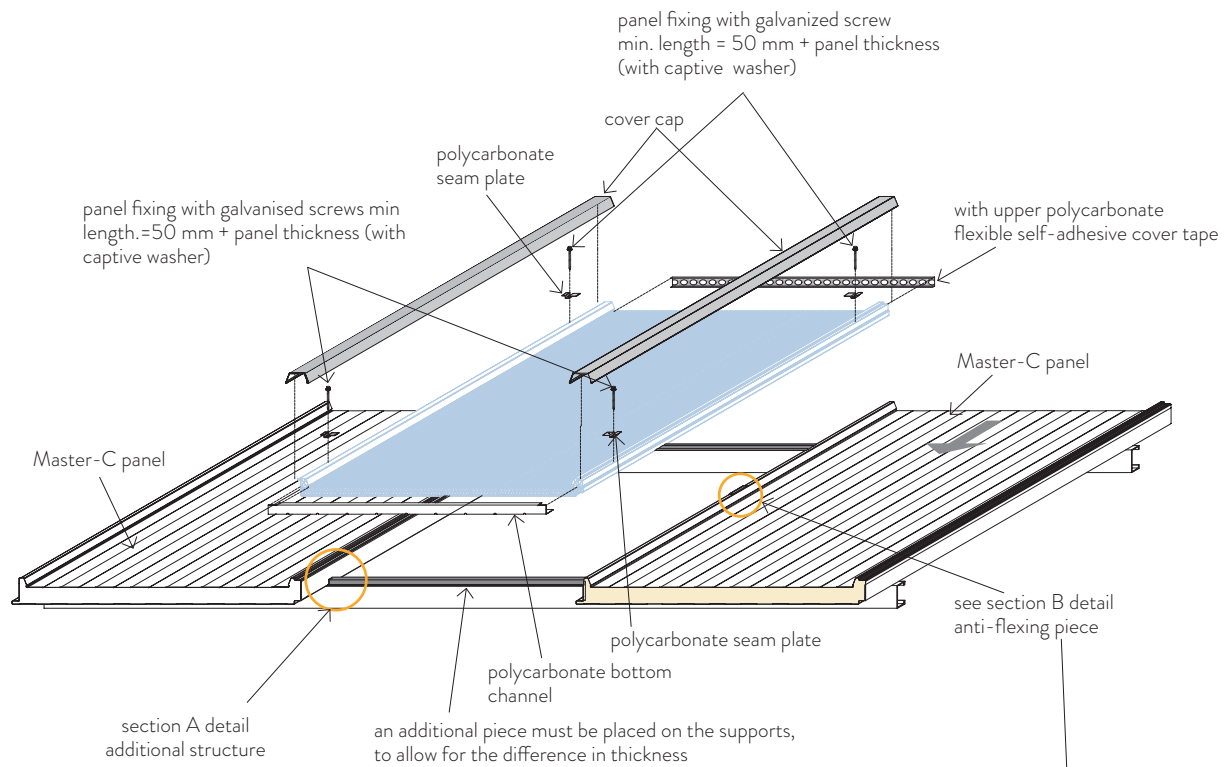
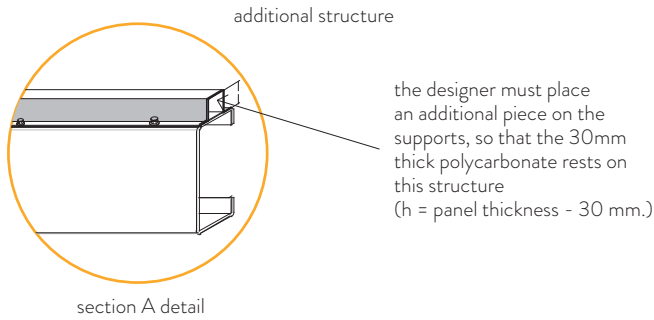
Technical assistance:

## POLYCARBONATE SOLUTION

FOR 30 mm MASTER-C.:

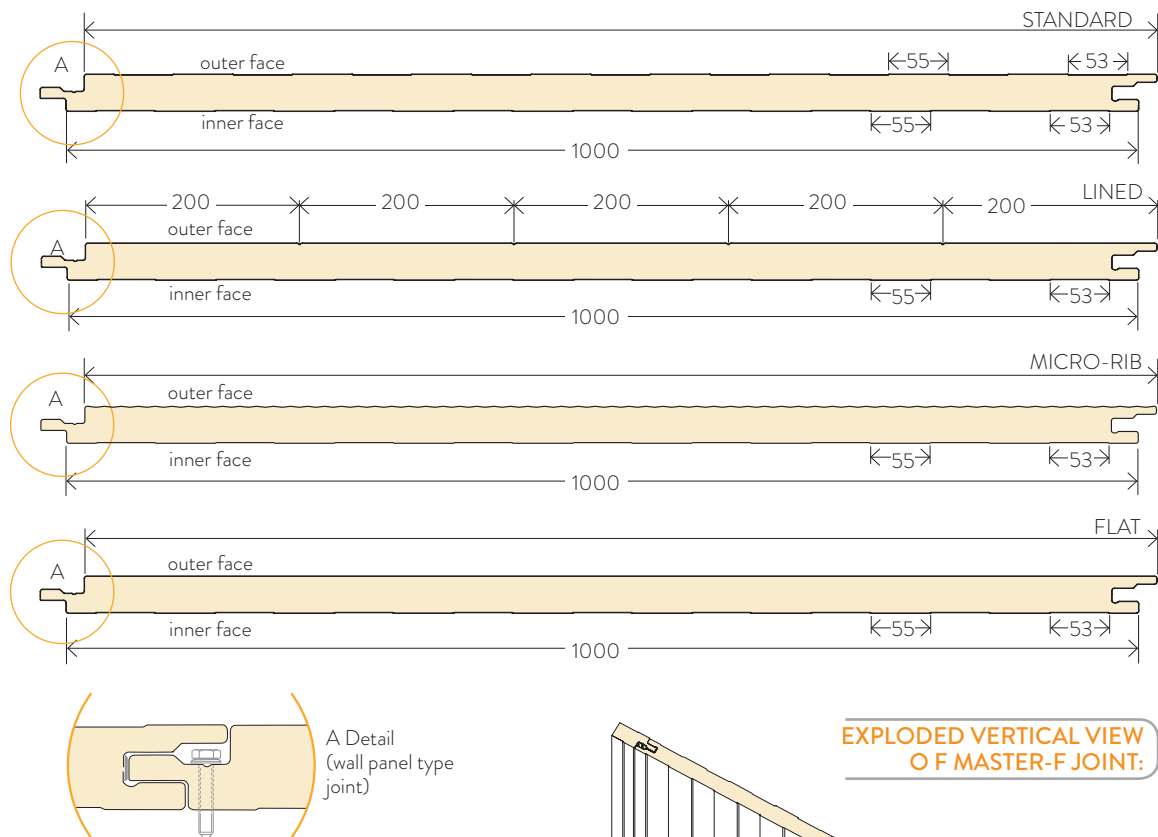


# FOR 40mm TO 120mm MASTER-C:

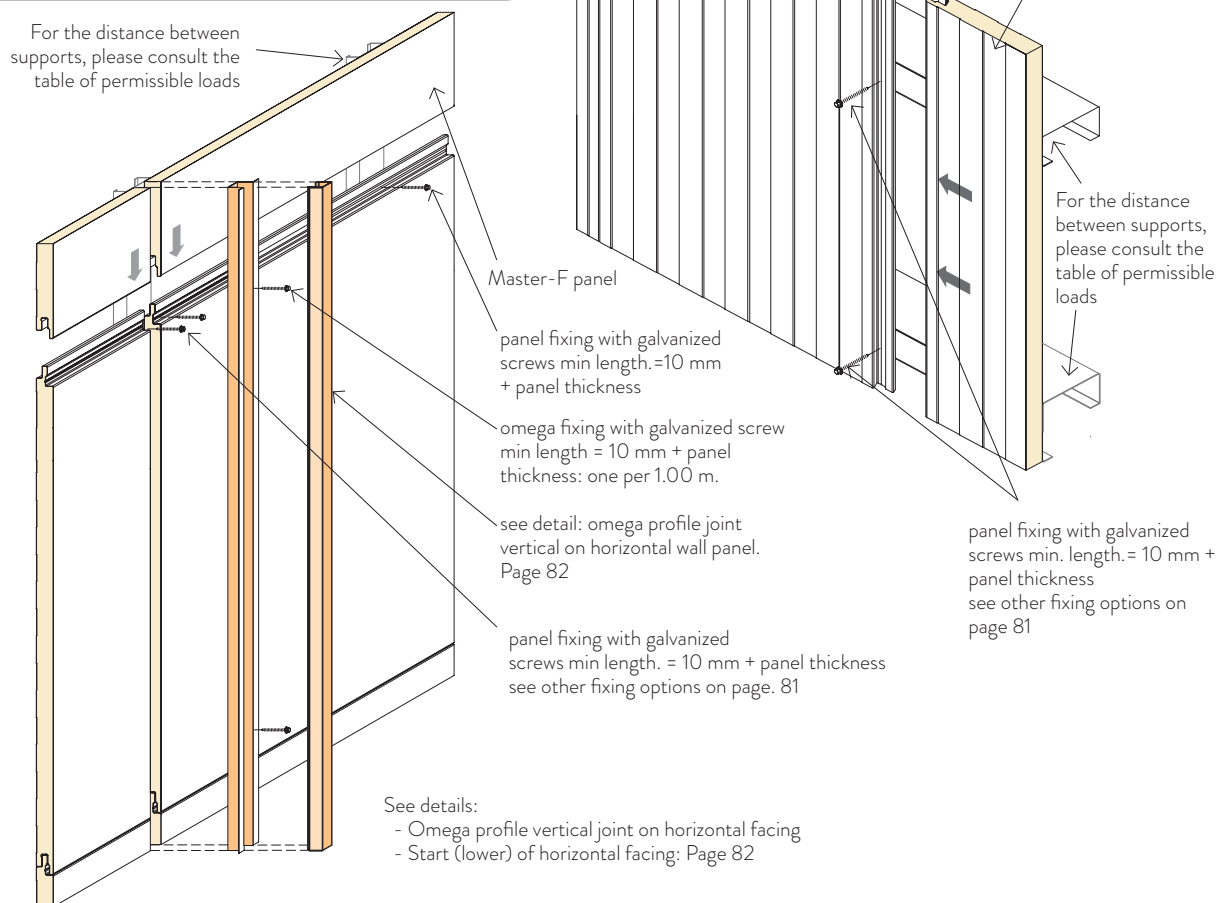


## Technical assistance:

## MASTER-F TYPE PROFILES AND JOINTS:

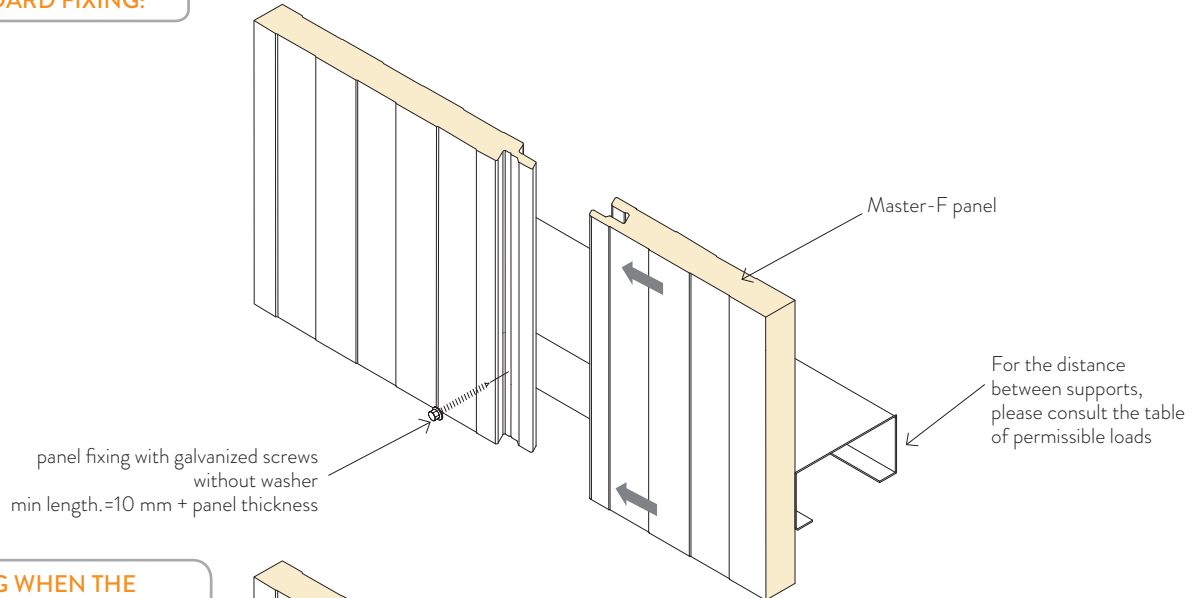


## EXPLODED HORIZONTAL VIEW OF MASTER-F JOINT:

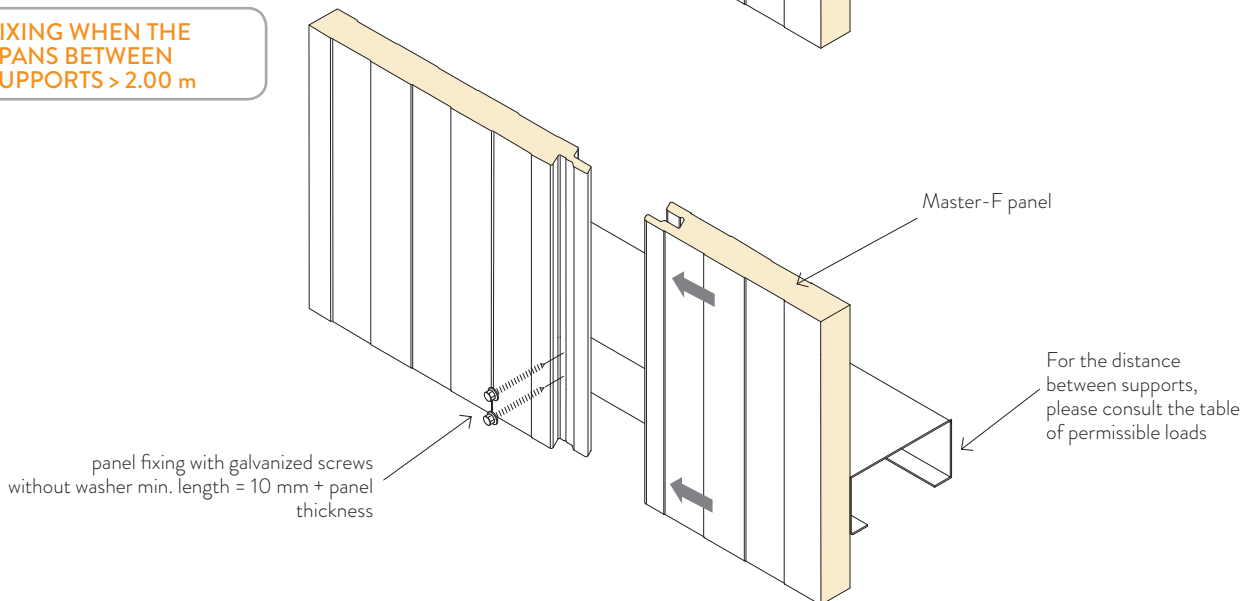


## MASTER-F FIXING OPTIONS:

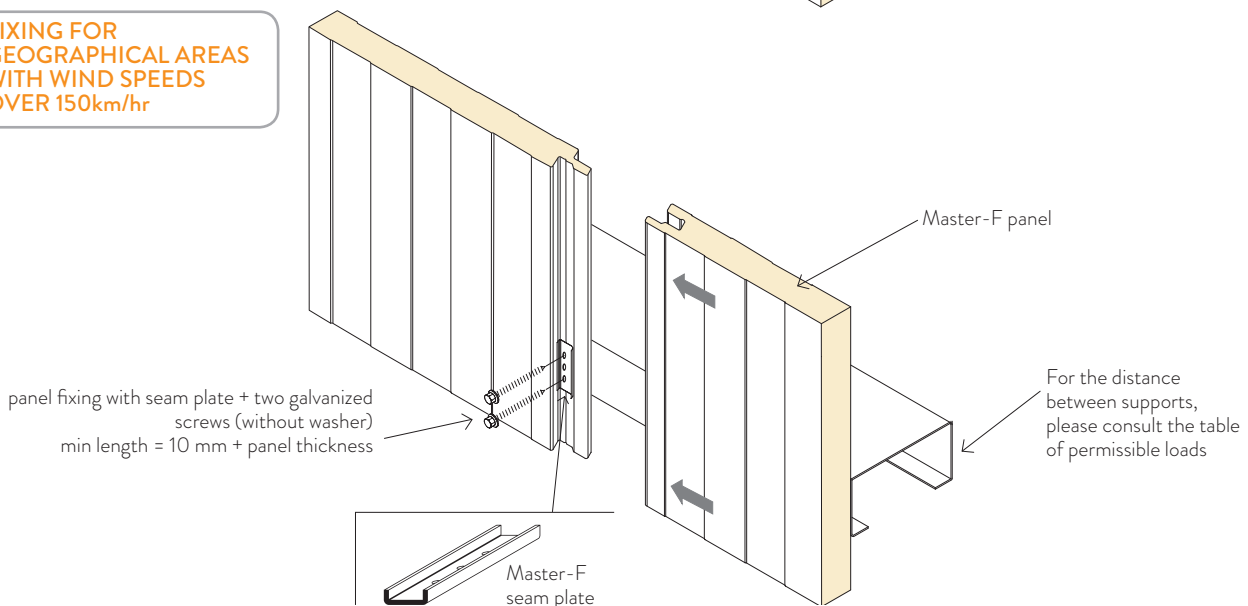
### STANDARD FIXING:



### FIXING WHEN THE SPANS BETWEEN SUPPORTS > 2.00 m



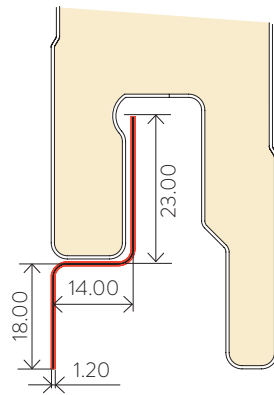
### FIXING FOR GEOGRAPHICAL AREAS WITH WIND SPEEDS OVER 150km/hr



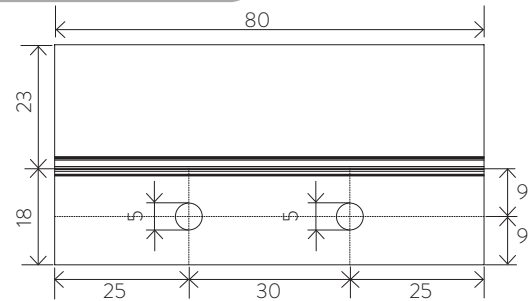
Technical assistance:

## START (LOWER) OF HORIZONTAL FACING:

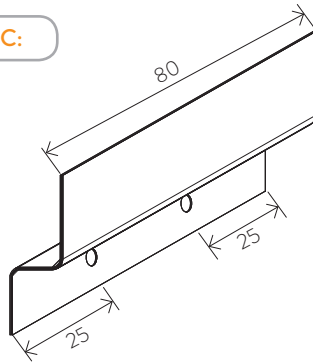
SECTION:



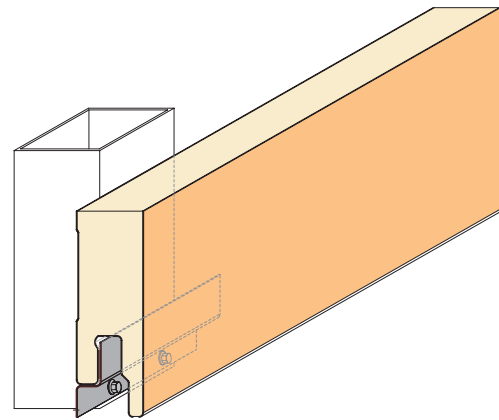
FRONT ELEVATION:



ISOMETRIC:

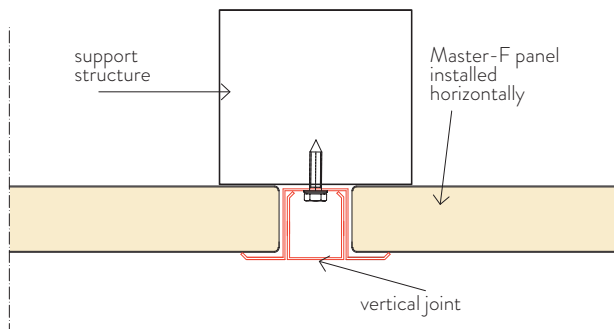


VIEW:

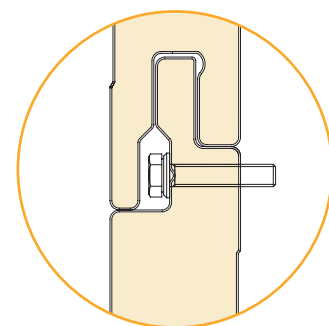
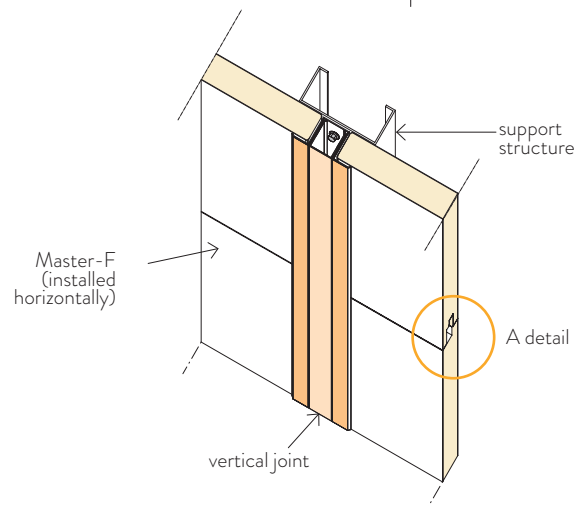


## OMEGA PROFILE VERTICAL ON HORIZONTAL FACING:

VIEW



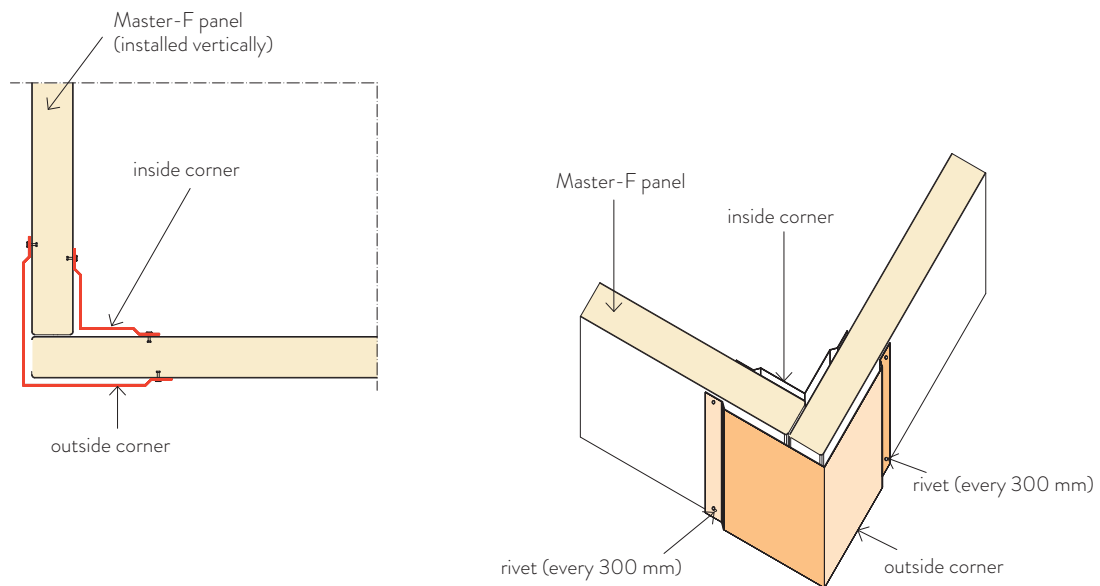
ISOMETRIC:



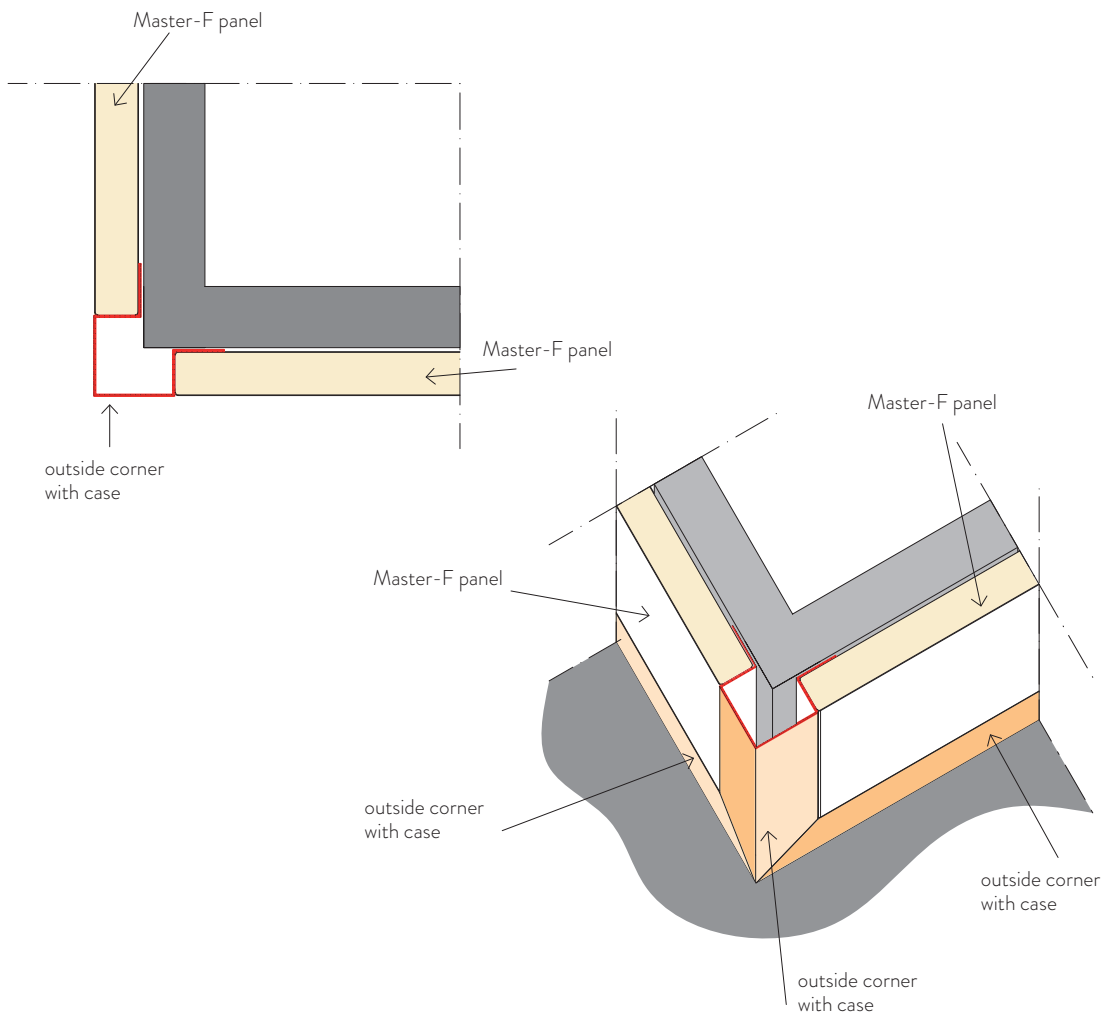
A detail  
(wall panel type joint)

A detail

## INNER/OUTER FACING CORNER:

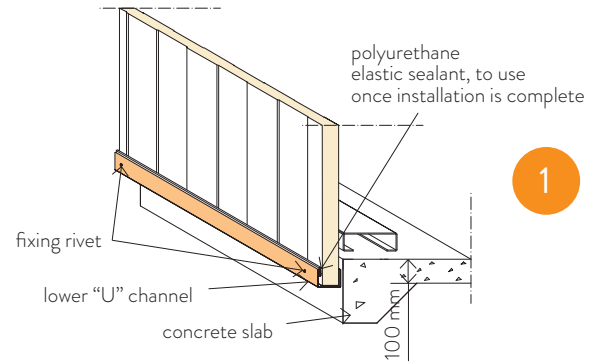
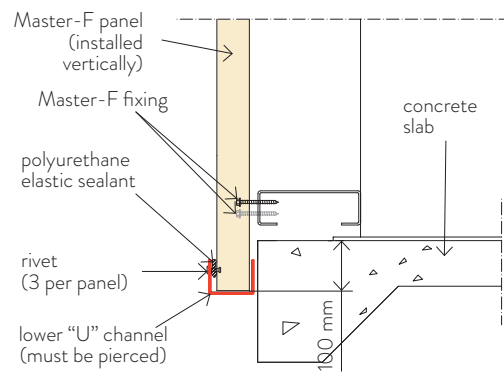


## OUTER CORNER WALL PANEL WITH CASE:

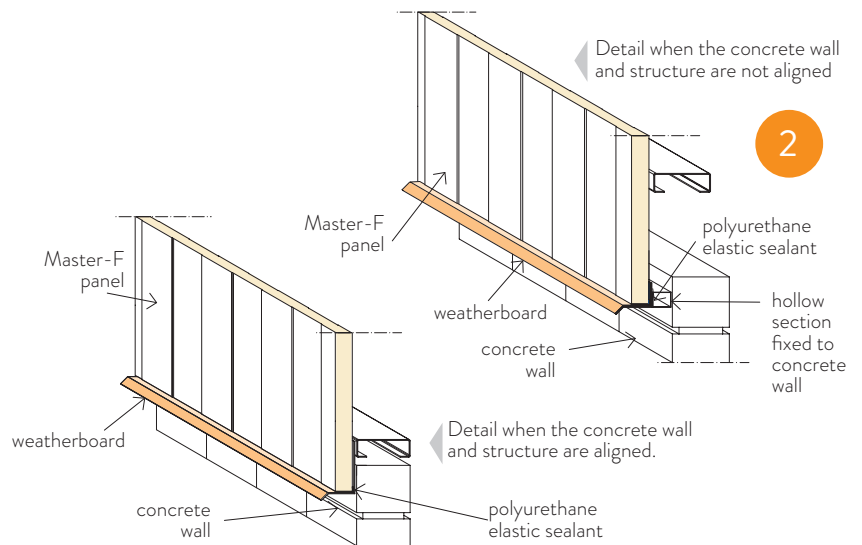
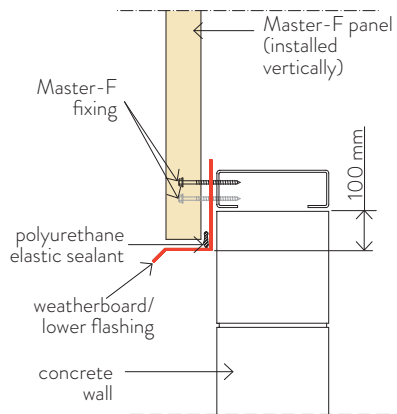


## Technical assistance:

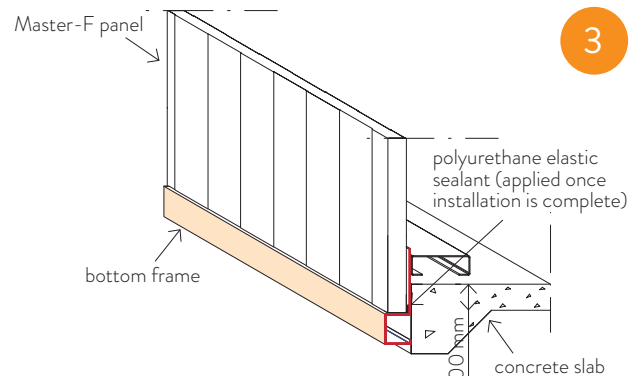
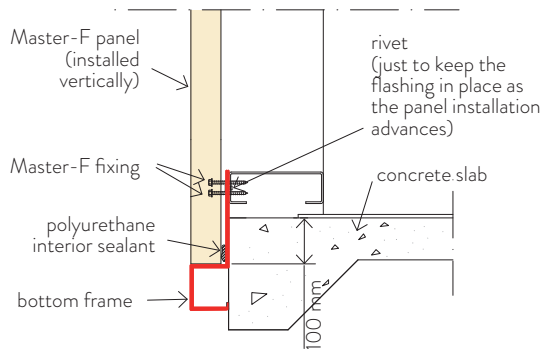
### LOWER VERTICAL FACING:



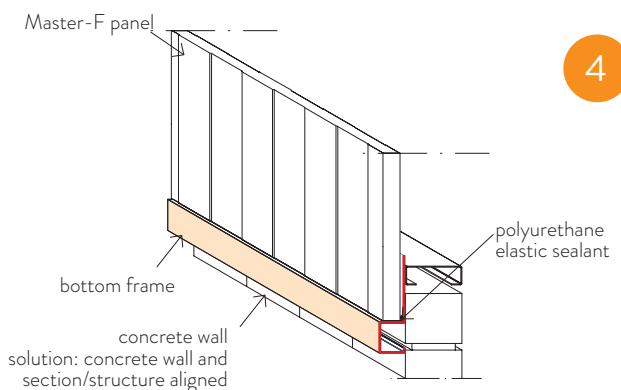
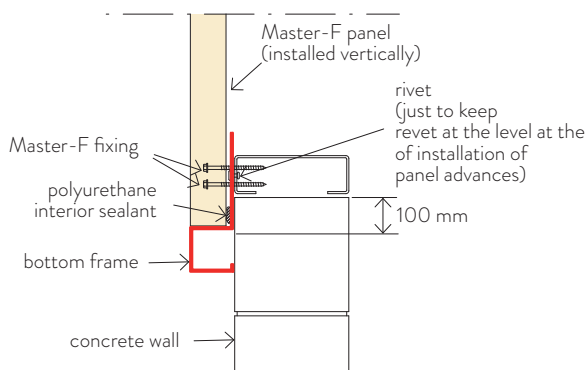
1



2

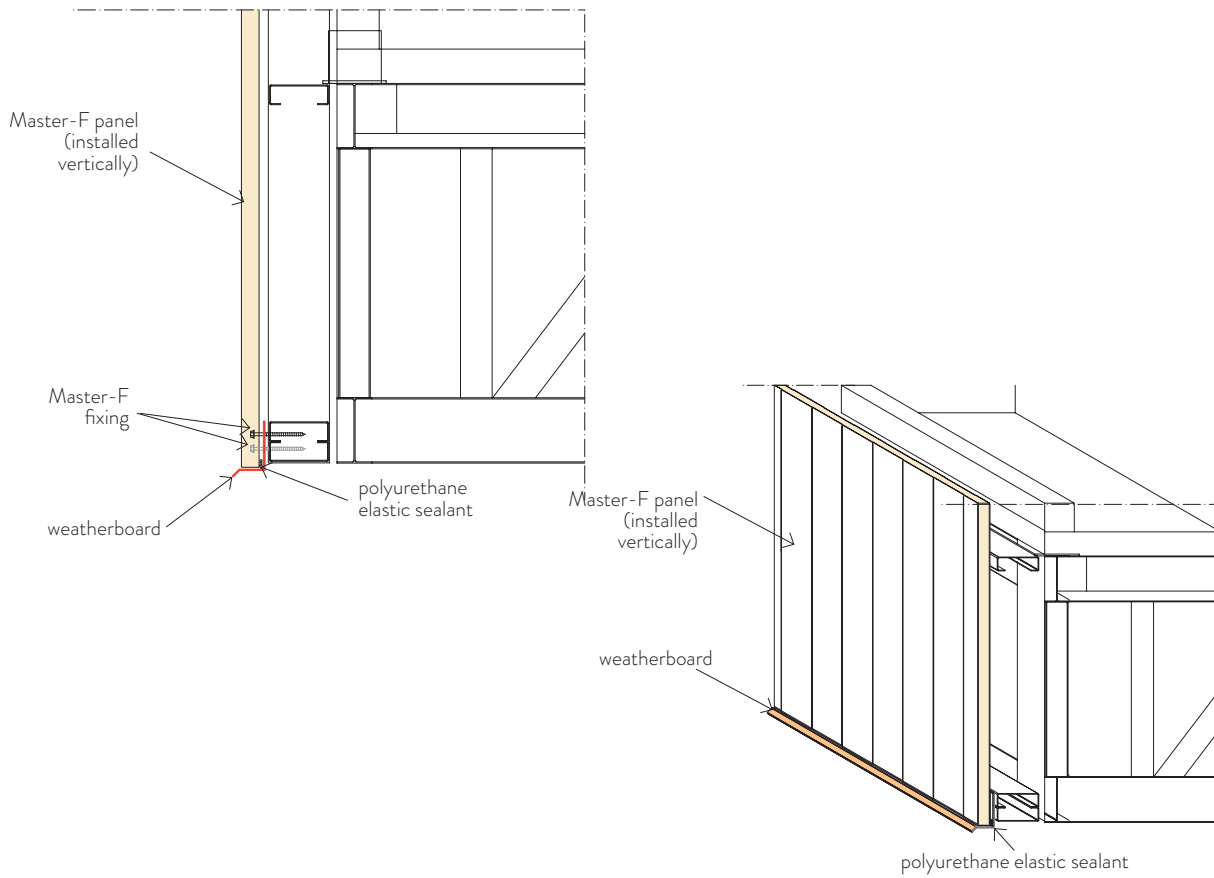


3

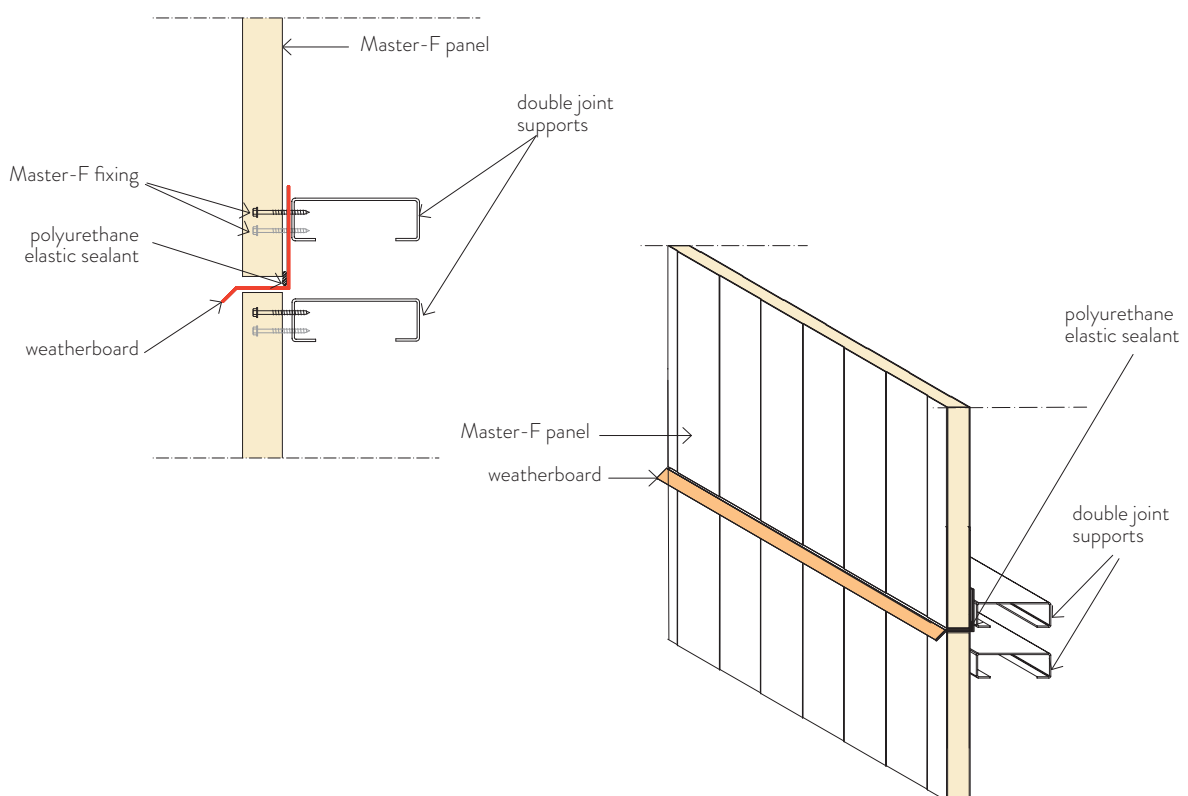


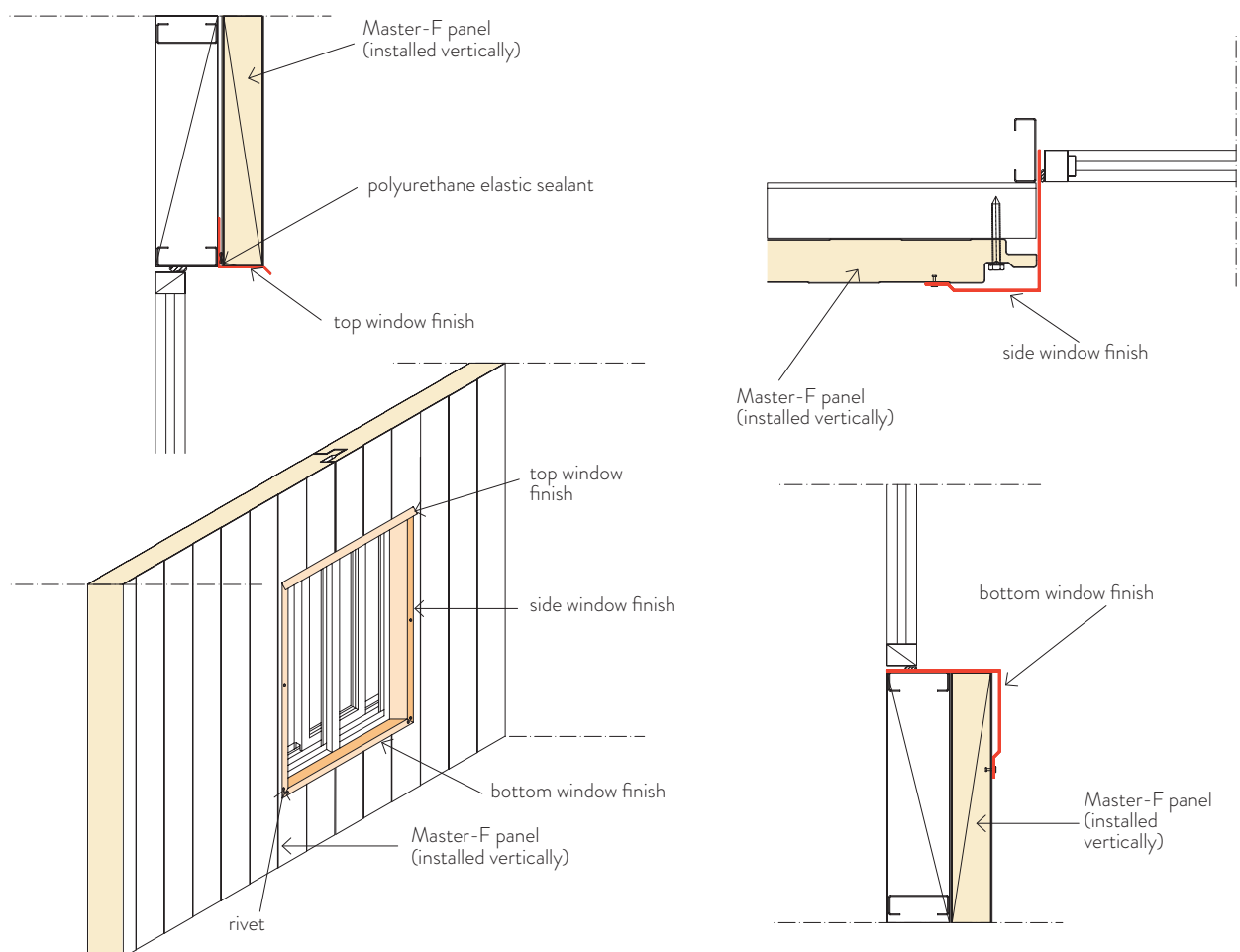
4

## UPPER VERTICAL FACING:

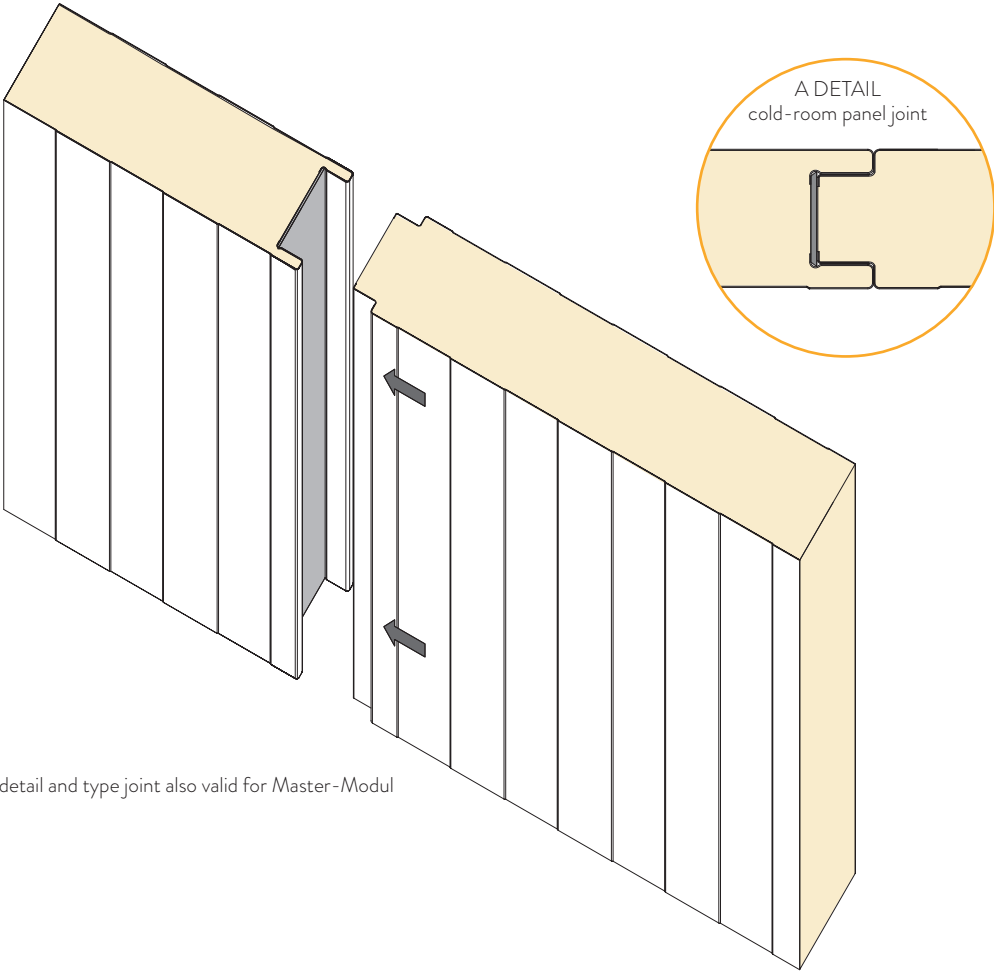
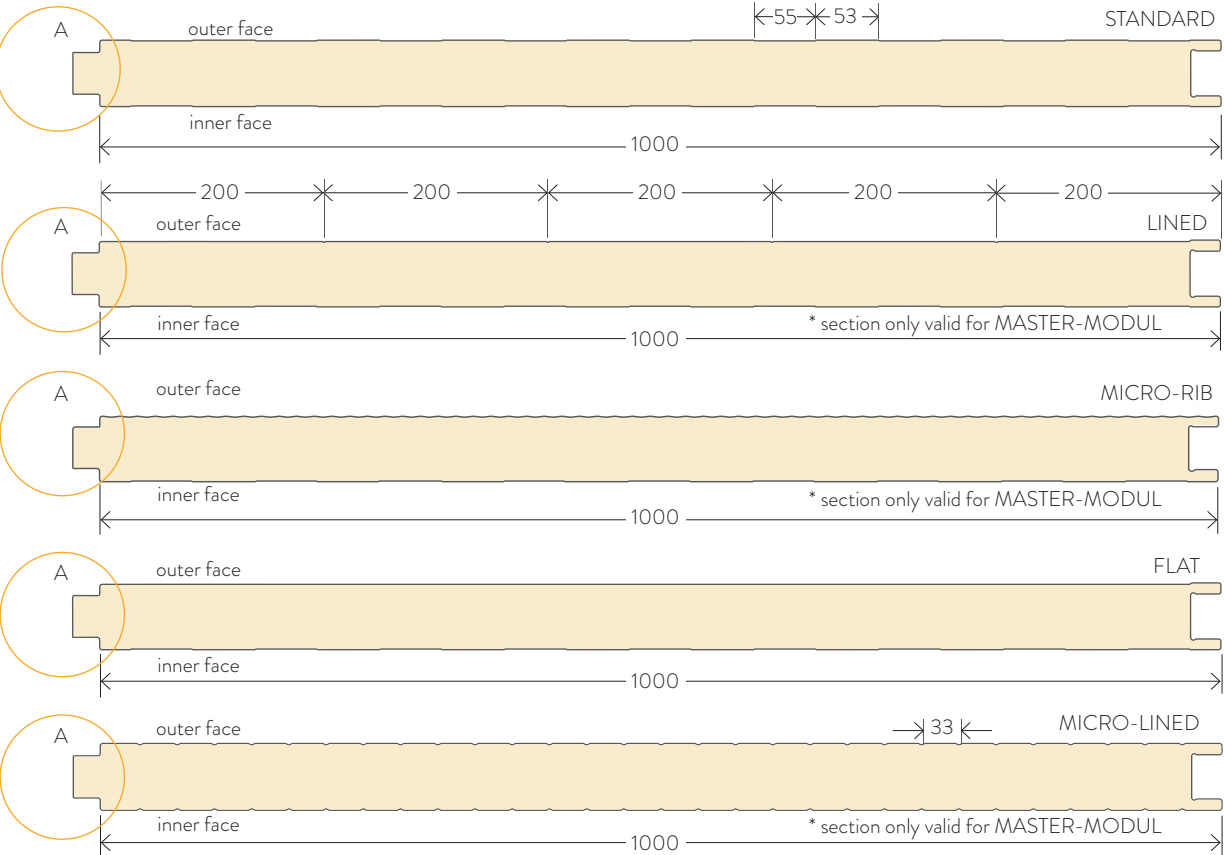


## TRANSVERSE JOINT ON VERTICAL FACING:





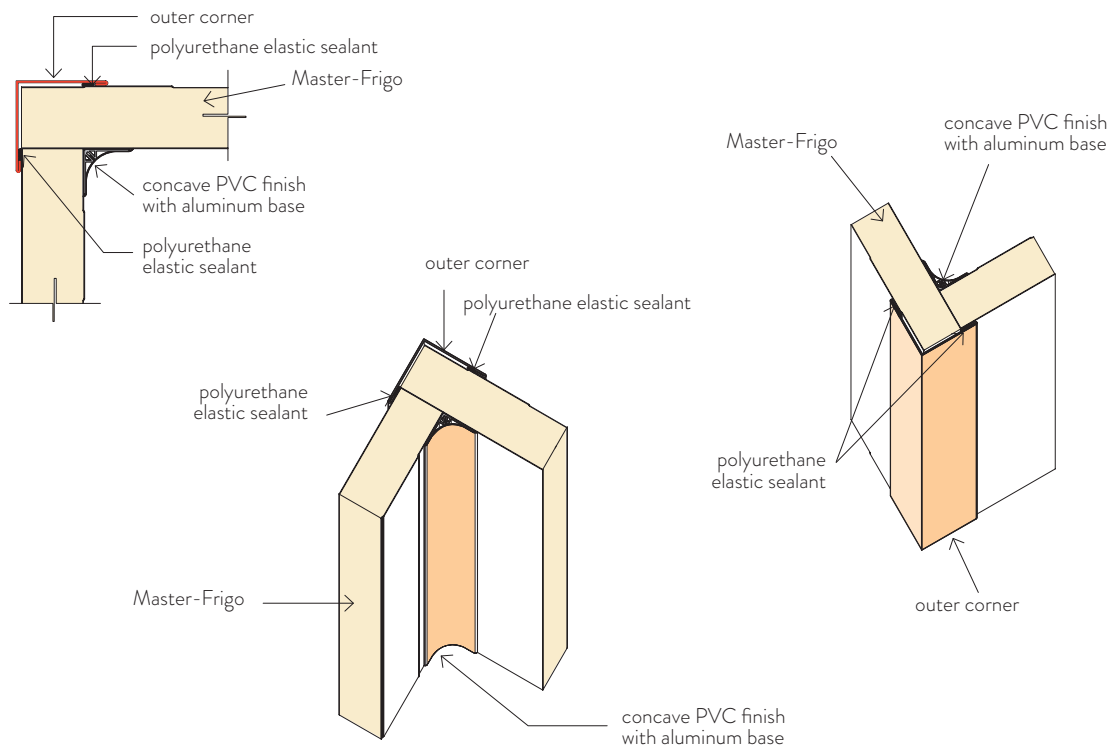
PROFILES AND TYPE MASTER-FRIGO/MODUL JOINT:



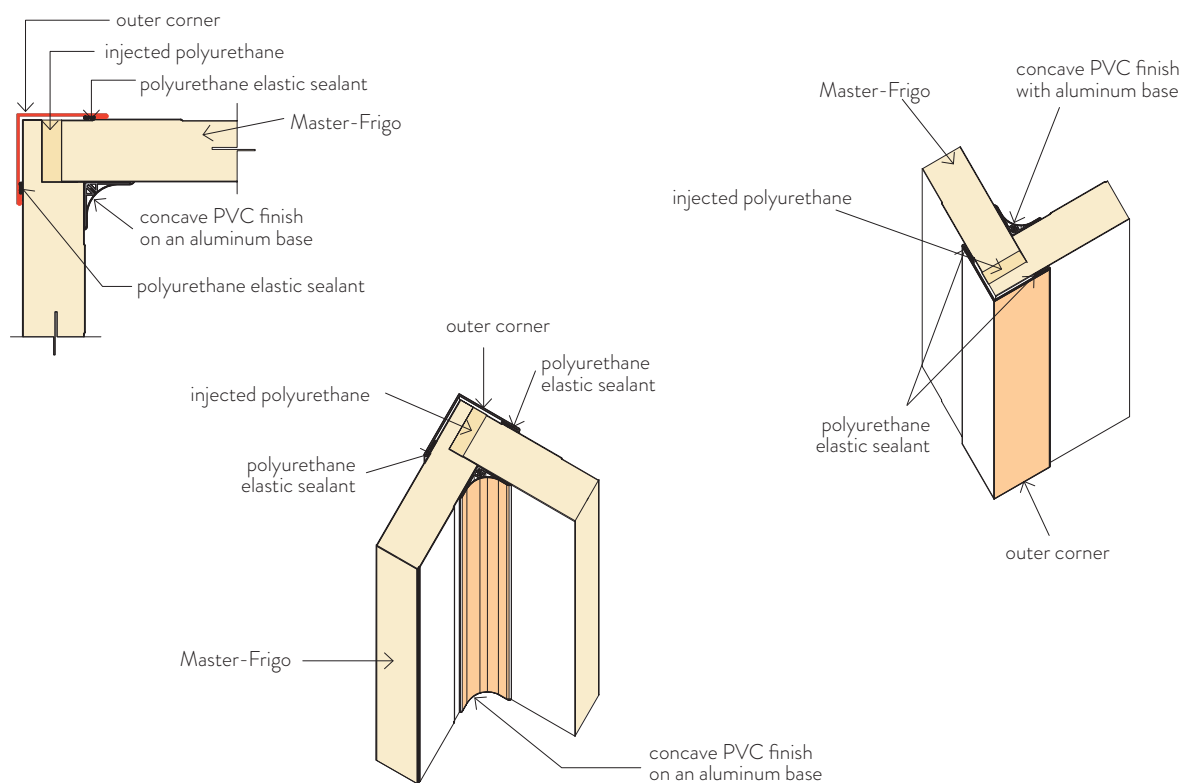
Profile detail and type joint also valid for Master-Modul

## Technical assistance:

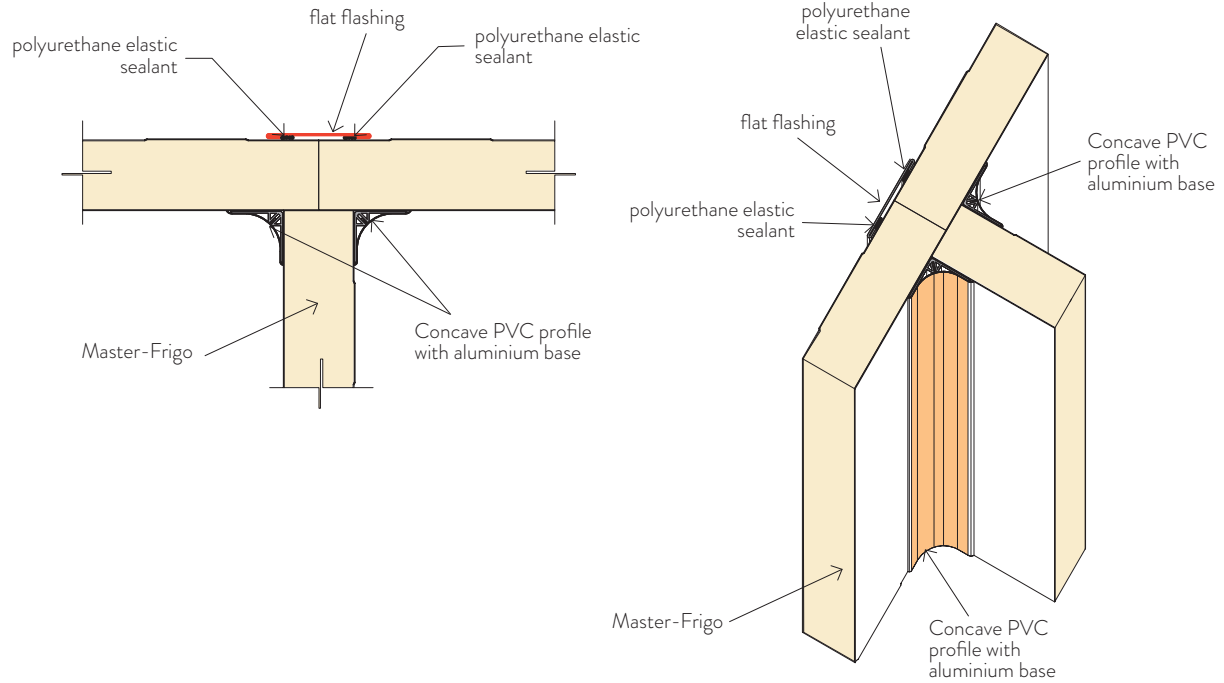
### COLD ROOM CORNER JOINT (ROOM TEMPERATURE $> 0^{\circ}\text{C}$ )



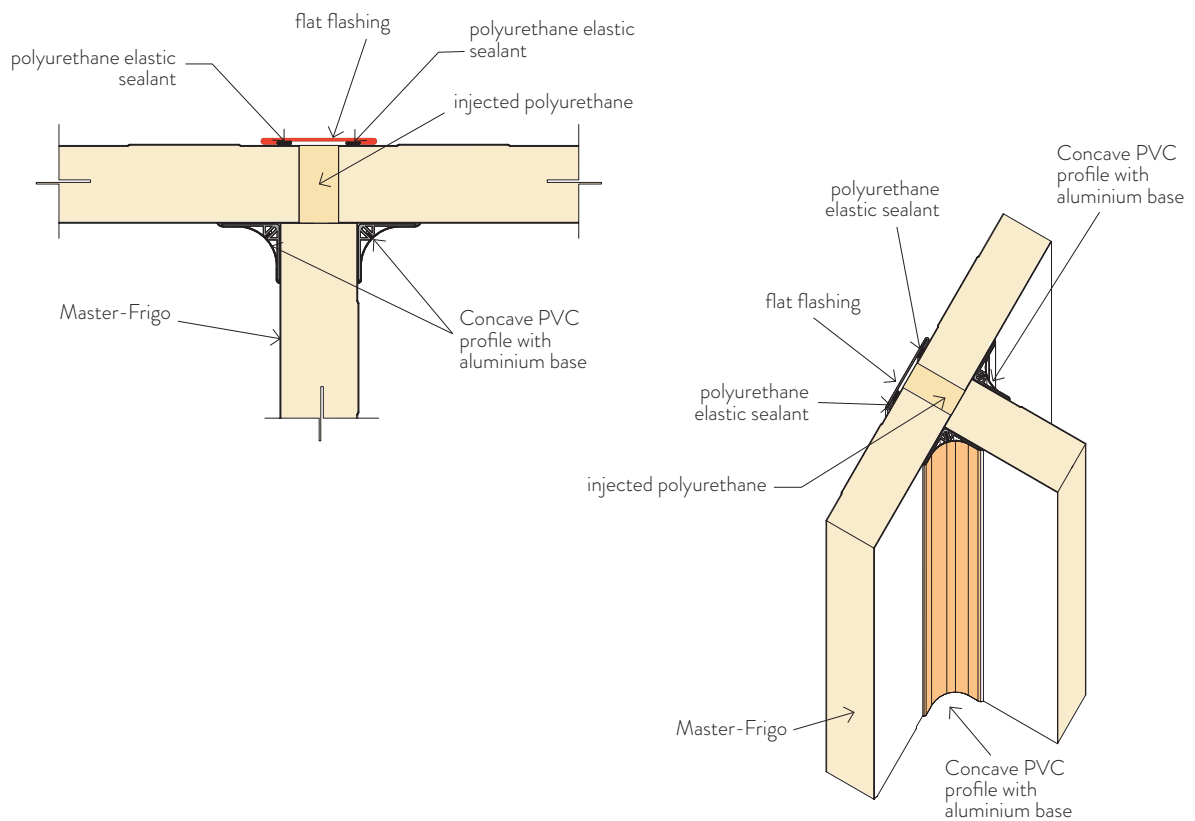
### COLD ROOM CORNER JOINT (ROOM TEMPERATURE $< 0^{\circ}\text{C}$ )



# DOUBLE CORNER COLD ROOM JOINT: (ROOM TEMPERATURE > 0 °C)

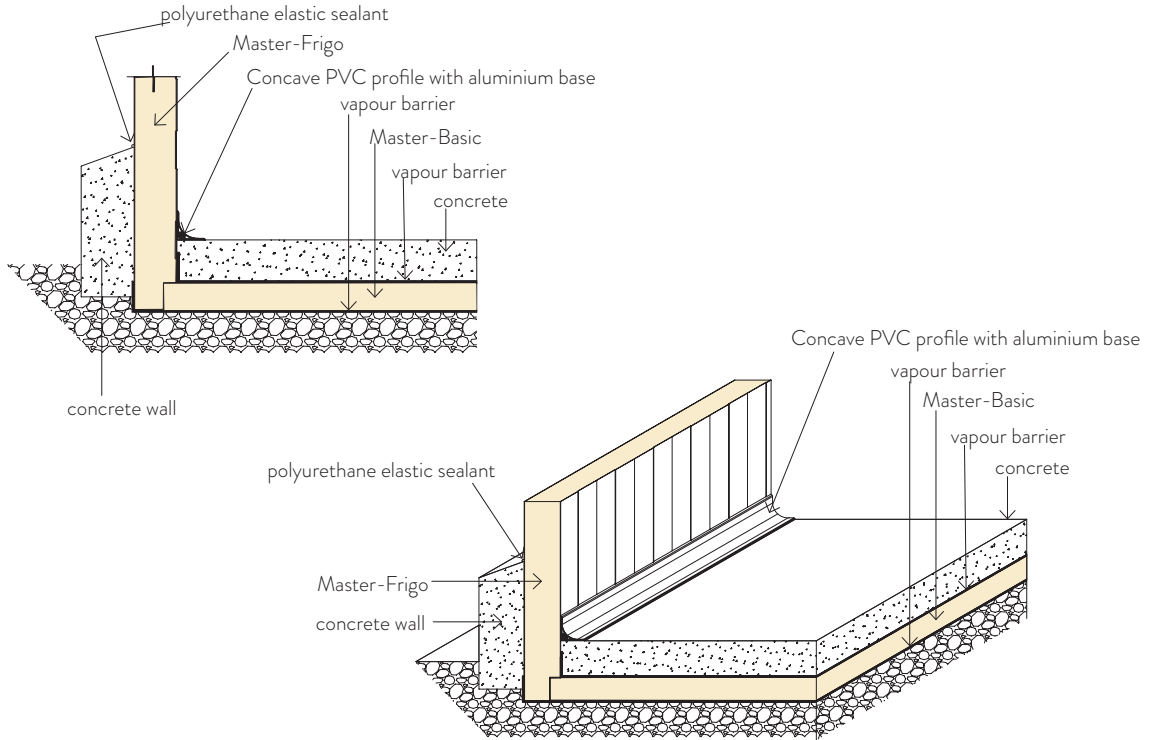


# DOUBLE CORNER COLD ROOM JOINT: (ROOM TEMPERATURE < 0 °C)

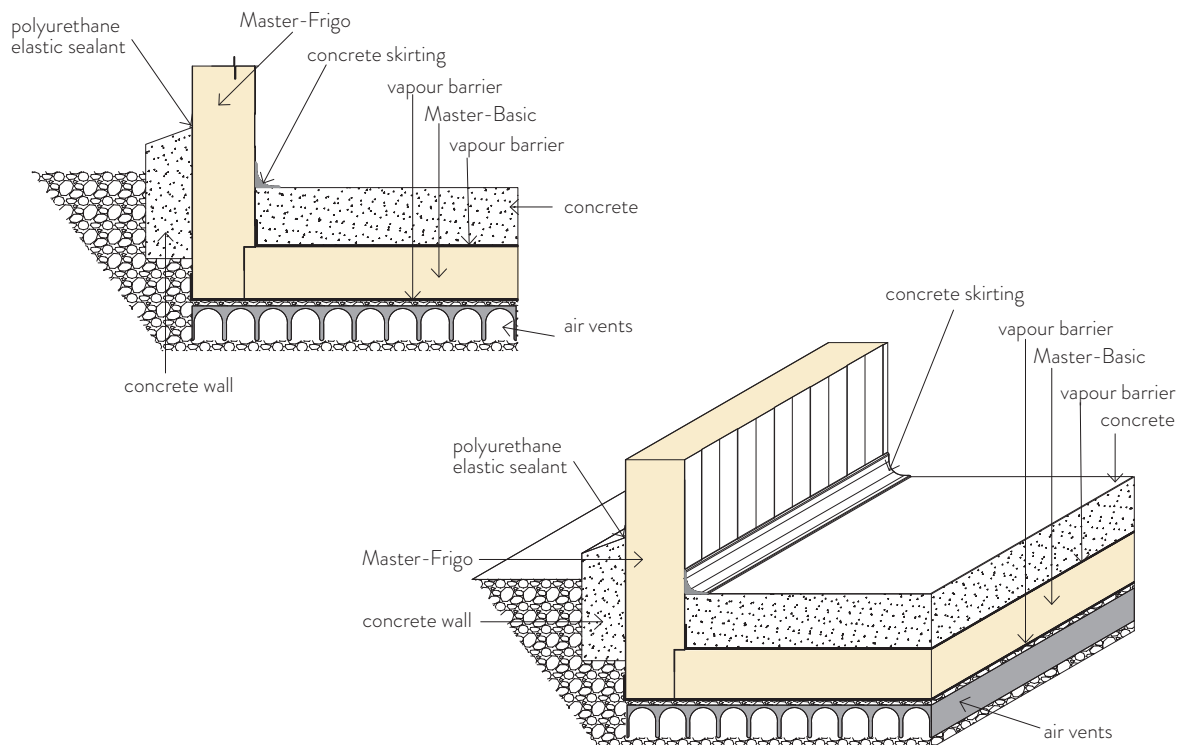


## Technical assistance:

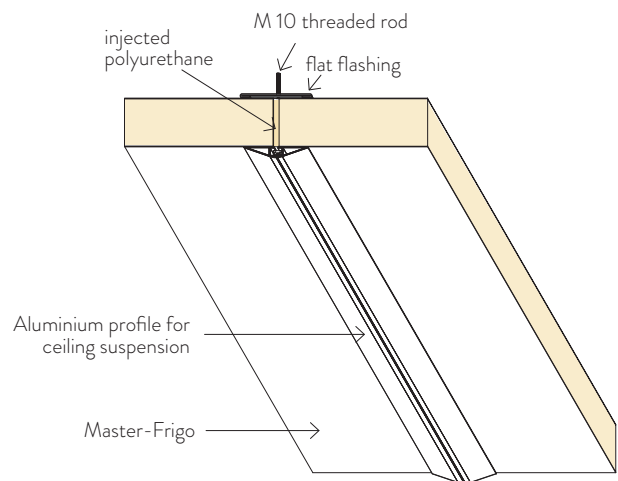
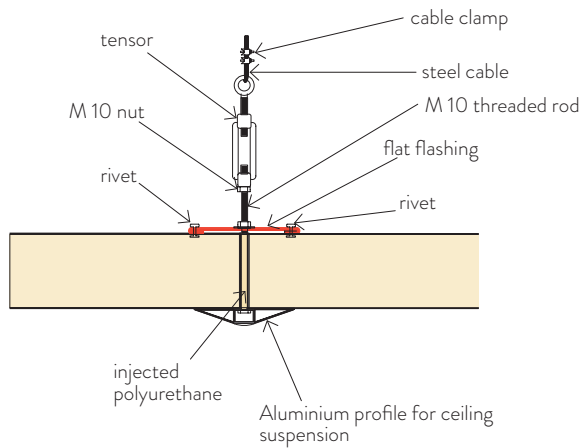
### COLD ROOM WALL-FLOOR JOINT: (ROOM TEMPERATURE $> 0^{\circ}\text{C}$ )



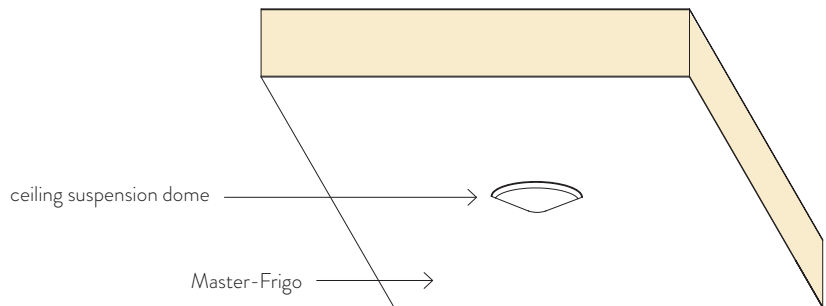
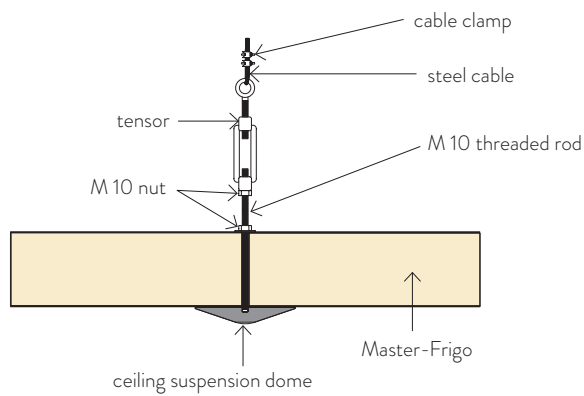
### COLD ROOM WALL-FLOOR JOINT: (ROOM TEMPERATURE $< 0^{\circ}\text{C}$ )



COLD-ROOM CEILING LONGITUDINAL SUSPENSION:



COLD ROOM CEILING POINT SUSPENSION:



# Fitting accessories:

## FIXING SCREWS:



### PROPERTIES

#### Self-drilling screw reduced tip

#### Self-drilling screw tip #3 . 5.5 mm

#### Self-drilling screw tip #3. 5.5 mm -6.3 mm

Material	AISI 1022 steel	AISI 1022 steel	AISI 1022 steel
Heat treatment	Annealing + tempering + hardening	Annealing + tempering + hardening	Annealing + tempering + hardening
Corrosion protection	galvanized	galvanized	delta yellow galvanized
Length (mm)	20	50 - 80 - 98	57 - 230
Diameter (mm)	6,3	5,5	5,5 lower - 6,3 upper
Drilling capacity	2,5 mm.	5,0 mm.	5,0 mm.
Surface hardness	450 HV	450 HV	450 HV
Core hardness	390 HV	390 HV	390 HV
Shear stress	9.500 N	10.000 N	10.000 N
Tensile stress	14.500 N	16.000 N	16.000 N



Self-drilling screw  
tip #3. 6.3 mm

Self-drilling screw  
tip #5. 5.5 mm

6.3 self-tapping screw

Concrete screw 6.5 mm

AISI 1022 steel

AISI 1022 steel

AISI 1018 steel

AISI 1022 steel

Annealing +  
tempering + hardening

Annealing +  
tempering + hardening

Annealing +  
tempering + hardening

Annealing +  
tempering + hardening

galvanized

delta yellow galvanized

delta galvanized

Blue Ruspert 1000 Hr C.N.S.

100 - 110 - 132 - 150 - 170

50 - 80 - 98

19 - 260

32 a 150

6,3

5,5

6,3

6,5

5,0 mm.

12,50 mm.

----

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Min 560 HV

Min 560 HV

450 HV

560 HV

240 - 425 HV

240 - 425 HV

390 HV

240 HV

11.500 N

11.000 N

10.780 N

11.500 N

18.000 N

18.000 N

14.000 N

18.000 N

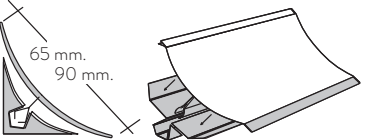
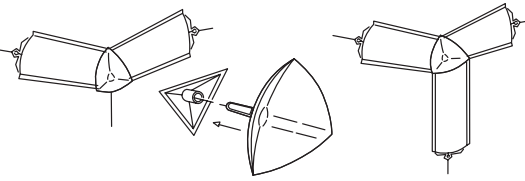
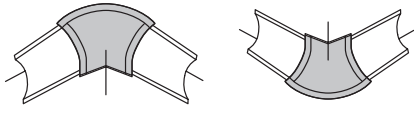
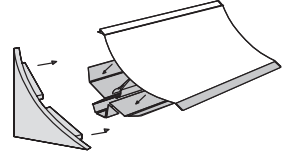
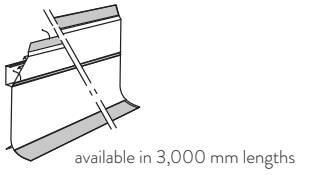
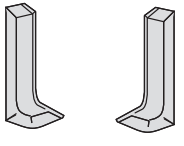
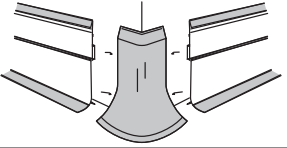
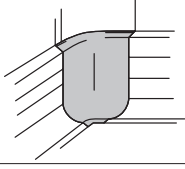
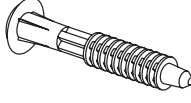
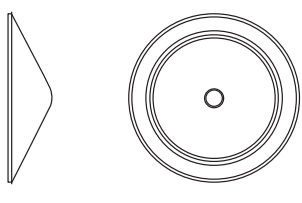
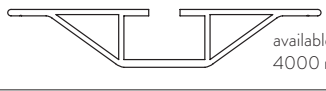
## Fitting accessories:

### COLD ROOM ACCESSORIES:

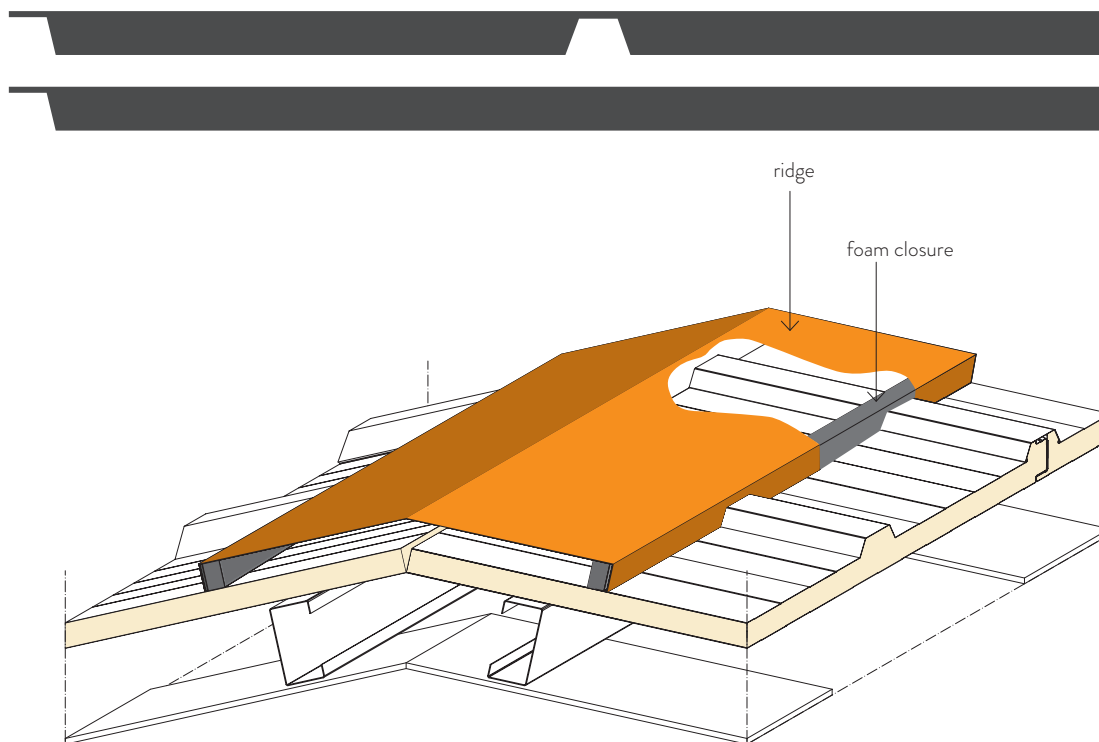
**Application:**  
Interior finishes for ceilings and walls for projects where a fungus- and bacteria-free hygienic environment is required or specified.

**General specifications:**

- Non-toxic
- High standards of hygiene-
- Non-porous
- Highly elastic
- Unaffected by fats, excretions or blood
- Recyclable material
- Resistant to chemical products, even alkalines
- Good behavior at low temperature.
- Easy installation
- No drying time
- No need for painting
- Pressure washable
- Waterproof
- Easy cleaning
- Non-stick surface
- Impact resistant
- Non corrosive
- Light

 <p>65 mm. 90 mm.</p> <p>available in 3,000 mm lengths</p>	<p>Concave profile 90 mm. Concave profile 65 mm. Aluminum base Narrow aluminum base PVC base</p>
	<p>3-way PVC corner 2-way PVC corner</p>
	<p>Corner angle joint</p>
	<p>End cover</p>
 <p>available in 3,000 mm lengths</p>	<p>PVC skirting</p>
	<p>Skirting terminal (Right and left)</p>
	<p>PVC Skirting corner-piece</p>
	<p>PVC skirting corner-piece</p>
	<p>Plastic plug</p>
	<p>Ceiling suspension dome</p>
 <p>available in pieces of 4000 mm in length</p>	<p>Aluminium profile for ceiling suspension (price includes one M10 nut per 1m)</p>

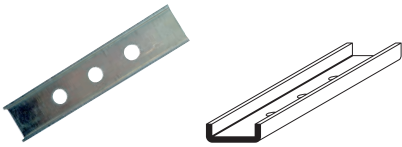
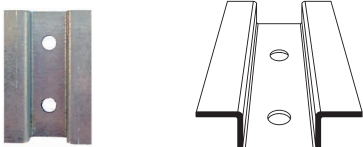





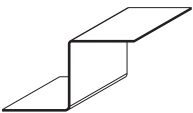



## FOAM CLOSURE FOR 2G AND 3G PROFILES

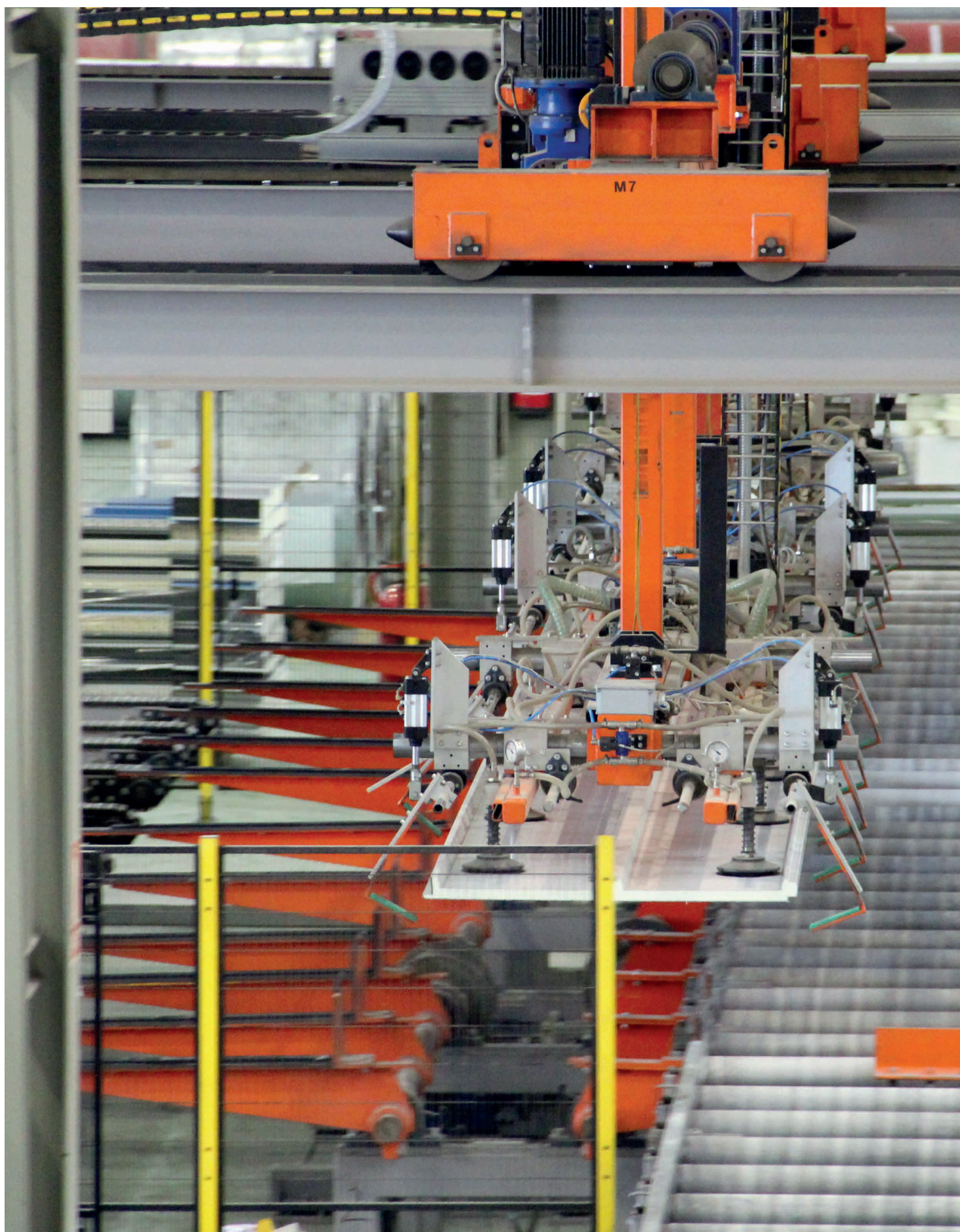


PROPERTIES	CHARACTERISTICS	STANDARD
<b>Material</b>	<b>cross-linked polythene</b>	
Apparent density	30+ -3kg/m <sup>3</sup>	ISO 845
Ultimate elongation	76 min. %	ISO 1926
Tensile strength	127 min. Kpa	ISO 1926
Yield strength 10%	25+ -6 Kpa	ISO 844
Yield strength 25%	41+ -6 Kpa	ISO 844
Yield strength 50%	98+ -8 Kpa	ISO 844
Permanent compression 25% 22 h., 23 °C at 1/2 hour	17 max. %	ISO 1856-B
Permanent compression 25% 22 h. 23 °C a las 24 horas	8 max. %	ISO 1856-B
Water absorption at 28 days	1 max. %	DIN 53428
Hardness	38 min. Shore <sup>oo</sup>	
Operating temperature	-80 a 100 °C	INTERNAL
Cell size	0,3 mm máx.	INTERNAL
Reaction to Fire	100 máx. mm./min>10 mm.	FMVSS Nr 302
<b>Material</b>	<b>Double-sided adhesive mesh</b>	-----
Support	Multidirectional polyester mesh	-----
Grams of adhesive	80 grams /m <sup>2</sup>	-----
Adhesive strength Afera 4001	N/25 mm. 16 +- 1%	-----
Temperature resistance	-20 a 100 °C	-----

## Fitting accessories:

### OTHER FITTING ACCESSORIES:

<b>Application:</b> Seam plate Master-F (see detail on page 81)		Master-F seam plate
Seam plate Master-C (see detail on page 65)		Master-C seam plate
Seam plate polycarbonate (see detail on page 78)		Polycarbonate seam plate
Sealant (ver detalles en págs. 64-91)		Polyurethane sealant
Sealant (see detail on page 64-91)		Neutral silicone
Sealant Alternative product for polyurethane sealant		Butyl rubber
Additional structural element for polycarbonate installation (see detail on page 79)		Omega supplement
polycarbonate anti-flexing piece (see detail on page 79)		Anti-flex piece
Polycarbonate bottom flashing (see detail on page 78)		Polycarbonate bottom flashing
Polycarbonate top finish (see detail on page 78)		Polycarbonate strip
Wall panel starter clip installed horizontally (see detail on page 82)		Wall panel starter clip





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