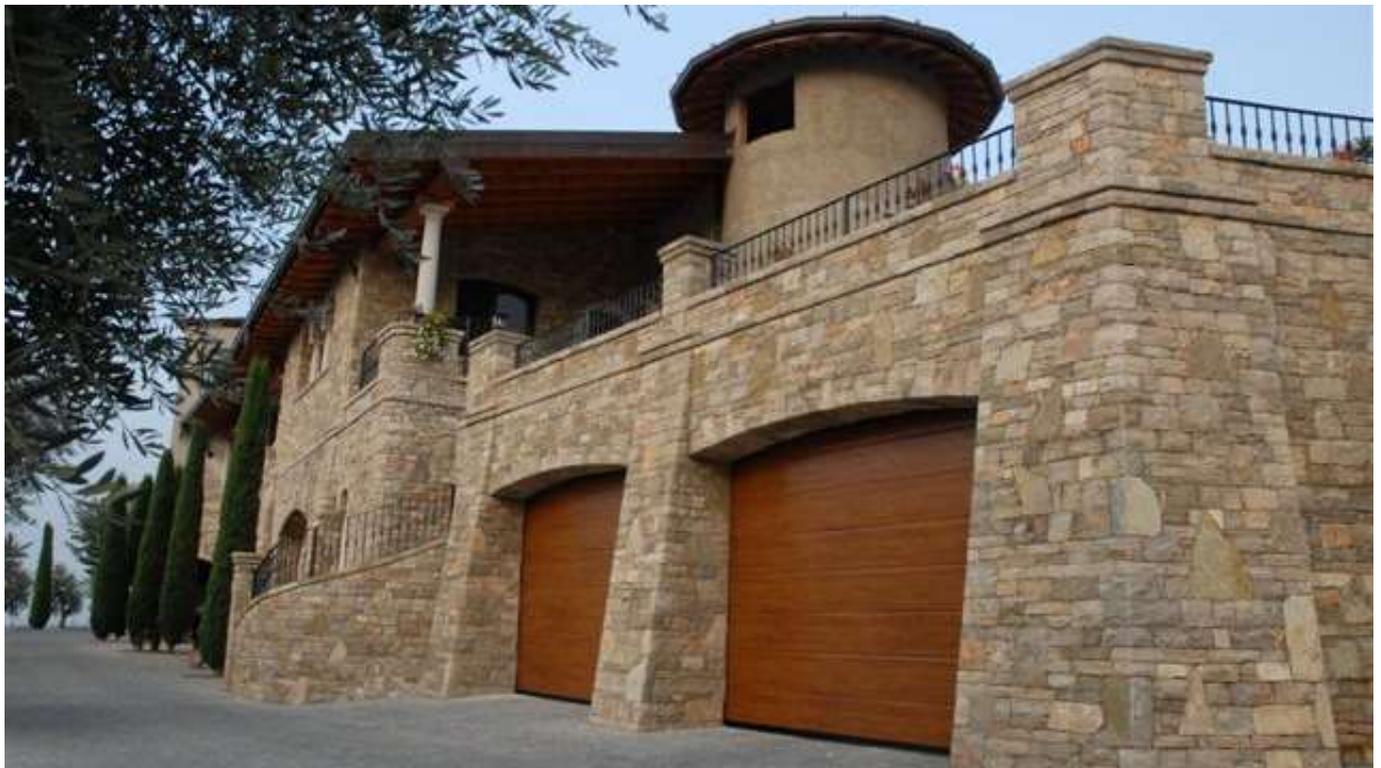




Technical manual

MB DOOR





**INFORMATIVE
NOTE**

The technical documentation and suggestions contained in this manual are the best understanding of the company regarding the properties and uses of the products and are intended to support the work of installers and technicians operating in the metal construction sector by providing useful information and suggestions concerning use.

However, given the many possibilities of use and the possibility of interference from external elements, the company assumes no responsibility for possible results. It is the responsibility of the user to ascertain the suitability of the product for the intended use, assuming responsibility for any consequential damage.

The user is also required to know the procedures necessary for the installation of the products, including the preparation of the **safety plans** and the updated requirements of all current regulations, in order to avoid dangerous situations.

The values indicated in **the capacity charts** are the result of practical tests carried out in our laboratories and certification bodies; however, the verification of the same, depending on the application, is the responsibility of the design engineer.

For any further information or clarification, please contact the Marcegaglia Buildtech technical office at the addresses listed on the back.

TABLE OF CONTENTS

MB DOOR.....	2
Products typology.....	2
Joint typology.....	4
Technical specifications	5
Metal supports	6
Protection of the supports	6
Panels weight.....	6
Static characteristics.....	7
Advice and instructions for use.....	8
Thermal expansion	8
Useful design information.....	8
Handling, storage and installation of panels	10
Maintenance and disposal.....	11
Routine maintenance	11
Disposal.....	11
Safety data.....	12



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Any violations will lead to a criminal prosecution as per art. 646 of the Italian Penal code.

MB DOOR

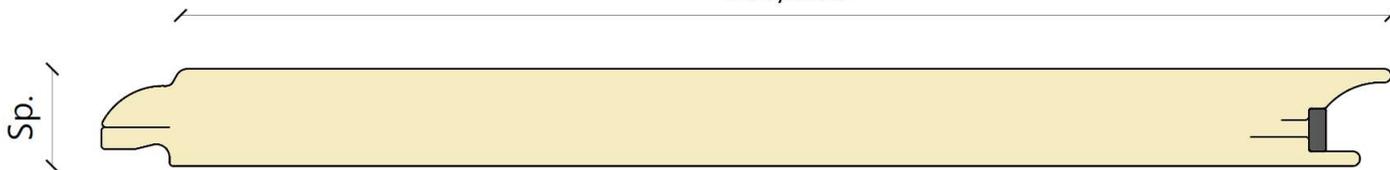
Sandwich panels with polyurethane foam insulation, used for the construction of sectional doors for residential and industrial use.

Products typology

MB DOOR RESIDENTIAL

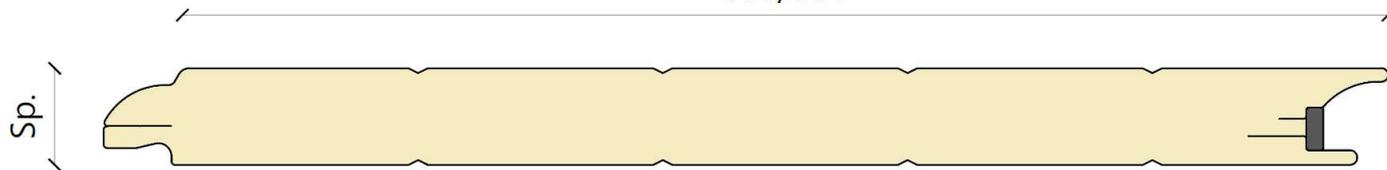
Flat external surface

500/610



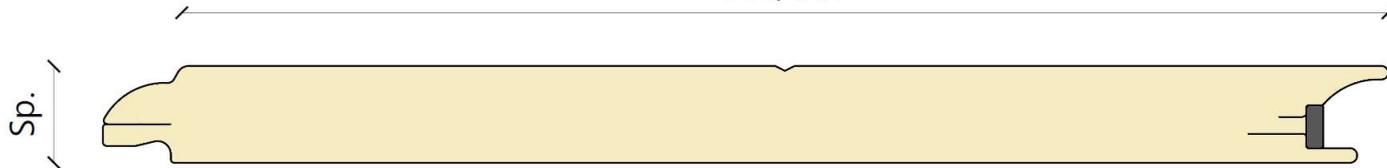
Ribbed external surface

500/610



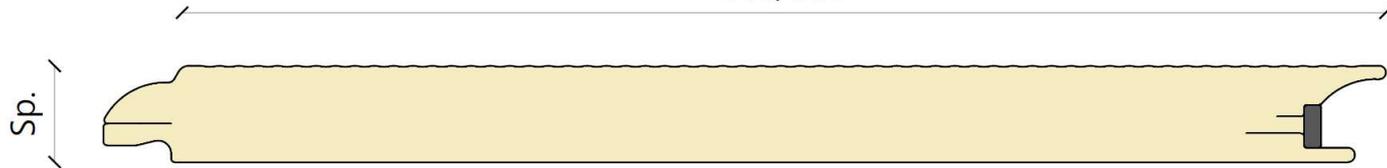
Middle rib on the external surface

500/610



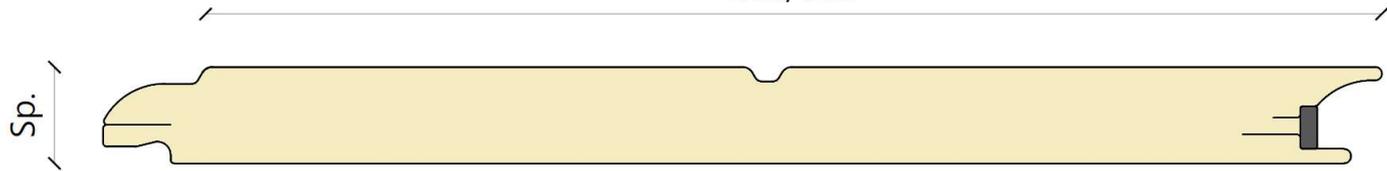
Micro-ribbed external surface

500/610



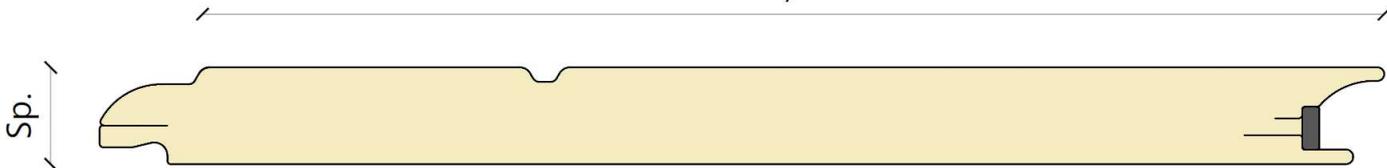
Middle groove on the external surface

500/610

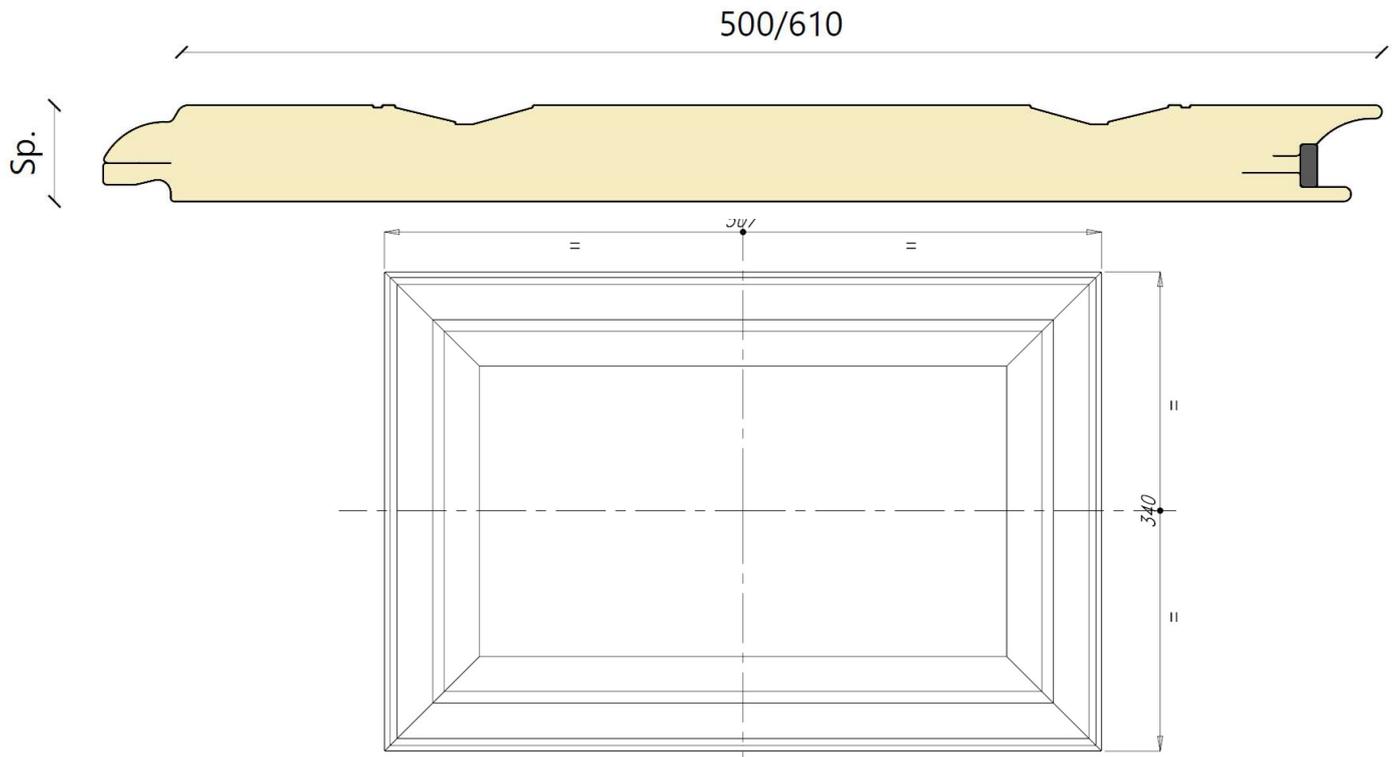


Asymmetric groove on the external surface

500/610

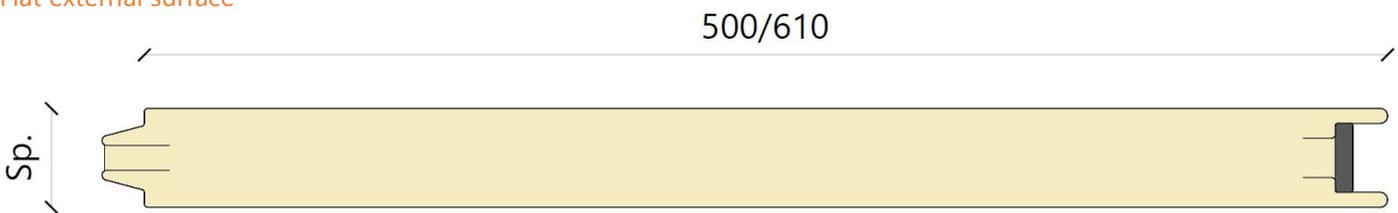


Cassettes on the external surface

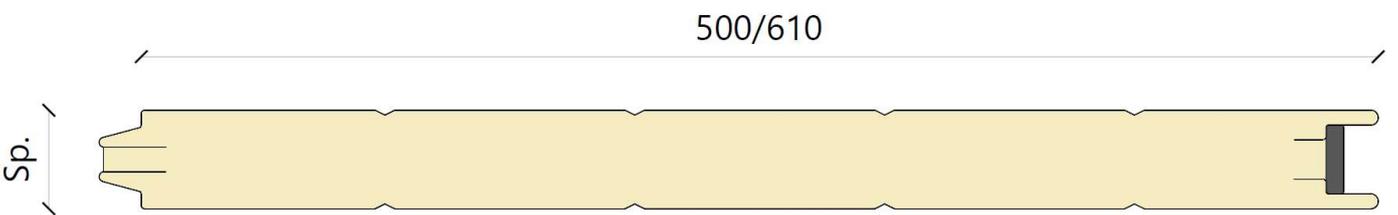


MB DOOR INDUSTRIAL

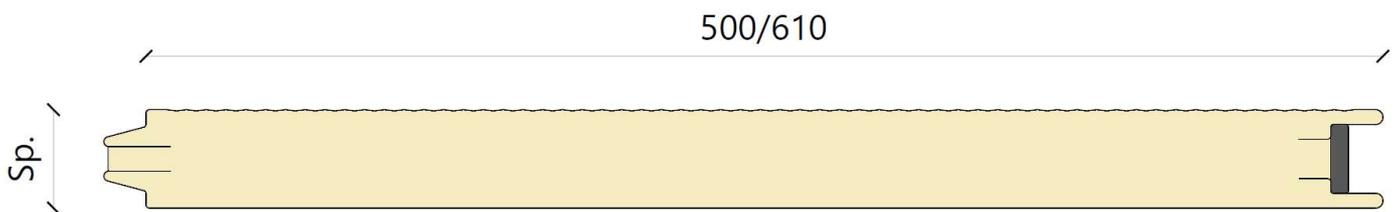
Flat external surface



Ribbed external surface

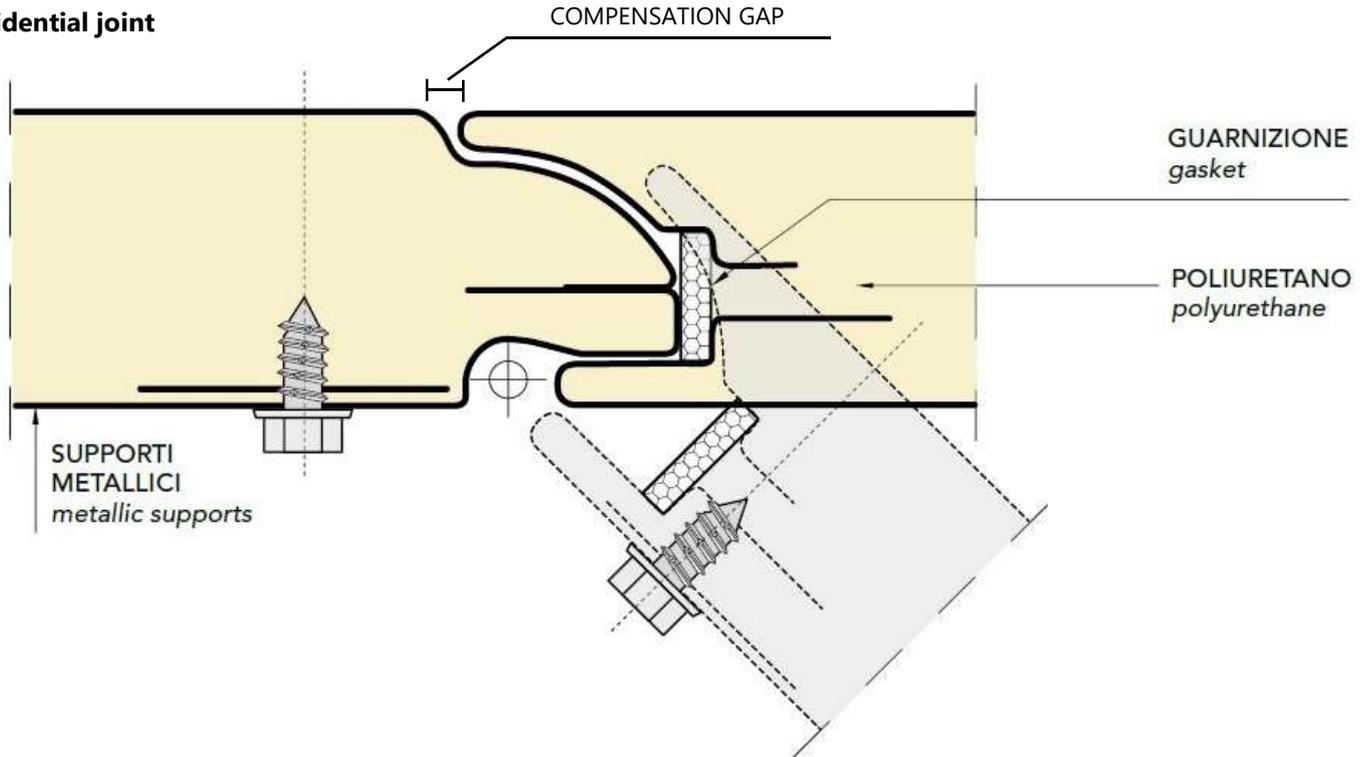


Micro-ribbed external surface



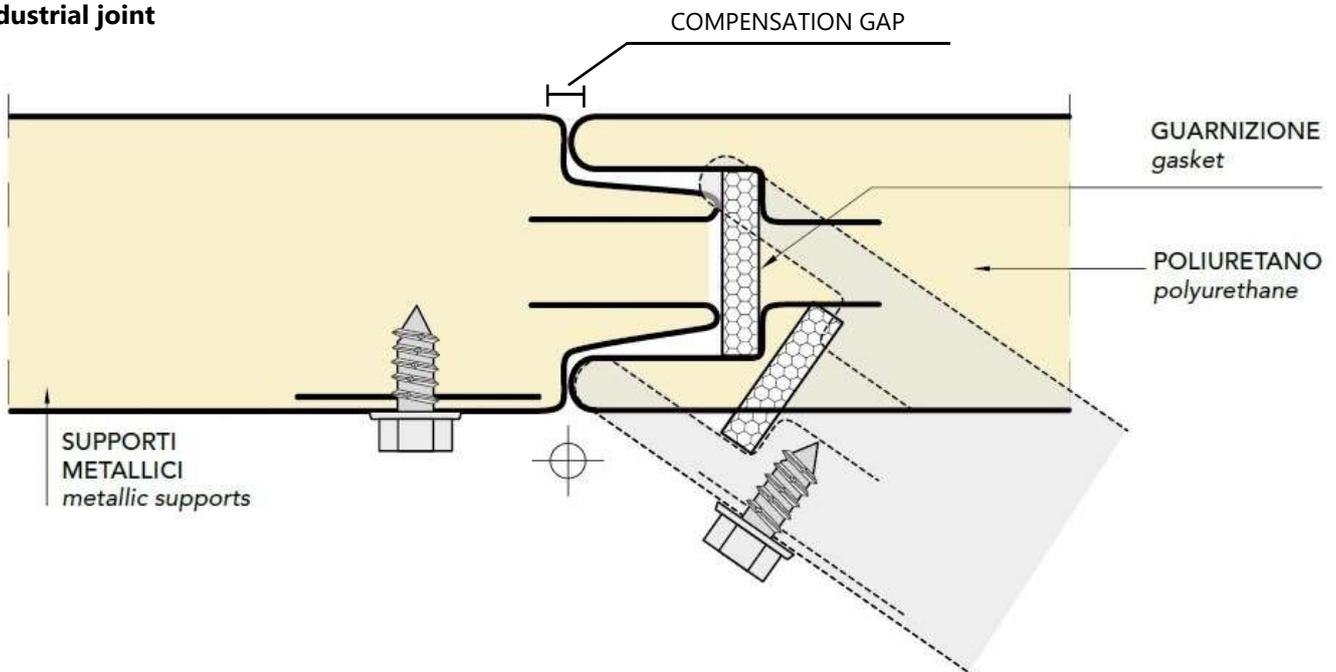
Joint typology

Residential joint



Special geometry profile which ensures that hands or other foreign bodies are not accidentally crushed during door closing, in accordance with EN 12604.

Industrial joint



Standard joining system provided with continuous reinforcement plates, which guarantees maximum resistance to repeated opening and closing, as well as excellent resistance to the exposure of atmospheric agents.

"COMPENSATION GAP" means the distance between the two ends of the jointed panels which can vary from installation to installation. The dimensions of this gap may depend on various elements, such as the methods and the installation precision or dimensional tolerances.

Technical specifications

	MB DOOR RESIDENTIAL	MB DOOR INDUSTRIAL
Useful width	500 mm 610 mm	
Lenght	Variable according to the construction needs related to the dimensions of the roofs to be made. Maximum productive length 15 m. Standard transport limits 13.5 m.	
Panel thickness	40 / 50 mm	40 / 60 / 80 mm
Insulation	CFC and HCFC-free polyurethane formulations are used which produce anigroscopic and anti-mould insulating foams with high content of closed cells (>95%).	
Total average density	41 kg/m ³ ± 3	
Thermal conductivity λ	λ = 0,021 W/mK	
Tolerances	<p>Panel thickness: ± 2 mm</p> <p>Panel lenght: ± 5 mm if L ≤ 3 m, ± 10 mm if L > 3 m</p> <p>Panel width (pitch): ± 2 mm</p> <p>Transversal deflection: ± 8,5 mm per meter</p> <p>Deviation from straightness: ≤ 1 mm per meter</p> <p>Deviation from flatness: ≤ 1 mm for L >700 mm</p> <p>Deviation from squariness: ± 3 mm</p> <p>Misalignment of supports: ≤ 3 mm</p> <p>Transversal deflection: ± 8,5 mm per meter</p>	



Metal supports

Marcegaglia Buildtech foresees the configuration of the panels with the following metal support variants:

Pre-painted steel , according to EN 10169 (coil coating) according to EURONORMS:

Plasticized galvanized steel EN 10346

Protection of the supports

To prevent the pre-painted metal supports from being damaged during production and subsequent movement of the panels, a polyethylene adhesive film is used which must be removed during the installation phase or in any case not later than 60 days from the production of the panels.

Please note that it is highly recommended not to store the panels in a place with prolonged sun exposure.

Marcegaglia Buildtech strongly advises against the request for material without a polyethylene adhesive film and assumes no responsibility for any damage in the event that such a request is submitted.

Panels weight

Panel thickness [mm]	Finishing EXT	Finishing INT	PITCH 500 Average weight [kg/ml]	PITCH 610 Average weight [kg/ml]
40	Std Goffered	Std Goffered	4,70	5,50
	Smooth		5,80	6,80
	Woodgrain		6,20	7,30
50	Std Goffered	Std Goffered	4,90	5,80
	Smooth		6,00	7,10
	Woodgrain		6,40	7,50
60	Std Goffered	Std Goffered	5,10	6,00
	Smooth		6,30	7,30
	Woodgrain		6,60	7,80
80	Std Goffered	Std Goffered	5,60	6,50
	Smooth		6,70	7,80
	Woodgrain		7,10	8,30

The indicated average weight can increase or decrease up to a maximum of 5%

Static characteristics

The capacity values in the tables below refer to panels subject to a distributed load that verifies the resistance to wind action (width of the supports for the calculation, 100 mm), **but they do not take into account the thermal effects that must be considered by the designer.** The data in question are therefore indicative and **cannot replace the design calculations** drawn-up by an expert and qualified technician who must verify and validate these indications taking into account the regulations in force at the place of installation.

The fastening system of the panels to the structure must be defined by the designer.

For further details and information, please contact the Marcegaglia Buildtech Technical Office.

MB DOOR PANEL STEEL				Capacity in kg/m ² [1/200 span]								
Thk.	U	Finishing		▲ ▲ Span in m, SINGLE SPAN								
mm	W/m ² K	Ext	Int	2,0	2,5	3,0	3,5	4,0	4,5	5,0	5,5	6,0
40	0,76	Std Goffered	Std Goffered	101,00	73,00	48,00	29,00	16,00				
		Smooth	Std Goffered	161,25	114,75	76,50	46,50	25,50	12,75			
		Woodgrain	Woodgrain	209,63	149,18	99,45	60,45	33,15	16,58			
50	0,58	Std Goffered	Std Goffered	114,00	89,00	66,00	45,00	28,00	16,00			
		Smooth	Std Goffered	180,00	140,25	104,25	70,50	43,50	24,00	12,75		
		Woodgrain	Woodgrain	234,00	182,33	135,53	91,65	56,55	31,20	16,58		
60	0,45	Std Goffered	Std Goffered	137,00	112,00	86,00	61,00	39,00	23,00	12,00		
		Smooth	Std Goffered	217,50	180,00	136,50	96,00	61,50	36,00	18,75	9,00	
		Woodgrain	Woodgrain	282,75	234,00	177,45	124,80	79,95	46,80	24,38	11,70	
80	0,32	Std Goffered	Std Goffered	175,00	126,00	99,00	77,00	62,00	45,00	30,00	18,00	10,00
		Smooth	Std Goffered	277,50	202,50	157,50	120,75	96,00	69,75	45,75	27,75	15,00
		Woodgrain	Woodgrain	360,75	263,25	204,75	156,98	124,80	90,68	59,48	36,08	19,50



Advice and instructions for use

Thermal expansion

Sandwich panels, given the nature of the materials they are made of, are subject to the natural phenomenon of thermal expansion in the presence of a thermal excursion acting on the metal supports.

This phenomenon acts on the straightness of the panel causing bends and deformations that can affect the functionality and the aesthetic appearance in the event that proper precautions are not taken.

The following conditions may affect the deformation of the panels:

- Significant lengths (e.g. 5 m)
- High solar radiation
- Supports colour
- Supports material
- Support thickness

The installation of appropriate reinforcement profiles above a certain size of the door may reduce bending effects. However, bending effects can be caused by many variables and so it is not possible to define a minimum door width above which it is recommended the installation.

As written in the European regulations of sandwich panels, thermal deformations caused by the solar radiation can normally measure up to few centimeters.

The following charts show the maximum deflection that can be reached by a door panel with different colours, thicknesses and lengths.

Max deflection (mm) for VERY LIGHT COLOURS $R_G=75-90$									
$\Delta T=35^\circ$ Text=55° Tint=20°		Panel length [m]							
		2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00
Panel thk. [mm]	40	9	13	17	23	28	35	42	50
	50	7	11	14	18	23	28	34	41
	60	6	9	12	15	19	24	28	34
	80	5	7	9	11	14	17	21	25

Max deflection (mm) for LIGHT COLOURS $R_G=40-74$									
$\Delta T=45^\circ$ Text=65° Tint=20°		Panel length [m]							
		2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00
Panel thk. [mm]	40	12	16	22	29	36	45	54	64
	50	9	13	18	24	30	36	44	52
	60	8	11	15	20	25	30	36	43
	80	6	8	11	14	18	22	27	32

Max deflection (mm) for DARK COLOURS $R_G=8-39$									
$\Delta T=60^\circ$ Text=80° Tint=20°		Panel length [m]							
		2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00
Panel thk. [mm]	40	15	22	29	38	48	59	72	85
	50	12	18	24	31	39	48	59	70
	60	10	15	20	26	33	40	49	58
	80	8	11	15	19	24	29	36	42

R_G = Degree of reflection

The ΔT value shown in charts is a fixed value but outside and inside temperature values may change.

Useful design information

Marcegaglia Buildtech points out that it is necessary to dimension a load-bearing structure in the design phase that can absorb the external load stresses so as not to jeopardize the basic functionality of the panels due to excessive and permanent deformations.

The following environmental conditions must be taken into consideration during the design and selection of the panels:

- **Thermal stress:** can lead to significant deformation of the panels and depends mainly on the exposure of the building and on the colour of the external metal support.
- **Wind action:** exerts a loading pressure on the exposed surfaces of the panel according to the wind speed, which varies according to the climatic zone in which the installation takes place. It is necessary to define the type and number of fixings according to the intensity of the described action.
- **Atmospheric aggressiveness:** it is necessary to choose the covering of the supports suitable for the environment in which the panels are installed (marine, industrial, urban, rural), since some environments are particularly aggressive in terms of corrosiveness of the panel surfaces.

If the possibility of using panels with an internal support different from the external one is taken into consideration, it is necessary to take into account the possible deformations due to the different coefficients of thermal expansion.

Marcegaglia Buildtech also recommends stocking spare panels beforehand (about 5% of the total), so as to make up for any lack of material due to damage during handling and installation.



Handling, storage and installation of panels

In order to guarantee integrity, the packs of panels must be unloaded from the transport means using a suitable sling bar and certified nylon straps.

The distance between lifting points must be equal to or greater than half the length of the package. To avoid damage, the nylon straps must be kept detached from the sides of the pack by using suitable wooden planks placed both above and below the package itself. No more than three packages may be stacked one on top of the other.

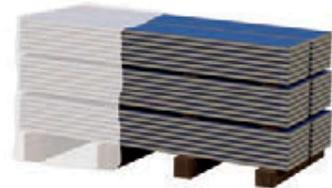


In the absence of a sling bar, in some cases unloading can also be done by using suitable forklift trucks. To avoid damaging the panel or even breaking the package, in these cases the distance between the forks must measure minimum 1 m in case of panels with less than 6 m length and the width of the lifting equipment must take into account the length of the pack, its weight, as well as the panel thickness. In case of panels with more than 6 m length it is strongly suggested to use side loaders with 4 forks.

If it is expected that the panels will be stored for a prolonged period of time, this must take place in a covered and ventilated environment and for a maximum period of six months. In these cases, it is a good rule to open the packs, and also to separate the panels with special spacers to ensure ventilation between one panel and another.

If this is not possible, for short storage periods (maximum 30 days) adequate covered place must be made and the panels must be protected with opaque waterproof sheets, taking care however to maintain adequate ventilation, to avoid damaging stagnant condensation between panels.

In any case, suitable supports must be provided to keep the packages raised from the ground. As light slope (5% minimum) must be provided to allow the outflow of any condensation or rain.



If these rules are not observed, there is the danger that the stagnant humidity will attack the coating, causing it to separate from the galvanized support, forming a phenomenon called "blistering". It is recommended to install the panels within one month of delivery to the building site.



If transported by container, the products must be removed from the same within 15 days from shipment in order to avoid deterioration of the pre-painted metal supports caused by the high concentration of moisture that can accumulate in the container when closed for a long time.

Due to the possible presence of small cutting burrs or metallic filings, the individual panels must be removed from the package taking care not to damage the panel underneath.

Manual transport must be carried out, keeping the panel in the rib and by at least two people.



The protective film must be removed during the installation of the panels and in any case not over 60 calendar days from the date of production of the panels. If the panels were ordered, produced and delivered without protective film on the painted support, it is necessary to pay careful attention not to cause damage during handling and assembly.



The panels must be set up by qualified personnel who are familiar with the rules of good technique.

Personnel equipment, in particular all PPE, must be provided for worker safety and to prevent damage to the panels during handling and installation.

WARRANTY: Failure to comply with these minimum requirements exempts Marcegaglia Buildtech from any responsibility for damage to the products and forfeiture of the warranty provided for by the terms of sale.



Maintenance and disposal

Routine maintenance

Routine maintenance is the responsibility of the end user and has the function of maintaining the aesthetics and functionality of the panels unchanged over the years following its construction.

The following are the main causes of intervention and the measures to be taken:

- **Storage of aggressive products:** pay particular attention to the affected areas and perform a thorough cleaning.
- **Scratches or abrasions of the pre-painted parts** caused by the transit of operators or accidental causes: eliminate by touching up the paint.
- **Dents caused by impacts:** in some cases it will be possible to intervene by restoring the surface; if this type of intervention is not feasible, the damaged panel must be replaced.
- **Formation of mould and algae,** possible in the case of environments with high humidity, in the shade or with stagnant water: moisten the area to be cleaned with cold water and then, using a non-abrasive brush, remove the deposits with a very diluted solution of water, bleach and a cup of liquid soap. Rinse with clean water.
- **Deposits of salt,** for example in marine environments: in the case of light superficial incrustations it is sufficient to use cold water through a garden hose at the standard pressure of the mains water supply. For all other cases it is necessary to dampen the surface to be treated with cold water and then, using a non-abrasive brush, remove the deposits with a very diluted solution of water, bleach and a cup of liquid soap. Rinse with clean water.

Failure to comply with these warnings, as well as the use of boiling water or abrasive material (brushes with metal bristles, etc.) can cause permanent damage to the surface, compromising the lifespan of the product. For further information consult the technical information "Maintenance and restoration of pre-painted parts".

Disposal

The disposal of insulated panels must only be entrusted to authorized companies and carried out in compliance with the laws in force.



Safety data

Please note that the product to which this document refers is classified in accordance with the regulation (EC) 1907/06-REACH as an article without intentional release of chemical substances and as such does not require the preparation of a safety data sheet.

However, Marcegaglia Buildtech wishes to identify the main dangers due to the use of the article in question.

1. Product identification

Insulated panel composed of two metal layers that contain a solid insulating layer of polyurethane foam.

Company / business identification

MARCEGAGLIA Buildtech S.r.l.

Via Giovanni della Casa 12 - 20151 Milano - Italy

Phone +39.0230704.1 fax +39.0233402706

e-mail: tamponamento@marcegaglia.com

2. Dangers identification

The product does not pose dangers to human health under normal conditions of use in accordance with REG EC 1272/08.

3. Composition / information on ingredients

The product is composed of two pre-painted steel sheets containing an insulating layer of polyurethane foam.

Component	% in weight
Metal supports	47-63
Gaskets	≈1
Insulating material	36-52

4. First aid measures

The handling of the product without the appropriate PPE can cause injuries to the skin and eyes due to the presence of the steel sheets; in the event of injuries contact a doctor immediately. In case of prolonged exposure to the dust, transport the affected person to a ventilated place.

5. Fire prevention measures

Polyurethane foam is not flammable, but as an organic material it is combustible. However, the protection of the metallic supports allows the risk of fire to be reduced to a low level.

The material used for packaging is combustible and if involved in a fire produces gases and fumes which could reduce visibility.

Extinguishing media

All extinguishing media are applicable. For large fires, use water, alcohol-resistant foams or universal foams according to the manufacturer's instructions. For fires of

limited proportion, use carbon dioxide or chemical powder.

6. Measures in case of accidental release

The product is stable; no special measures are expected to be taken.

In the event of accidental release of polyurethane dusts (coming, for example, from cutting operations), remove the material preferably with suction systems, ventilate the room and keep away from sources of ignition. Perform these operations with a protective mask.

7. Handling and storage

Handle using the appropriate personal protective equipment. For more information about handling and the personal protective equipment to be used, see section 8. For correct handling and correct storage, refer to the "Regulations for handling and storage of materials" in the technical manual.

8. Personal protection

Respiratory protection

Normal use does not require any protection for the respiratory tract. If it is necessary for work activities to cut the panels and carry out any operation that could lead to the generation of dust, it is advisable to install an appropriate extraction and reduction system.

When this is not possible or the concentrations of dust in the working environment remain at high concentrations, the possibility of isolating the dust production area or providing the operators with devices for the protection of the respiratory tract is evaluated.

Hands protection

The presence of steel sheets can cause cuts or injuries to the skin tissue, and in this regard during normal operations involving the handling of the panels, leather or hide gloves resistant to abrasion, cutting, tearing and perforation must be worn in conformity with the UNI EN 388 standard.

Eyes protection

Normal use does not require any protection for the eyes. If it is necessary for work activities to cut the panels and carry out any operation that could lead to the production of shards or projectile particles, it is advisable to wear polycarbonate glasses to protect against the projection of particles at high speed / low impact energy; compliant with standard EN 166.

Skin protection

Normal use does not require any specific protection other than work clothes.

Control of the environmental exposure

Normal use does not require any specific measure to reduce environmental exposure as the product is to be considered non-toxic. Should it be necessary to cut the panels and carry out any operation that could lead to the generation of dust, install an extraction system with an appropriate abatement system in order to limit environmental pollution.

9. Physical and chemical properties

Appearance: the product comes in the form of a panel clad in metal and a core of straw-coloured expanded polyurethane foam.

Odour: Odourless

Boiling point: not applicable

Melting point: the sheet melts based on the metal, the polyurethane does not melt or drip.

Flash point: polyurethane between 300 and 400°C.

Calorific value: 6500-7500 kcal / kg

Auto-ignition: not applicable

Explosive properties: not applicable

Oxidizing properties: not applicable

Vapour pressure: not applicable

Water solubility: not applicable

Fat solubility: not applicable

Partition coefficient: not applicable

10. Stability and reactivity

Pre-painted steel and polyurethane are stable under normal weather conditions.

Conditions to avoid:

Avoid using naked flames near polyurethane dust.

11. Toxicological information

With the present state of knowledge, the material is to be considered non-toxic.

12. Ecological information

There are no known harmful effects on the environment.

Should it be necessary to cut the panels and carry out any operation that could lead to the generation of dust, install an extraction system with an appropriate abatement system in order to limit environmental pollution.

13. Disposal considerations

The disposal of polyurethane insulated panels must only be entrusted to authorized companies and carried out in compliance with the laws in force.

14. Transport information

No special measures must be taken during transport.

15. Regulatory information

No restrictions pursuant to Annex XVII of the REACH Regulation. No ingredient is included in the REACH Candidate List (> 0.1 % m/m). Regulation (EC) No. 1907/2006 of the European Parliament and of the Council, of December 18, 2006, concerning the registration, evaluation, authorization and restriction of chemical substances (REACH).

Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of December 16, 2008 concerning the classification, labelling and packaging of substances and mixtures which amends and repeals Directives 67/548/EEC and 1999/45/EC and amends regulation (EC) No. 1907/2006.

Regulation 830/2015 Annex II of REACH.

Legislative decree 81/2008 Consolidated Law on Occupational Health and Safety.

16. Other information

The information contained in this sheet are based on our knowledge and experience at the date of the latest version. The user must verify the suitability and completeness of the information in relation to the specific use of the product.

This document must not be interpreted as a guarantee of any specific property of the product. Since the use of the product does not fall under our direct control, it is the user's obligation under its responsibility to observe the laws and regulations in force concerning hygiene and safety.

No liability is assumed for improper use. Provide adequate training for the personnel involved in the use of chemical products.



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