masterpanel

MASTER PANEL S.L. was created in 2007, based on our group's 35 years experience in the metal structure sector. We specialise in the manufacture 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.

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 a suitable response at technical, aesthetic and functional levels, while maintaining respect for the environment.

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 checking of each production batch in our own laboratory.

Master Panel. 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 where the heat produced evaporates the very low thermal conductivity pentane 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 pre-painted 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.

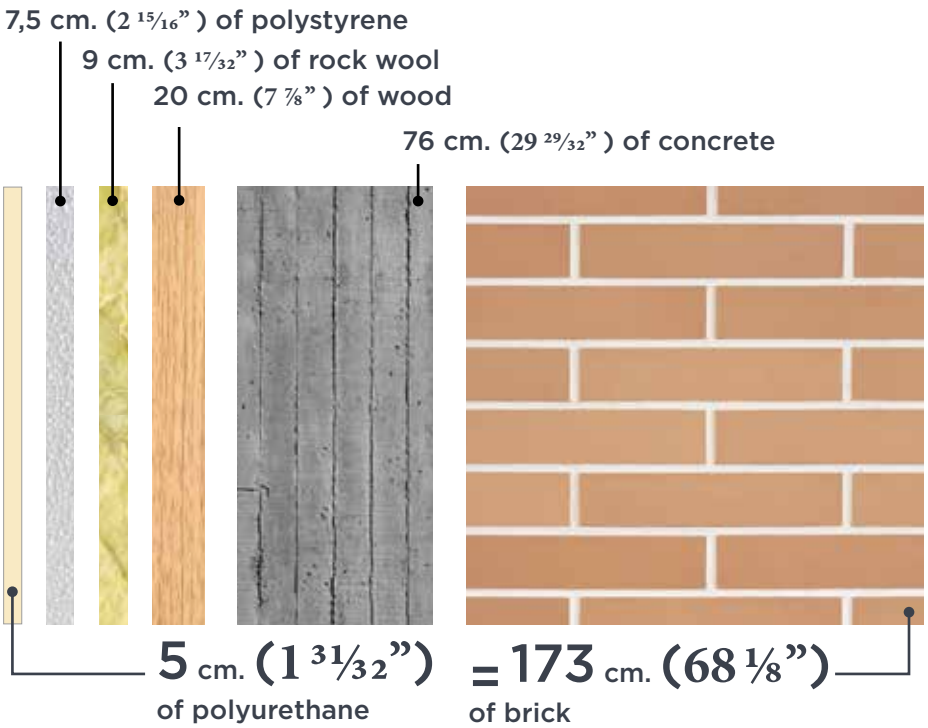
Properties of a **Master** sandwich panel.

Thermal insulation

In construction, the thermal performance of the façade, 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. The insulating core of **Master** panels has the lowest coefficient of thermal conductivity available.

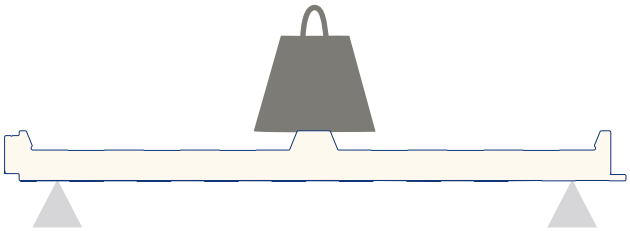
As you can see in the illustration below, insulating with **Master** panels achieves the same "U" value as other materials with considerably less thickness.

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, regardless of the outside temperature.



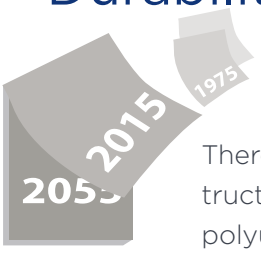
Mechanical properties

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".**



Design of the metal faces: supports tensile and compressive strength + **Polyurethane interior: It supports the shear stress** = **with a single material: mechanical properties similar to other structural elements**

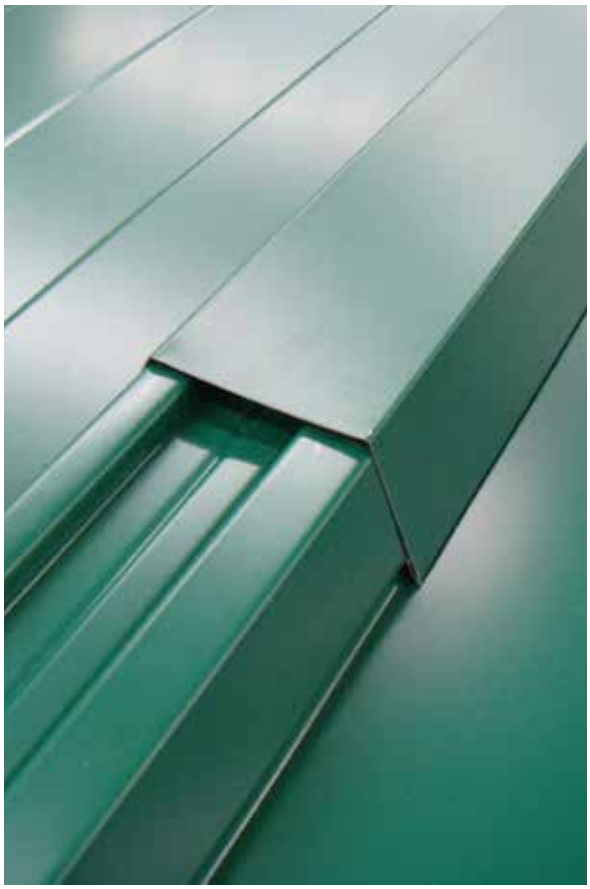
Durability



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.

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.



Acoustic insulation

As regards soundproofing, a polyurethane sandwich panel of medium thickness can achieve acoustic insulation of 25-35 decibels, and complementing the panel with another product can achieve still 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. Moreover, the waste products from panel production can be utilised, since the steel sheet can be recycled and the rigid polyurethane foam can be incinerated and use made of the energy generated. 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: leads to energy savings and reduced CO^2 emissions.

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

Minimum thickness: minimizes the footprint of the building and use.

Reduces the size of the structure: lower environmental impact of the building structure.

Transport: being very light and thin, the insulation requires less delivery transportation, giving a low environmental impact.

Our waste products: 95% of our waste products are recyclable.

Ozone friendly: Our Processes and Products are CFC and HCFC free

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 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.
- **Incineration.** 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.

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 highlight the Polyisocyanurate foams **(PIR)** which are modified polyurethane foams whose molecules have a network structure that gives them fire-resisting properties, helping to resist the spread of fire.

Our panels are manufactured using this new generation of PIR foams characterized by their reaction to fire. They can be called self-extinguishing foams since they reduces fire propagation and smoke emissions, and do not melt or drip when heated

We have tested our **PIR foam** panels according to **ASTM-E84**, which measures frame spread and smoke development, obtaining the following results:

- Frame spread index: 20
- Smoke development index: 300

Intertek

Report number
102643891SAT-001A

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

Project No. 102643891SAT-001A
Master Panel SL

July 11, 2016
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ABSTRACT

Specimen I. D.	"Master-C 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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Joseph Martinez
Technician III — July 11, 2016

Reviewed and approved:

Servando Romo
Project Manager — July 11, 2016

Rick Curkeet, PE
Chief Engineer-Building & Hearth Products — July 11, 2016

WISCONSIN 07/12/16 FREDERICK D. CURKEET E-25509 BLACK EARTH WI PROFESSIONAL ENGINEER

Intertek

Quality.

At **Master Panel** we have implemented the most stringent controls in our production process to guarantee our customers a high standard of quality, as ensured by our ISO9001: 2015 certification, and supplemented by exhaustive tests carried out on every production batch in our own laboratory.

All our products bear the CE mark, which lets our clients know that our panels comply with current legislation.

TÜV NORD

CERTIFICATE

Management system as per
ISO 9001 : 2015

In accordance with TÜV NORD CERT procedures, it is hereby certified that

Master Panel S.L.
Camino de Toledo s/n, Pol. Ind. La Cárdena
45221 Esquivias (Toledo)
Spain

applies a management system in line with the above standard for the following scope

Continuous Production of Polyurethane / Polyisocyanurate Insulated Metal Panels.

Certificate Registration N°: 44/10017510007
Audit Report N°: 170244

Valid from: 05.06.2017
Valid until: 04.06.2020

Certification Body
at TÜV NORD CERT GmbH

Madrid, 05.06.2017

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH Langemarckstraße 20 28033 Essen www.tuev-nord-cert.com

DAkkS

TABLE OF DIMENSIONAL TOLERANCES

Dimension	Maximum tolerance	
Panel thickness	E ≤ 100 mm (3 15/16")	± 2 mm (3/32")
	E ≥ 100 mm (3 15/16")	± 2 %
Deviation from flatness	Deviation from flatness 1,5 mm (1/16")	
Length of the panel	L ≤ 3 m (9' 10⅛")	± 5 mm (13/64")
	L > 3 m (9' 10⅛")	± 10 mm (13/32")
Useable width of the panel	± 2 mm (3/32")	
Non-squareness	6 mm (¼")	
Deviation from straightness	1 mm (1/32") per metre, maximum 5 mm (13/64")	
Warp	2 mm (3/32") per metre of length, maximum 10 mm (13/32")	
	10 mm (13/32") in width of the panel	
Profiling design	± 3 mm (⅛")	

Florida Approved

We have obtained the FL approval (#FL 21699) for our Master-C roofing panel.

CREEK
TECHNICAL SERVICES, LLC

Certificate of Authorization No. 29824
17530 Edinburgh Dr
Tampa, FL 33647
(813) 480-3421

EVALUATION REPORT — FLORIDA BUILDING CODE 5th EDITION (2014)

Issued February 9, 2017

Manufacturer: MASTER PANEL S.L.
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Camino de Toledo
45221 Esquivias, Toledo, Spain
(+34) 925 51 99 28
http://masterpanel.es/en

Manufacturing: Toledo, Spain

Quality Assurance: UL LLC (QUA9625)

SCOPE

Category: Roofing
Subcategory: Metal Roofing
Code Sections: 1504.3.2
Properties: Wind Resistance, Physical Properties

REFERENCES

Entity	Report No.	Standard	Year
PRI Construction Materials Technologies (TST5675)	MPNL-006-03-01	ASTM E 8	2013
PRI Construction Materials Technologies (TST5675)	MPNL-006-03-01	FM 4471	1995
		ASTM E 1592	2005
Intertek Testing Services NA Inc. (TST1195)	102941991GA7-001A	ASTM E 84	2009

PRODUCT DESCRIPTION

Master-C Roofing Panel (three ribs)

Profile: 32 mm (1.3 inch) ribs; 1,000 mm (39.37 inch) coverage
Description: Structural roof panel composed of steel skins laminated to a minimum 40mm (1.6 inch) polyisocyanurate foam core (min. 2.3 pcf); through-fastened over steel purlins; Side lap enclosed in snap-together sap
Material: Min. 26 ga. ASTM A792 or ASTM A653; F_y = min. 50 ksi. Shall conform with FBC Section 1507.4.3

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This evaluation report is provided for State of Florida product approval under Rule 61G20-3. The manufacturer shall notify CREEK Technical Services, LLC of any product changes or quality assurance changes throughout the duration for which this report is valid. This evaluation report does not express nor imply warranty, installation, recommended use, or other product attributes that are not specifically addressed herein.

Wind uplift

Testing was completed as described in **ASTM E 1592-01 & 05** and **FM4471** (1995) to determine the uplift resistance of Master-C roofing panels.

Master-C roofing panels was tested over 16 ga. purlins with the following results:

	Passing pressure (psf)	Passing pressure (psf)	
Installed at 1 feet span	+ 60	- 270	Complies with FM Windstorm classif 1-270
Installed at 4 feet span	+50	- 75	Complies with FM Windstorm classif 1-75

Permeability

Testing was completed as described in **ASTM E2140-01** (2009) to determine the resistance to water penetration.

Test was passed with no observed water leaks while maintaining a 6” head of water for 6h continuously.

Strength

Testing was completed as described in **ASTM E8/ E 8M-130** to determine the tensile strength of steel skins used in Master-C roofing panel.

Steel skins complied with Fy > 50 ksi

Technical assistance

Technical assistance:
Recommendations

Master Panel 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 must always be packed with polystyrene blocks at the base to prevent damage **(fig. 1).**
- Panels must never be stacked to a height greater than 2.70 m. (8' 10'') (including polystyrene blocks, accessories, cover caps, trims, etc) **(fig. 2).**

Transport:

By truck:

In containers:

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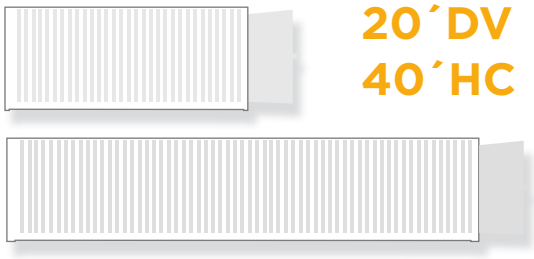

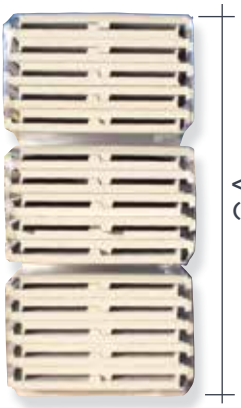

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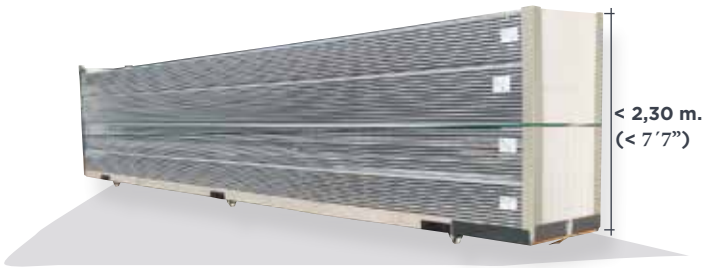
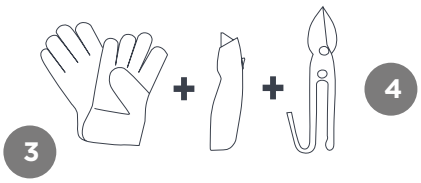


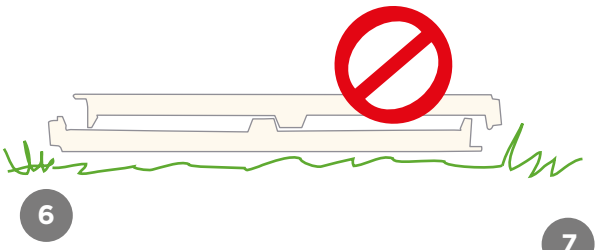
Handling

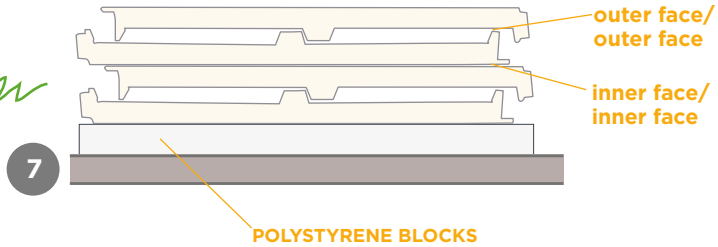
Manual unloading:

- Staff who handle panels should always wear safety gloves **(fig. 3).**
- Appropriate tools should be used to remove the panel packaging. **(fig. 4).**
- The storage area must be defined in advance. Always store on a firm, level surface free of debris (see recommendations for storage). Remember that panels should not be stacked to a height exceeding 2.70 m. (8' 10'').
- Always move panels one by one. Panels should always be moved by lifting them, they should never be dragged, as the panel edges can cause damage to the next panel.
- Panels should always be moved while held in a vertical position. Auxiliary slings may be used where necessary **(fig. 5).**
- Packs of panels should never be stacked directly on earth, vegetation or bare ground **(fig. 6).**
- Panels can be stacked on site by placing one panel over another, facing each other **(fig. 7)**

handling:







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. **(fig. 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.

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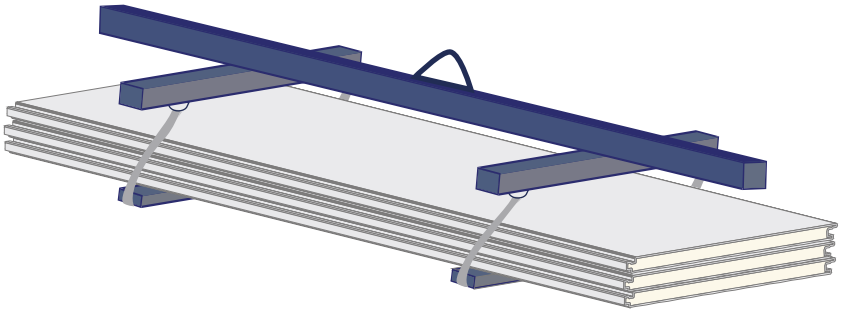

Storage.

Short term:

- Packs and panels should never be stacked directly in contact with bare earth or vegetation **(fig. 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 film plastic packaging so as to allow the escape of any water that may accidentally enter. Packages must be covered with waterproof materials, tarpaulin or plastic **(fig. 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 **(fig. 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.

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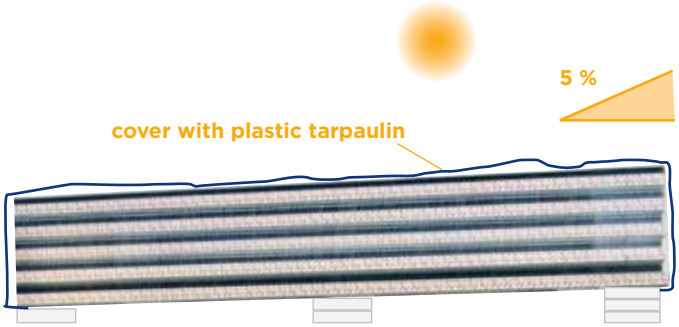

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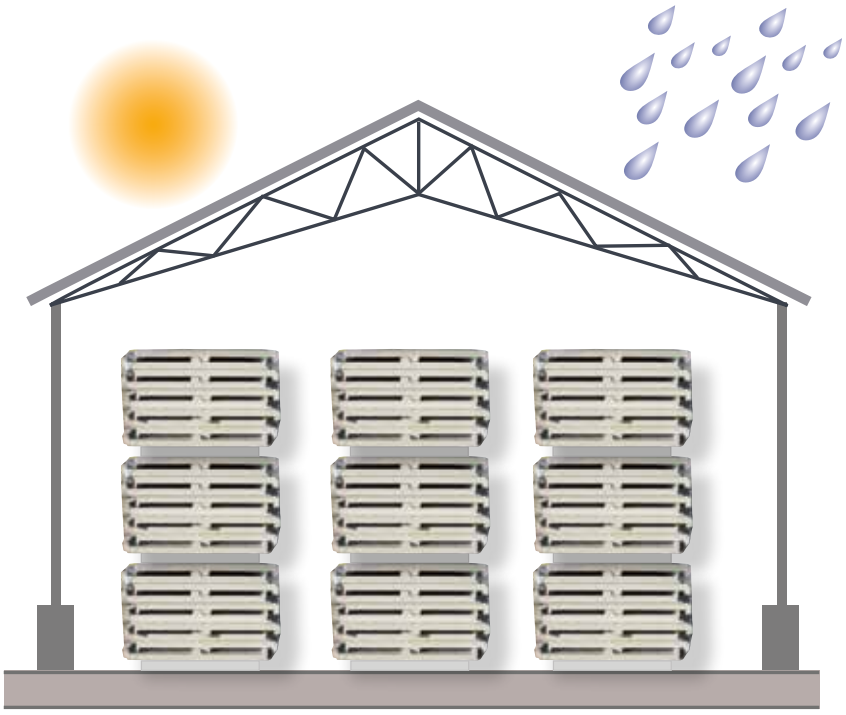
Long term:

- 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 **(fig. 11).**
- Remove the stretch plastic packing from the panels to prevent the build-up of moisture or condensation inside the pack.



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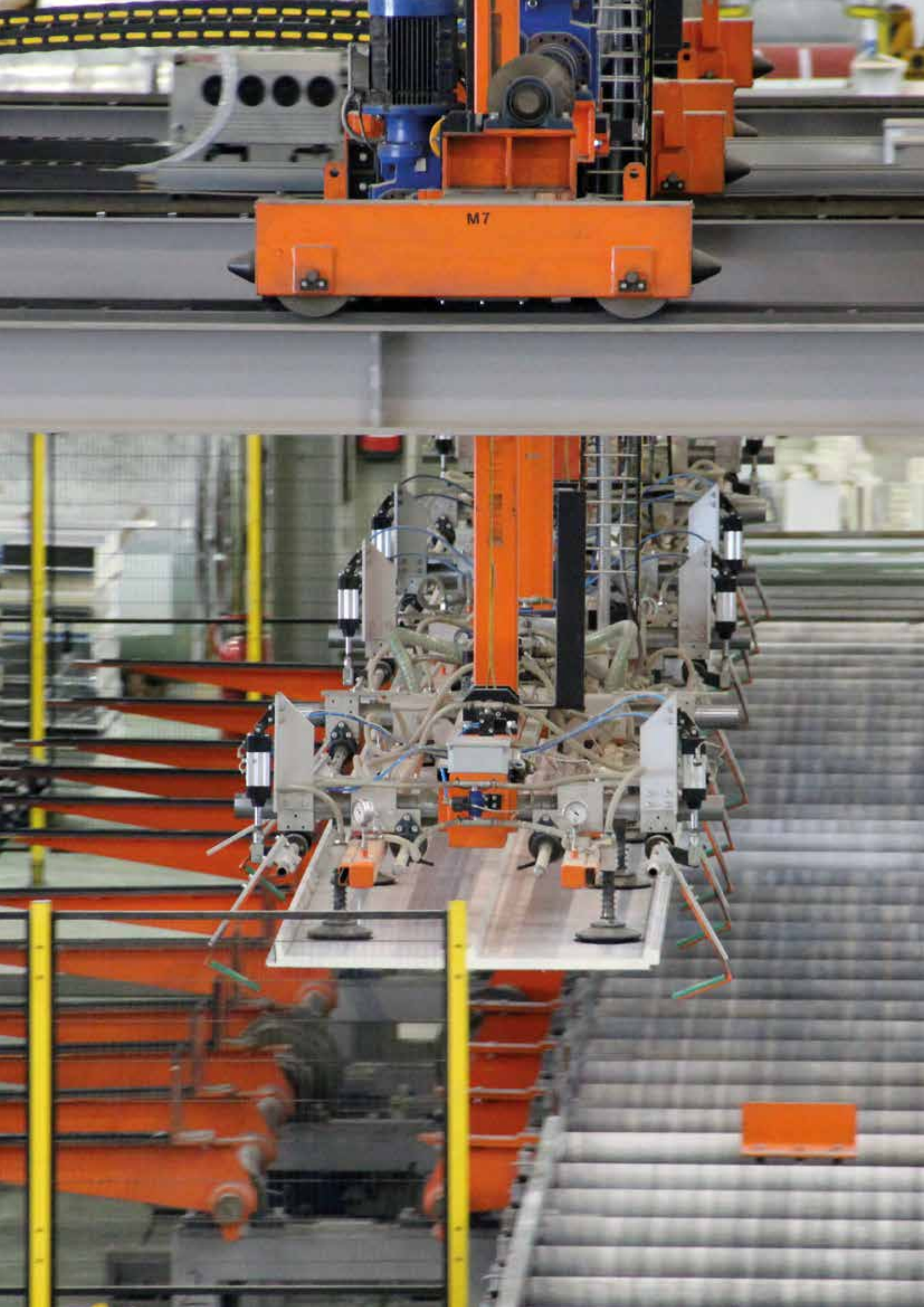
Maintenance Recommendations

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 the gutters and downpipes twice a year.
- Carry out an annual cleaning, including skylights. If necessary use a 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, re-seal.
- If lightning conductors are installed, make an annual inspection of the condition of the installation.
- For panels with a polyester paint finish, check the state of the paint every two years. For special finishes the first inspection should be carried out as from the fifth year.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