PURICELLI
laminati plastici e
superfici decorative

LAMINATE EMPLOYMENT TECHNIQUES

Puricelli Laminate

Directions for Laminate Use and Application

This booklet illustrates some application methods for the PURICELLI ornamental laminates.

The suggestions offered in this booklet are aimed at achieving the best results during setting; however, we recommend you always check the data beforehand with the firms that are in charge of installing and/or setting the panels.

Puricelli S.r.L.
Via Nuova Valassina, 3 • 23845 Costamasnaga (LC)
Tel. ++39 031 855051 • Fax ++39 031 8550887

Chapter

2

Bilaminate Compact

Puricelli Compact bilaminates are products made of synthetic thermosetting resins. The laminate is produced in a symmetric manner: the two sides display the same colour and have a surface that can be made available both with a matt and a scratch-proof finish. They can be produced with a width ranging between 2 and 30 mm.

Transport

During transport, place the panels on pallets and protect the sheets with wrapping paper and polyethylene film. Fix the sheets to the pallets with metal straps, and cover the edges with plastic protections. This will prevent the sheets from slipping and causing scratches or breakage. During loading and unloading operations, adopt further protective measures to prevent the sheets from scraping against each other or slipping onto one another. Lift the sheets manually or with the aid of a mechanical arm equipped with suckers.

Storage

Bilaminates need to be stored at standard environmental conditions (the optimal values being 18-22° C temperature with 40-60% humidity). Always place the panels horizontally.

Sectioning

For sectioning Compact bilaminate, we recommend you employ a low feeding speed, which will have to be worked out depending on the panel thickness and on the desired cutting quality. For the sectioning of double-sided panels, you will need to adjust the height of the blade to

avoid damaging the lower side. To achieve optimal results, we recommend you use a saw with a marking gauge.

Please find below the optimal values:

Revolutions: 3000-4000 rpm. Tooth pitch: 10-15 mm

Feeding speed: 10-20 m/min.

The results will depend on several factors. Always comply with the indications of the blade manufacturer.

Should you be producing cabinet doors or doors for bathrooms or changing rooms, there are some rules to be kept to.
The vertical long side should be obtained by cutting the laminate longitudinally in the direction of the fibre, so as to avoid possible tensioning resulting from cutting transversally against the fibre, which may cause distortions to the panel and loss of planarity.

Piercing

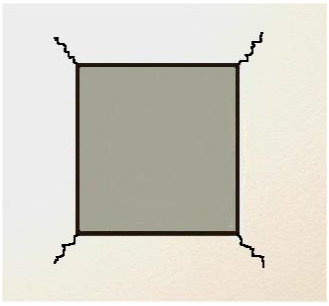
Compact HPL laminates tend to contract at low humidity rates, whereas they tend to expand at high humidity rates; therefore, while piercing the laminate, you need to take these dimension changes into account and allow adequate space around the screw (hole diameter = screw diameter + 0.5 mm) to avoid the cracks. Mill the hole mouth and use plastic or metal washers to avoid tightening the screw too much against the surface of the laminate.

Always rest the panel on a solid surface (either wood or plywood) to avoid fissures or splints on the opposite side.
When making dead holes for screws or mortises, always allow at least 1.5 mm from the panel thickness.
A simple tap for threading will allow you to easily pierce Compact laminates. You can also use self-tapping screws.

Milling and Edge Finishing

To obtain proper finishing you need to mill the edges and round them. You will obtain good results by using fine-grained abrasive paper. Polish the edges with silicon-free furniture polish. Round the corners to avoid any damage.

Internal openings should also have rounded corners.



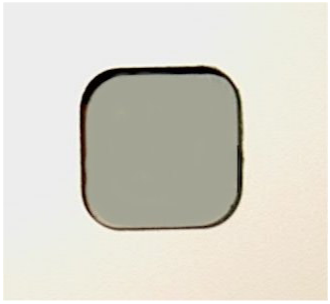


Fig. 1.2 Unsafe cut – Straight angle ***Safe cut with rounded corners***

Assembly

With Compact laminates various assembly possibilities exist, among which wooden substructures, aluminium frames and fastening with screws or aluminium rivets. However, it is important to take into account the effects produced by certain climatic (temperature, humidity) changes, which result in slight changes in size. This can be accomplished by arranging for slightly larger holes during assembly, or placing a joint between the sheets, etc.

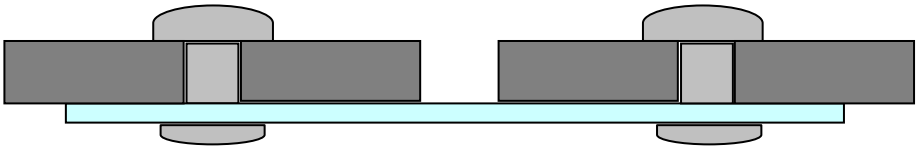
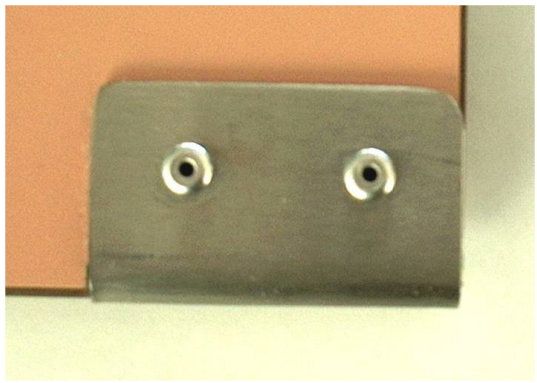


Fig. 2.2 Fastening accomplished with rivets

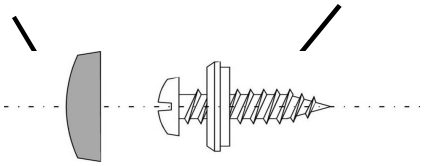


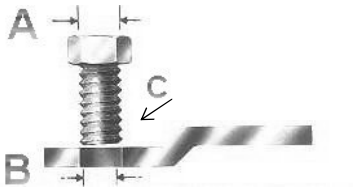
Self-Tapping Screws

Self-tapping screws are employed to fix different kinds of pieces. Triangular-head screws with three quick threads one above the other are

the best.
The hole needs to have a diameter **B** equal to the diameter of the screw **A** minus the widths of the thread **C**. The hole must be at least 1 mm deeper than the length of the screw.
The screws should be lubricated beforehand.

Cap **Washer**





Assembling the Panels

For the fitting and assembly of laminates in the creation of partitions, or booths and cabinets for changing rooms, certain rules need to be kept to in terms of distances in which rivets, self-tapping screws or door hinges are to be inserted.

Please find below an explanatory diagram and a summary table covering the most common thickness values.

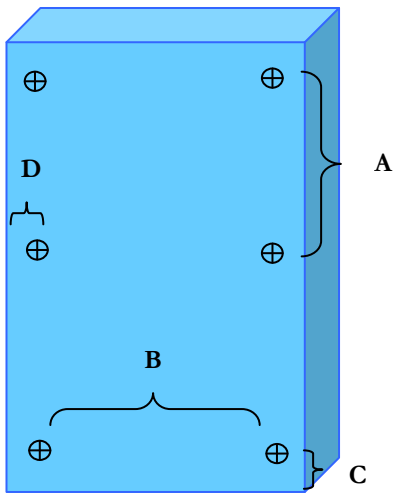
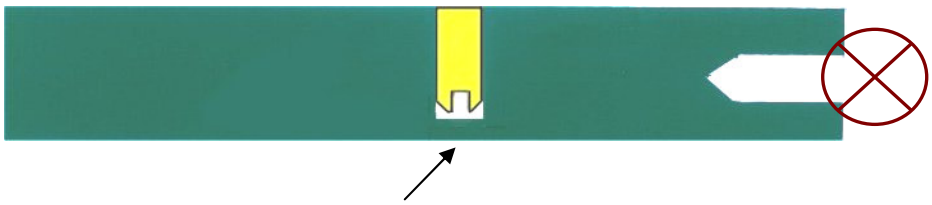


Fig. 3.2 Assembly diagram for compact laminate

Thickness	*Dist. A*	*Dist. B*	*Dist. C*	*Dist. D*
6	550	400	20 – 60	20 – 50
8	700	500	20 – 80	20 – 60
10	800	600	20 - 100	20 - 80

Plugs

Plugs need to be smooth and free from any protuberances. They should never completely penetrate the panel and leave at least 1.5 mm thickness. Never insert a plug or wedge into the edge of a panel.



Minimum 1.5 mm thickness from the surface Not allowed

Glued Sheets

The sheets are reciprocally subject to various mechanical actions in length and width.
If you need to glue a number of sheets together you need to direct the fibres in the same direction.
The sense of direction will have to be identified on the sheets when they are whole, if necessary prior to being processed.
Before gluing, always smooth the surfaces to facilitate the gluing process.

Application Fields

PURICELLI COMPACT laminates can be widely applied in all sorts of different fields such as: the creation of doors, partition walls, toilet partitions, changing room cabinets, cabinets for communities, hospitals and laboratories.

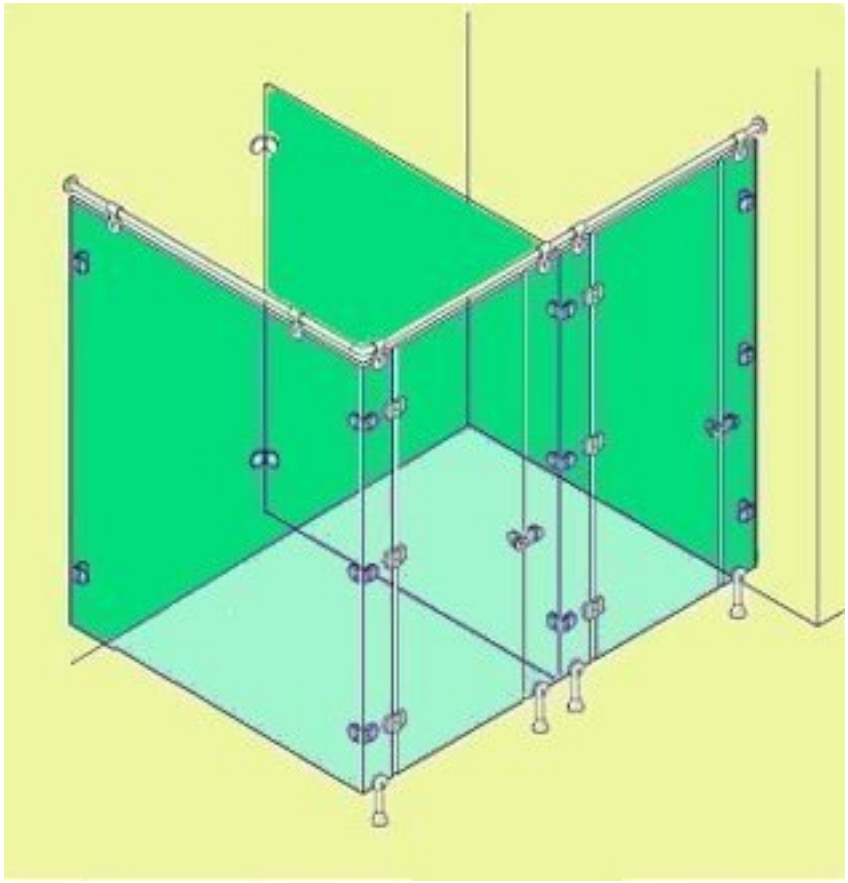


Fig. 4.2 Toilet Cubicles Assembly example

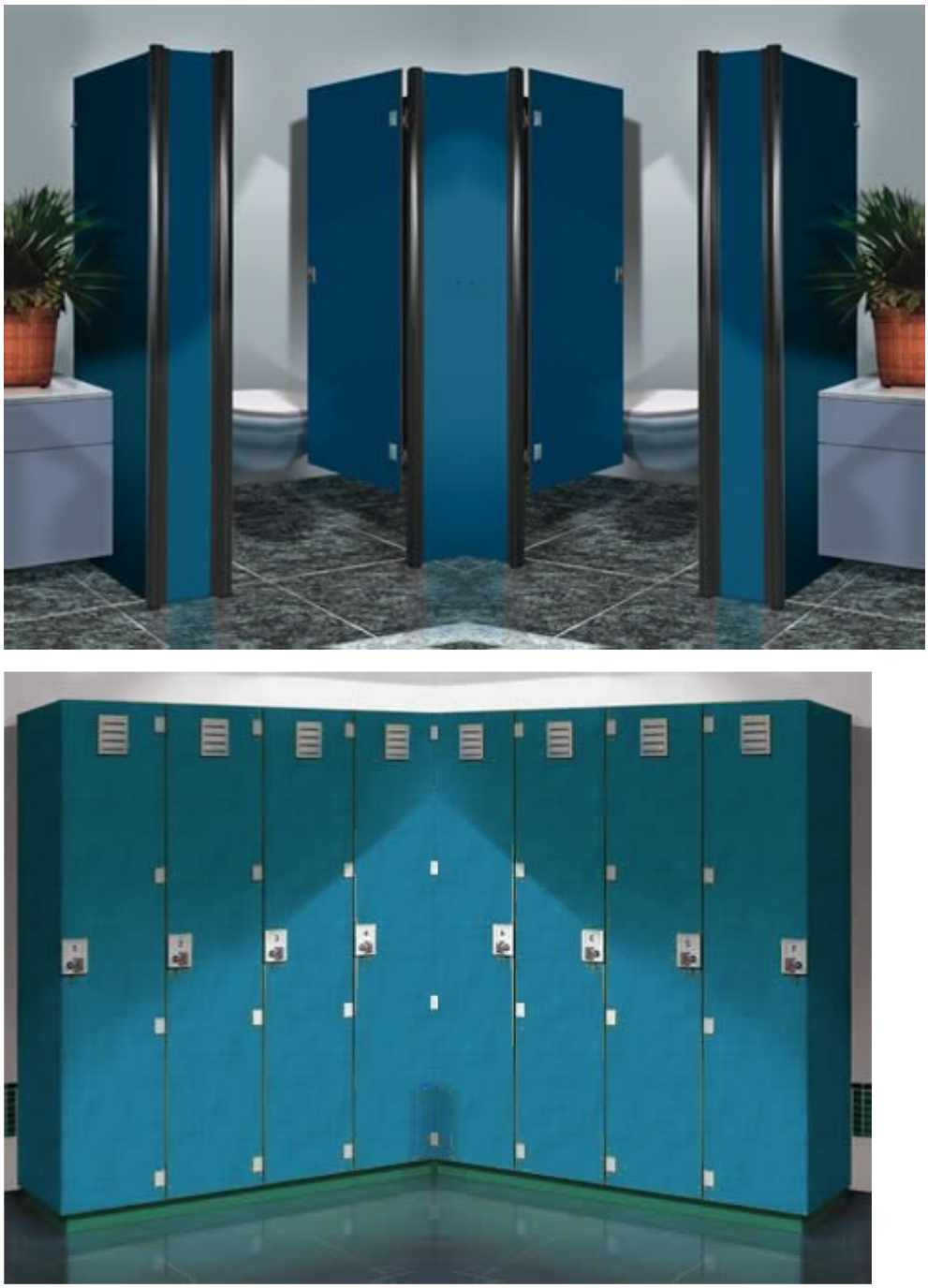


Fig. 5.2 Changing room cabinets

Fig. 6.2 Partition panels

WR1 PURICELLI Compact for Outdoor Use

WR1 Compact laminates for outdoor use represent an ideal article, employed in the building industry for covering the façade of schools, offices, houses, storehouses, factories, balconies, etc.
Like Compact laminate for indoor use, WR1 Compact for outdoor use is also made of synthetic thermosetting resins. Also in this case, the laminate is produced in a symmetric manner: the two sides display the same colour and have a surface that can be made available both with a matt and a scratch-proof finish.
A specific feature of this product is its high resistance to sunlight and other weather conditions, thanks to a special choice of raw materials and to a specific production process.

This product is used for new buildings or for refurbishing purposes, with or without insulation. Always refer to the local building industry regulations in force, prescribing application conditions for materials designed for outdoor use.

Storage

Compact laminate for outdoor use must be stacked in a horizontal position on flat and dry surfaces. The sheets should be kept for a few days on the premises on which they will be processed and assembled, in order to condition them. In stacking them, it is advisable to leave a hollow space between one sheet and the other. If exposed to direct sunlight or stored under large sheets of plastic before processing, they can get deformed. This should be avoided by all means!

FIXING METHODS

Bilaminate sheets can be assembled in various manners:

- On vertical studs.

  On the back side, horizontal laths can be placed, (double or single lathing).

- On a metal framework.

- By beating: sheets applied like a glass wall.

We recommend the following fixing methods:

- transport screw with coloured head
- transport screw with intercalary washer and cap
- self-tapping screw with intercalary washer and cap
- gluing for invisible fixing.

Whatever fixing method you choose, you need to leave sufficient space both around the sheet and around the holes produced for fixing purposes. In this way, any thermal or humidity related changes can take place without subjecting the sheet to tension.

In order to work out the width of the joints to be inserted between sheets you need to take into account a maximum dilation of 2 mm/m in length and 2.5 mm/m in width for each bilaminate sheet. Practical and aesthetic purposes usually involve using 10 mm joints.

At time of fastening, the piercing diameter for the holes will have to be at least 1.5 times the diameter of the screw.

Transport screw with coloured head.

This type of screw, whose head is provided with a covering in coloured epoxy resin-based powder, is usually employed for visible fixing of bilaminate sheets onto a wooden framework. The screws are usually in stainless steel, quality A2 (AISI 304). Suppliers of this type of screw are in a position to cover the coloured head with epoxy resin, in colours matching the covering of the bilaminate sheets.

Table 1: Minimum dimensions of the screw.

Bilaminate thickness	*Diameter and length of the screw mm x mm.*	*Diameter of the hole in mm.*
6 – 8 - 10	4.5 x 38	6.75

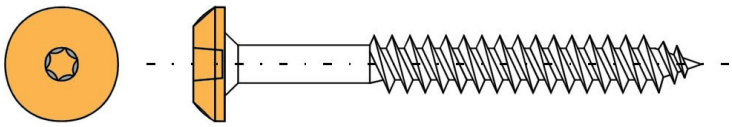


Fig. 7.2 Transport screw with coloured head.

Transport screw with intercalary washer and cap

This screw is employed for fastening bilaminate sheets onto a wooden framework. The screw is in stainless steel, quality A2 (AISI 304). It is marketed together with an intercalary washer in synthetic material or in stainless steel and a cap withstanding ultraviolet radiation, in a colour matching the colour of the bilaminate sheet.

The screws need to be tightened in such a way that the washer touches the sheet without exerting any pressure.

Table: Minimum dimensions of the screw

Bilaminate thickness	*Diameter and length of the screw mm x mm.*	*Diameter of the hole in mm.*
6 – 8 - 10	4.5 x 40	6.75

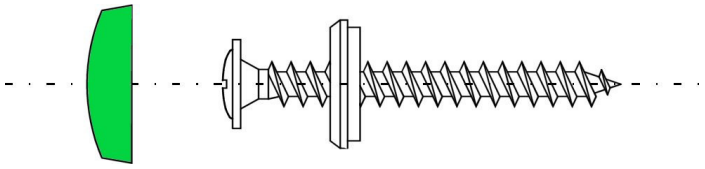


Fig. 8.2 – Transport screw - washer – cap

Self-tapping screw with intercalary washer and cap

Self-tapping screws can be used to fasten bilaminate sheets onto a metal framework. The lower part of the screw head is completely flat (cylindrical head). The screws are employed with a washer in synthetic material or in stainless steel and a cap withstanding ultraviolet radiation, in a colour matching the colour of the bilaminate sheet.

Bilaminate thickness	*Diameter and length of the screw mm x mm.*	*Diameter of the hole in mm.*
6 – 8	4.2 x 15.8	6.5
10	4.2 x 15.8	6.5

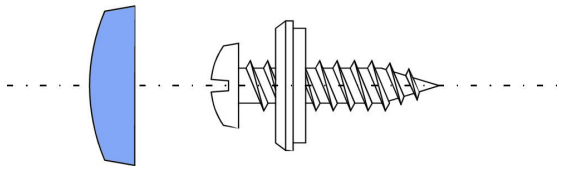


Fig. 9.2 Self-tapping screw - washer- cap

Gluing

Gluing is resorted to for invisible fixing of bilaminate sheets onto a wooden or metal framework. The invisible gluing system allows the achievement of a homogenous front displaying high aesthetic quality. This fixing method requires less maintenance care, whereas when using screws cavities may form under the caps after some time.

The gluing can be performed with polyurethane glue.

Butt straps for vertical and horizontal joints.

Bilaminate sheets are set with a joint, having a width which is at least the same size as the thickness of the sheet, so as to allow for the sheet dimensions to change as a result of thermal or weather action.

A butt strap is applied for aesthetic purposes and to protect the framework from humidity.

The joints can be fixed in different ways. The following pictures provide a few examples.

FIG. 10.2 Butt strap in EPDM

Application field: vertical joints

Fixing method: fastening or gluing

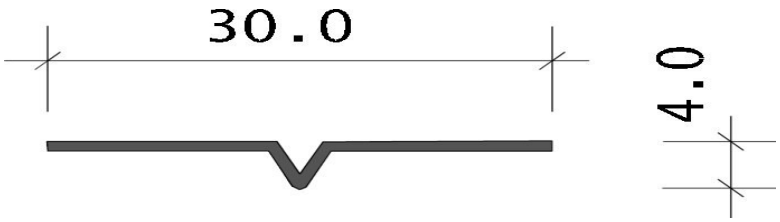


FIG. 11.2 Butt strap in aluminium

Application field: vertical and horizontal joints

Fixing method: gluing

Notes:

Whenever joints intersect vertical butt straps they have priority over the horizontal ones. Hence, vertical finishing structural shapes cannot be interrupted.

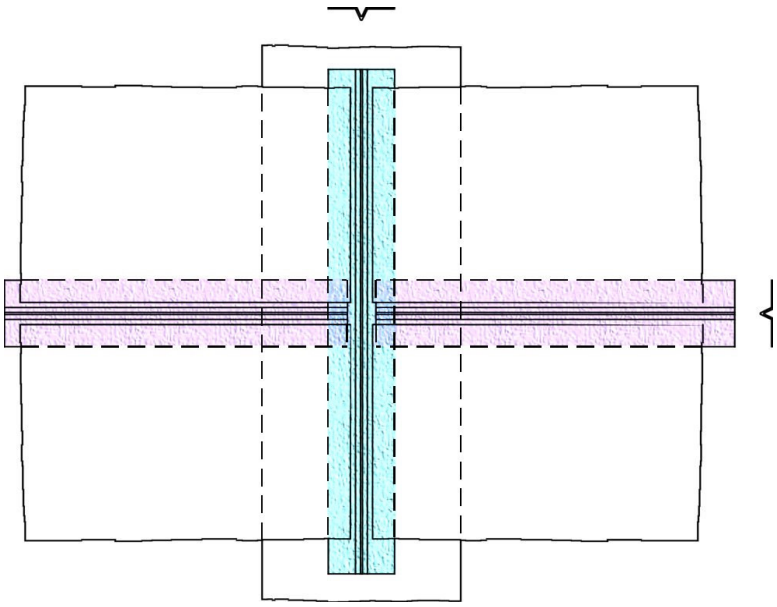


FIG. 12.2 Butt strap in aluminium

FINISHING STRUCTURAL SHAPES

These structural shapes (designed for protection against rain, as a ventilation grid, etc.) are used for the finishing of bilaminate covering edges. These are described in detail in chapter III, A, 6. Such structural shapes are not distributed by our company. For further information, please contact our technical assistance/customer service department.

III. FITTING

A. Facades

In new buildings, as well as in refurbishing work, bilaminate coverings have different purposes:

- decorating the building from an aesthetic point of view

- creating a protection against rain

- offering the opportunity to apply sound/thermal insulation material

- conveying stress to foundations and main walls.

1. General principles

In order to meet all the above mentioned functions in the best of ways, a façade covering is made up of different elements:

- A framework

- An insulation layer (optional)

- A ventilated cavity

- A bilaminate sheet is weatherable and shock-proof; it protects the materials placed behind its surface from climatic influences and offers an aesthetic finish at the same time.

A) Framework

The various kinds of framework that bilaminate sheets can be applied to will be illustrated in the following chapters.

By acting on the façade panels, the framework conveys stress (from wind or its own weight) to the foundations and to the main walls (brickwork and cement).

In order to obtain an attractive and solid façade, it has to be applied on a flat surface. If the surface is not flat, the framework needs to be smoothed.

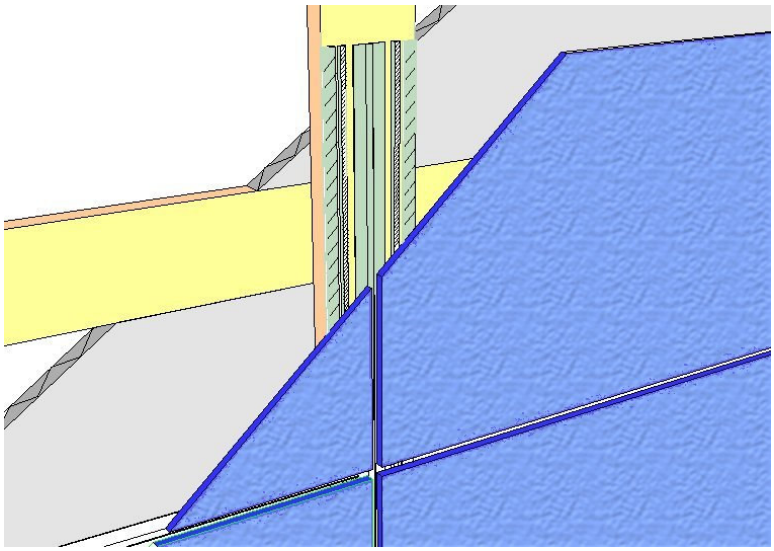


Fig. 13.2 Example of glued façade covering

B) Insulation Layer

Applying an insulation layer to the outside façade offers a number of advantages compared to internal insulation:

- Sudden changes in temperature in the foundations and main walls are significantly reduced.

- Indoor thermal capacity is at its best, with a consequent increase in comfort.

- It is the easiest way of avoiding heat bridges and consequent surface condensation.

- In most cases there is no need to take measures to prevent condensation in the building.

- There is no loss in indoor available space.

- In the event of refurbishing, residents suffer minimum discomfort since no work needs to be carried out on the outside.

C) Ventilated Cavity

A well ventilated cavity behind bilaminate sheets has several functions

- The framework remains dry, which also prevents deterioration (such as decay or corrosion) as well as the formation of mould.

- The insulation layer and the part of the building that stands in front of it remain dry and preserve their thermal insulation capacity.

- During the summer, significant heating of the front side of the building is prevented thanks to the thermal exchange with the air circulating inside the cavity.

- Water vapour moving through the foundations and main walls towards the outside can be discharged thanks to the air circulating in this cavity.

- Any humidity penetrating indoors from the joints placed between the sheets is partly discharged behind the sheets, while the remaining part will be transported by ventilation.

In view of the above, the necessary measures need to be taken to ensure proper ventilation of the cavity. This means that one needs to provide not only for an uninterrupted and adequately wide cavity, but also for airing openings towards the bottom and the top of the façade.

For the covering of one side, this will involve:

Cavity width > 22 mm

Airing opening > 50 cm2/m

For limited height surfaces (<60 cm)

Cavity width > 15 mm

Airing opening > 20 cm2/m

Depending on the framework, ventilation can be accomplished in different ways. Airing openings can be finished off with a perforated ventilation structural shape that prevents insects' entry while allowing sufficient ventilation, taking into account the reduced ventilation sections thanks to the grid.

D) The Joints

Bilaminate sheets are always applied with a joint that allows them to adjust to temperature and humidity related changes. As a rule, the width of a joint is at least equal to the thickness of the sheet.

Practical and aesthetic purposes very often involve using 10 mm joints.

Joints can be finished off in different ways with the butt straps referred to in the previous chapter.

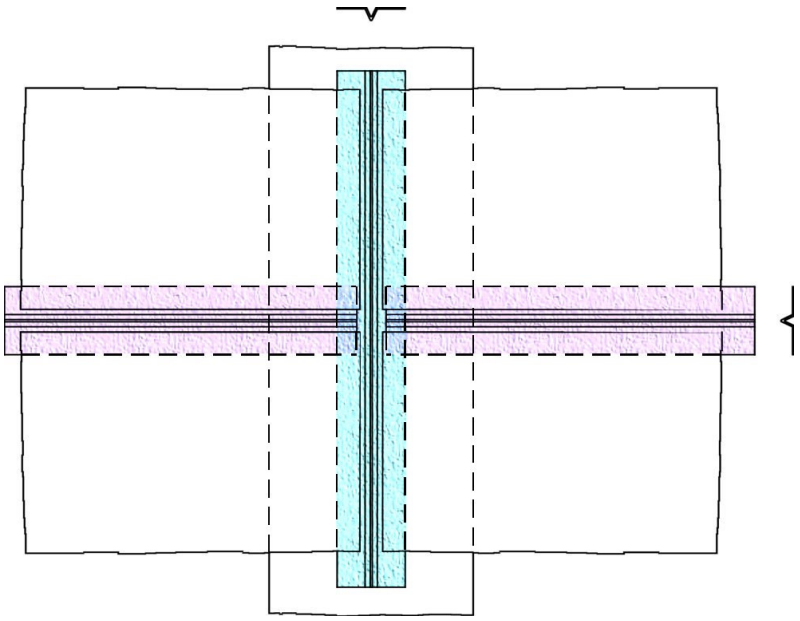


Fig. 14.2 Joint intersection

Vertical joints are always covered by a butt strap. Horizontal joints may remain open if the width of the cross exceeds 22 mm (=screen open for rain).

In the event of intersecting joints, vertical butt straps have priority over horizontal butt straps (see fig. 7.2). Vertical butt straps must never be interrupted.

In all cases, measures must be taken to prevent butt straps from interfering with ventilation.

Compact laminate for outdoor purposes is a stiff and self-supporting product. The minimum thickness employed is 4 mm.
This is a homogeneous product made of high pressure laminate (HPL).
Thanks to its features, Compact bilaminate for outdoor use can be directly fixed onto different kinds of wooden frameworks, which usually have a 20 mm thickness.

Bilaminate sheets can be applied on different types of wooden frameworks:

- Single lathing, directly attached to the rear of the building, with or without insulation layer (see fig. 2.8).

- Single vertical lathing, with opening devices, with or without insulation layer (see fig. 2.9).

- Double lathing, with or without insulation layer (See fig. 2.10).

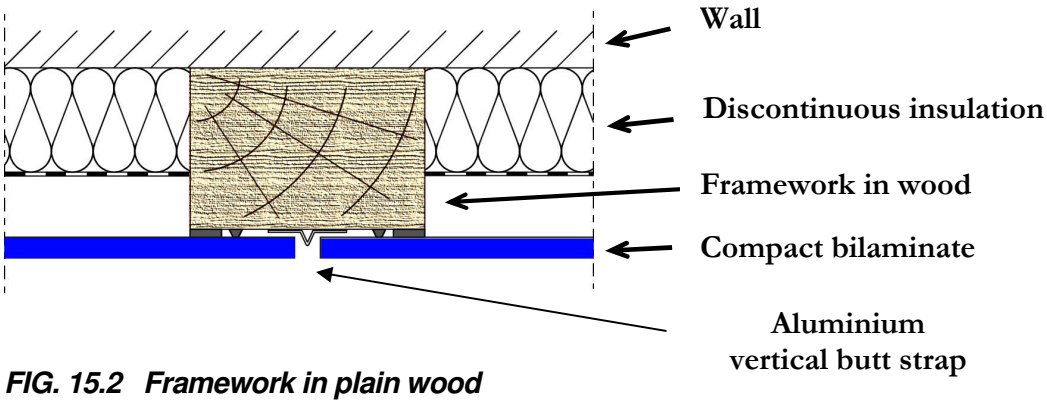


FIG. 15.2 Framework in plain wood

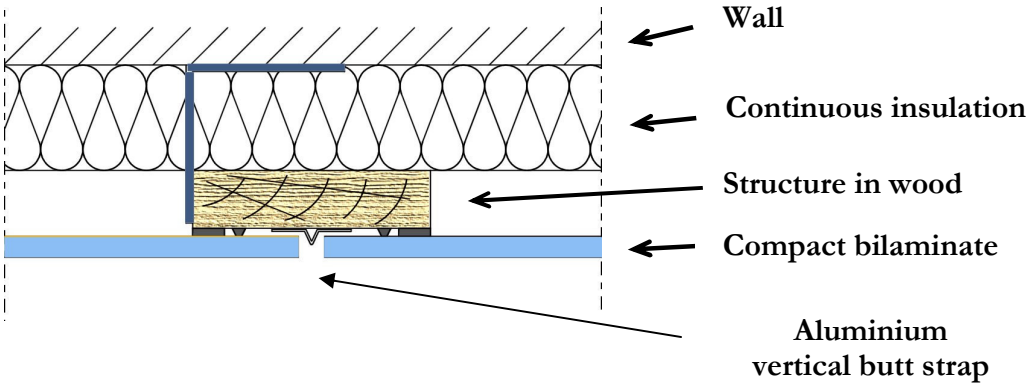


FIG. 16.2 Framework in plain wood with opening devices

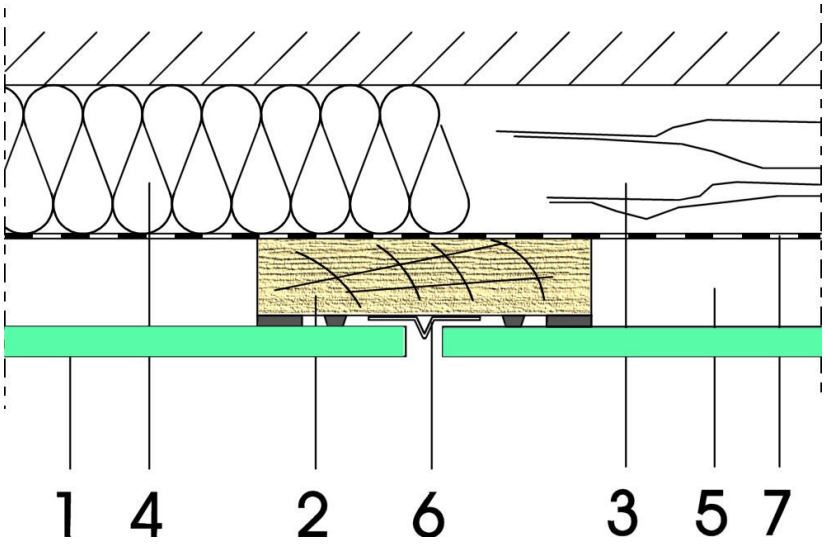


Fig. 17.2 Double lathing.

1. **WR1 Compact**
2. **Support lath**
3. **Base lath**
4. **Insulation layer**
5. **Ventilated cavity**
6. **Vertical butt strap (in aluminium)**

A plain framework with vertically arranged laths certainly represents the easiest and cheapest solution.

Nevertheless a double lathing is preferable, owing to:

- Greater opportunities of evening out any imperfections relating to the foundations and main walls.

- Optimal ventilation of the cavity, thanks to the vertical laths.

- Smaller number of points in which the formwork is fastened to the foundations and main walls.

- Easy installation of the insulation layer between horizontal base laths.

A single vertical lathing fixed with opening devices not only offers the advantages of a double lathing but also allows the application of an uninterrupted insulation layer.

In practice, a double lathing is resorted to in most cases: hence the construction details listed below refer to this type of structure.

The wooden framework is fastened to the foundations with stainless steel pivots or screws.

A) Wooden Protection

The wood must comply with the NBN 281 standards.

Furthermore, the wood is protected from mould etc. according to the NBN 471 standard.

For gluing purposes, the framework must be in surfaced fir. It must have been dried in the wind and must be free from dust and oily substances. The maximum humidity rate for the wood is ± 16%.

B) Minimum Sections for the Wood

Taking into account the action of the weights exerted on a façade, the following minimum sections need to be complied with for base laths and support laths. No differentiation applies between screwing and gluing.

Screwing

Base laths :	Thickness	> 40 mm or = insulation thickness
	Width	> 60 mm
Support laths :	Thickness	> 40 mm
	Width	> 70 mm at a vertical joint
		> 60 mm at an intermediary stud

Gluing

Base laths :	Thickness	> 40 mm or = insulation thickness
	Width	> 60 mm
Support laths :	Thickness	> 22 mm
	Width	> 90 mm at a vertical joint
		> 45 mm at an intermediary stud
		>70 mm at the corner stud

For joint widths exceeding 10 mm the width of the support laths must be adjusted accordingly.

If a joint section is not applied to the intermediary studs, the support lath must be thicker in order to obtain a completely flat support surface.

C) Support and Fixing Distances

Fixing with Screws

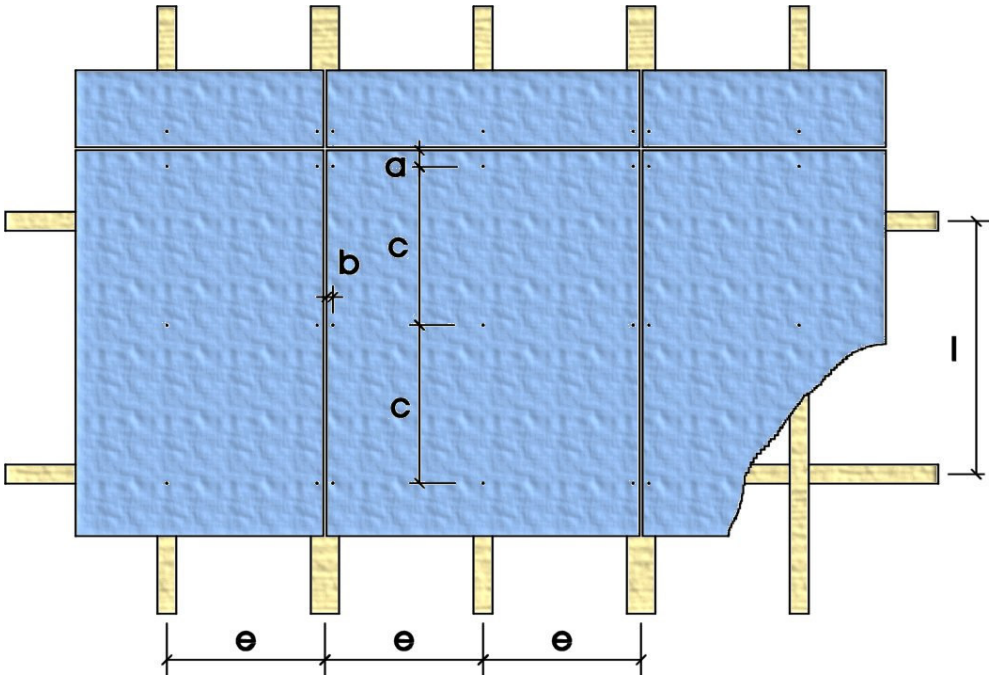


FIG. 18.2 Support and fixing distances in case of screwing

With double laths the distance " **l** " of the base laths is 80 cm. maximum (see fig. 3.2). If the insulation layer is applied between the base laths, " **l** " is adjusted to the dimensions of the insulating sheets.

The maximum distance for the support laths " **e** " and the distance between the fixing points " **c** " are listed in the tables below.

The minimum distance of a fixing point on the edge of the sheet is also shown in fig. 11. The vertical distance of the edge (**a**) is of at least 50 mm, the horizontal distance of the edge (**b**) is of at least 20 mm.
The maxim protuberance (**a** and **b**) is of 100 mm.
The screws must be fixed in the wooden laths at a minimum distance of 10 mm from the edge.

Table 1: support and fixing distances for a sheet with 2 support points.

Thickness	*Height of the building 0-8 m.*				*Height of the building 8-20 m.*			
Compact	*Centre of the facade*		*Perimeter zone*		*Centre of the facade*		*Perimeter zone*	
mm	*e*	*c*	*e*	*c*	*e*	*c*	*e*	*c*
6	*35*	*35*	*30*	*30*	*35*	*35*	*30*	*30*
8	*50*	*50*	*40*	*40*	*50*	*50*	*40*	*40*
10	*65*	*65*	*55*	*55*	*60*	*60*	*50*	*50*

1) “Perimeter zone” means: the 1 m width zone surrounding the whole perimeter of each wall surface.

Table 2: support and fixing distances for a sheet with 3 or more support points.

Thickness	*Height of the building 0-8 m.*				*Height of the building 8-20 m.*			
Compact	*Centre of the facade*		*Perimeter zone*		*Centre of the facade*		*Perimeter zone*	
mm	e	c	e	c	e	c	e	c
6	55	55	40	40	50	50	40	40
8	70	70	55	55	70	70	55	55
10	85	70	70	70	85	70	70	70

1) “Perimeter zone” means: the 1 m width zone surrounding the whole perimeter of each wall surface.

The distances listed in table 1 and 2 relate to facades with a normal exposure to the wind.

The wooden structure must be placed on the outside of the insulation material. This will create space for air to circulate.
Free spaces must be left near the roof, windows or floor to allow air to circulate freely.

Gluing

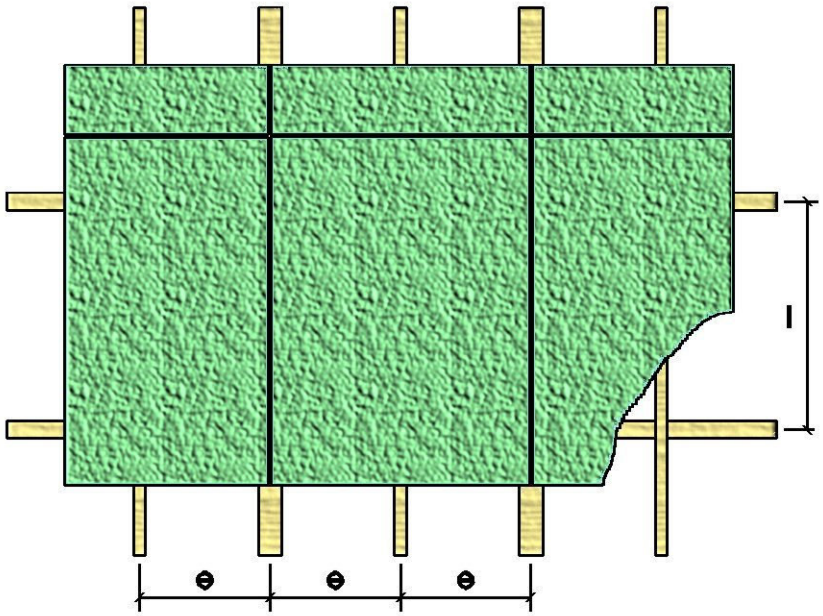


Fig. 19.2 Support distances for gluing.

With double laths the distance" **l** " of the base laths is 80 cm. maximum (see fig. 12.2). If an insulation layer has to be applied between the support laths, " **l** " is adjusted to the dimensions of the insulating sheets.

The maximum distance for support laths is indicated in table 3 and depends on the height of the building. In the perimeter (a 1 m area) a supplementary intermediary vertical lathing is placed in the middle of the capacity load or else narrower sheets are employed.

The maxim protuberance (**a** and **b**) is of 100 mm.

Table 3: Support lath distances for gluing

Thickness	*Height of building 0-8 m.*			*Height of building 8-20 m.*		
mm	***1 open-ing***	***2 open-ings***	***Perimeter zone***	***1 open-ing***	***2 open-ings***	***Perimeter zone***
6	*45*	*50*	*lath*	*35*	*30*	*lath*
8	*50*	*65*	*intermediary*	*50*	*40*	*intermediary*
10	*60*	*70*	*supplementar y*	*60*	*50*	*supplementar y*

1) “Perimeter zone” means: the 1 m width zone surrounding the whole perimeter of each wall surface.

The distances listed in table 1 and 2 relate to facades with a normal exposure to the wind.

3. Metal Framework

The metal framework is in pre-treated (anodised) metal. There are various metal framework systems. For further information on such systems, please refer to the manufacturers of the systems.

4. Applications.

A) Screwing

Wooden Framework

For the fixing of bilaminate sheets on support laths, transport screws are used (see pages 27-28). The diameter of the pre-pierced hole must me 2 mm larger than that with the screw.

Metal Framework

For the fixing of bilaminate sheets on support laths, self-tapping screws are used (see page 29). The diameter of the pre-pierced hole must me 2 mm larger than that of the screw.

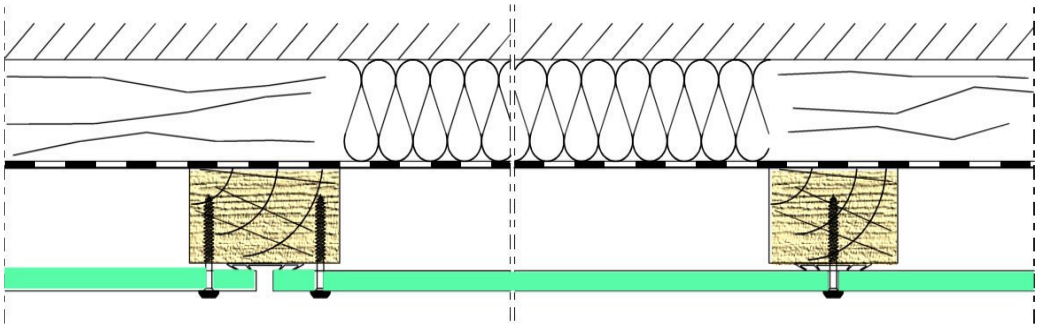


Fig. 20.2 Screwing system.

B) Gluing

Wooden Framework

The framework must be in surfaced fir (eventually soaked). It must have been dried in the wind and must be free from dust and oily substances. The maximum humidity rate for the wood is ± 16%.

The supporting laths must be pre-treated with a primer. With non-treated surfaced fir, the laths need to be treated with the primer on all sides; with soaked wood, only the visible surface must be treated with the primer. This primer has a protective function, it withstands ultraviolet radiation and is also waterproof, thus preventing wood decay.

Once the primer has dried, the butt straps are glued or fastened to the framework and biadhesive tape is applied without interruption on the side of the lath. The thickness of the tape is 3 mm; its width is 12 mm. This tape holds the façade covering sheets temporary in place and makes it possible to achieve glue thickness that is constant and capable of adjusting to the sheet changes caused by humidity and temperature variations.

Furthermore, the surfaces to be glued and the framework should be cleaned before setting.

Ms-polymer or polyurethane glue is applied vertically on the lath in a single bead, either by means of a compressed-air gun or manually. The bead is applied at a maximum distance of 10 mm from the tape. The application temperature ranges between 5° C and 40°C, depending on the glue hardening features.

Once the glue has been applied, the protective sheet can be removed from the bi-adhesive tape. Following this, you can put the bilaminate sheet in place.
This operation must be carried out without allowing the brush to touch the panel. Once the sheet is in place, it can be pressed against the tape, within 10 minutes of applying the glue.
To ensure the bilaminate sheets remain perfectly in place, these need to be temporarily fixed until the glue has hardened completely (24 h at 20°C and 50% HR). For this purpose, at the intersection of the 4 sheets, a small wooden lath and a screw are used to hold the corner points on the joint exactly on the same level. Furthermore, with larger sheets, small laths are fixed on the joints 60 cm away from one another (see fig. 15).
Excess not hardening glue can be removed with a cleaner.

Some of the data supplied by the glue manufacturer can vary slightly from the general data.
You also need to make careful reference to setting indications provided by the glue manufacturer.

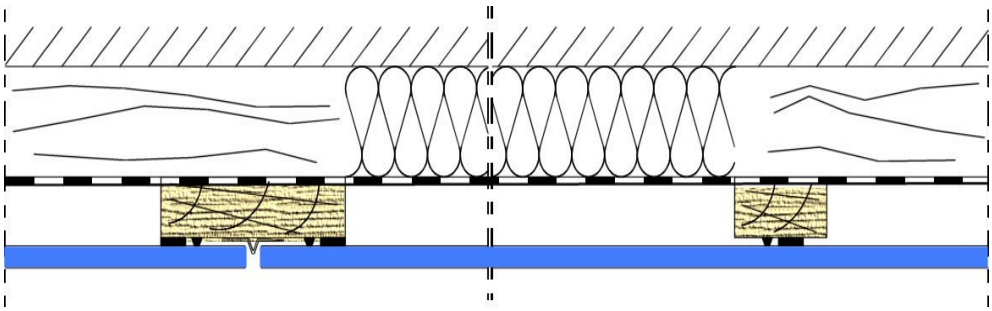
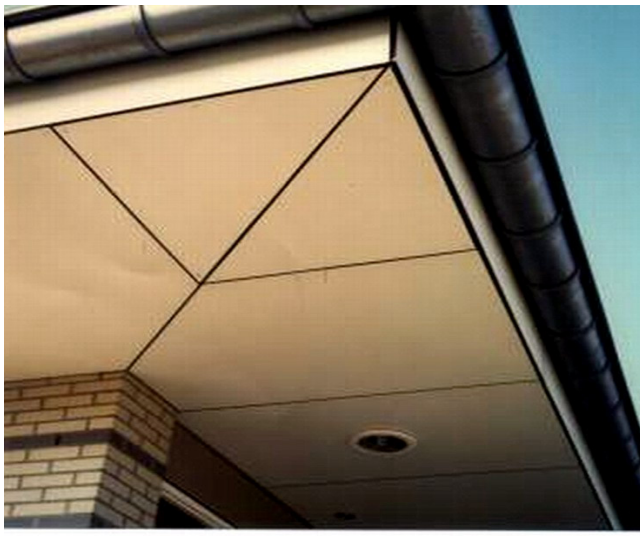


Fig. 21.2 Gluing system

Metal Framework.

Gluing is performed in the same way as for wooden frameworks. The only difference is that the surface of the metal framework needs to be slightly smoothed for the glue to better adhere to the metal. To remove the dust from the metal you need to use a cleaner.
Some of the data supplied by the glue manufacturer can vary slightly from the general data.
You also need to make careful reference to setting indications provided by the glue manufacturer.

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