

FENIX®



STORAGE, HANDLING
AND PROCESSING GUIDELINES.

STORAGE AND TRANSPORTATION

Transportation and handling of the sheet material should only be carried out using suitable equipment. Sheets must always be handled with care to prevent damage to the external surface. FENIX is not an inflammable material; therefore fire prevention and protection measures must be adopted as per wood based products.

STORAGE

The sheets must be stored in a proper environment as for example a dry, clean and frost-free room. Place pallets and sheets on a flat surface that provides full support. Keep sheets in the original packaging whenever possible. Remove straps if sheets are to be stored for a long period of time. Prevent moisture forming between sheets. Do not place moisture-sensitive (paper) layers between sheets.

Partial (on one side only) exposure to moisture or heat can be prevented by:

- stacking the sheets one on the top of the other;
- avoiding gaps between sheets, e.g. when sheets have been machined;
- removing protective films from both sides at the same time;
- removing protective film within 24 hours after packaging removal.

TRANSPORT

FENIX sheets should be handled and transported only by a moving or other professional with proper equipment with great care to avoid breakage and damage. If the sheets should be loaded or unloaded, they should be lifted and not slid during loading and unloading operations, unless they are back to back, in pairs. One sheet rubbing against another can cause surface scratches or abrasions.

Single sheets should be carried with the pigmented part facing the carrier's body. Two people are needed to handle large sheets, and we further recommend bending the sheets lengthwise.

Prevent dust from depositing on and between sheets. Use adhesive, easy to peel off stickers for marking / coding and remove immediately after installation.

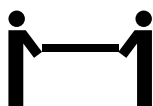
Transport of FENIX Thin Sheets

In case of thin sheets (less than 0.9 mm thickness), individual sheets may be rolled up for handling with the pigmented side facing inward, forming a cylinder about 600 mm in diameter or at least large enough not to damage the sheet. When transporting stacks of sheets, use a platform of suitable size and stability, securing the sheets with straps or stretch film in order to avoid dangerous slipping.

If the sheets have to be transported, secure the sheets using straps and place corner protection under the metal straps.



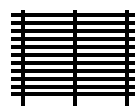
During transportation, the panel pigmented side should be facing the carrier's body



Two persons are always required to handle large sheets.



Fork length >1.5m with load capacity > 2500Kg



6m max height for stacking pallets



Panel should be stored in sheltered rooms



Correct panel positioning



Panel handling should be carried out by two people

Transport of FENIX Solid Panels

Secure the panels using straps during transportation. Place corner protection under the straps.

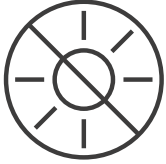
Sheets with adhesive protective film

The protective film is designed to temporarily protect the surface from dust, scratches and marks left by handling equipment; it does not protect from corrosion, dampness or chemical agents.

Sheets covered with protective film should be stored in a clean dry atmosphere at room temperature (ideally 20 °C), avoiding exposure to atmospheric agents and UVA rays.

The protective film should be removed from the sheet surface after application and before the final item. In case of thick sheets with protective film on both sides, the film should always be removed from both sides at the same time. In any case, the removal should take place within 6 months from the date of shipping by Arpa. Arpa shall not accept liability for improper use of sheets covered with a protective film, nor for any consequences of an incorrect application.

Protective film symbols:



The protective film used is photosensitive; therefore storing sheets under direct sun light is to be avoided.



The product has a slight directionality, which is only visible under some light conditions. Direction is indicated on product packaging for extra precaution.

FENIX PROCESSING

FENIX sheets are composed of over 60% cellulose fibre. They are sensitive to temperature variations and, above all, to humidity variations, which can cause dimensional changes.

Dimensional changes of FENIX sheets can be different from those of the support and so cause warping of the finished composite sheet.

This issue can be solved by:

- pre-conditioning of both support and sheet before gluing;
- balancing the composite sheet so that both sides are made of sheets with identical properties;
- ventilation and humidity control of the room where the composite sheet is installed;
- installing the sheet so as to allow for dimensional changes, if any.

PRE-CONDITIONING

In order for FENIX sheets and its support to reach a balanced and constant level of humidity, both the sheet and support need to be pre-conditioned at the same time before gluing.

This operation makes it possible to reduce any differences in the materials to a minimum, particularly in case of changing environmental conditions that generate tensions.

Solutions include either "cold" or "hot" techniques as described below.

Cold pre-conditioning

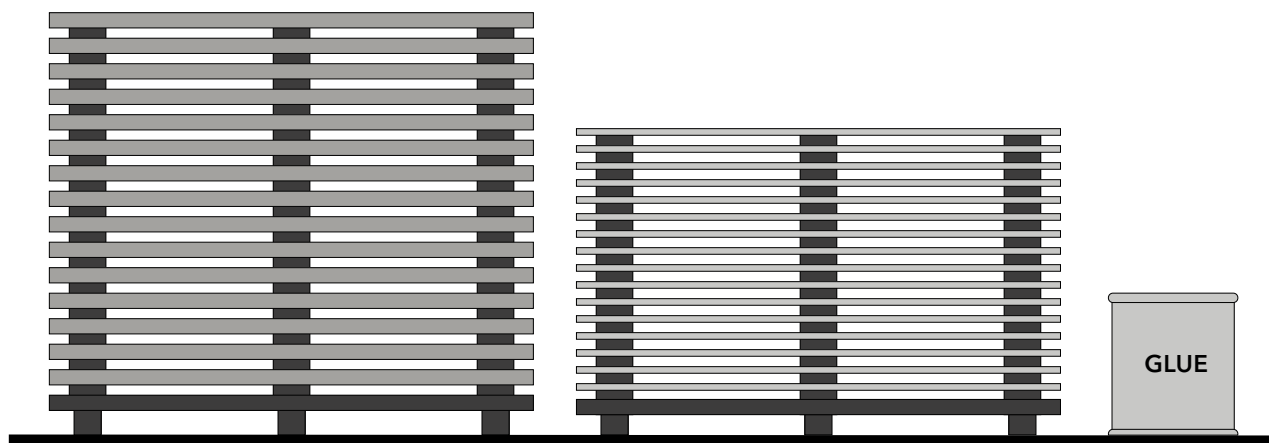
Method A

Sheets and supports are stacked together for at least three days in a room where humidity and temperature conditions are similar to those of the place where finished sheets will be installed.

If these sheets are installed in a warm place with constant low humidity, their components should be conditioned in a warm and dry atmosphere to avoid subsequent shrinking.

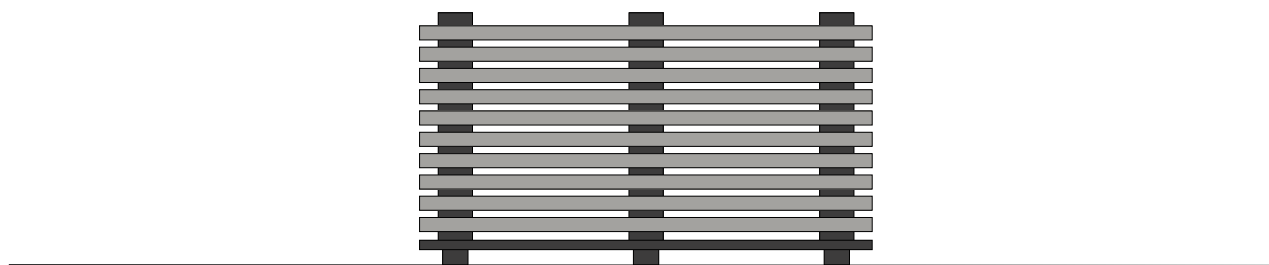
Method B

Sheets, supports and glue should be placed for about ten days in a room with a temperature ranging between 18 °C and 20 °C, with a humidity percentage of 50% and good air circulation.



Method C

FENIX sheets that constitute the opposite sides of the same sheet are stacked back to back, in pairs, for at least three days in a dry room, until they reach a similar degree of humidity. After gluing, each movement caused by humidity variations will be similar in size and direction on each side of the sheet, thus reducing the risk of warping. With this method, conditioning of the support in the same location is not required.

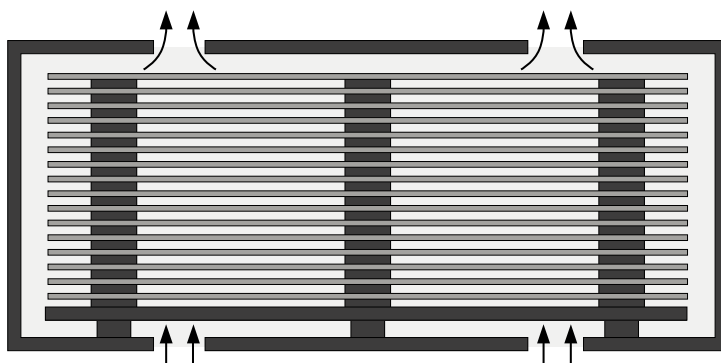


Hot pre-conditioning

FENIX sheets are arranged in pairs, spaced apart, in order to allow hot air to circulate.

Duration and temperatures will vary depending on the type of glue used (e.g. for about 10 hours at 40 °C or 6 hours at 50 °C). If the operation needs to be speeded up, the sheets can undergo an accelerated partial drying process by placing them, separated by battens, in a small heated room (e.g. for about 3 hours at a temperature of 40 °C or for 2 hours at a temperature of 50 °C). To speed up the operation even further, a heat press can be used, whereby sheets are processed two at a time (face to face) (e.g. for about ten minutes). Gluing should be carried out a few hours later. The above guidelines can be applied when weather conditions at the sheet's intended location are temperate.

If the composite sheet's final destination is one with low relative humidity, it is advisable to pre-condition both the support and the sheet at a similar relative humidity and at room temperature, or at a higher temperature for a shorter period (e.g. 20 hours at 40 °C or 10 hours at 50 °C). It is never advisable to exceed 50 °C. Gluing should be carried out immediately after pre-conditioning, strictly in accordance with the manufacturers' recommendations.



Please note that the mentioned durations and temperatures are a general guide to good practice only and constitute no form of warranty or representation as to fitness for purpose in respect of the process. The user is required to verify and test for specific suitability.

FENIX SHEET BALANCING

For correct sheet balancing, the same type of FENIX sheet should be used on both sides (thickness 0.7, 0.9 mm or 1.2 mm and if possible from the same production batch). Stresses may occur between two different materials bonded together. To avoid subsequent distortion in the resulting sheet, it is therefore desirable to use materials with identical properties on both sides, subject to the same dimensional changes in relation to environmental variations. This is an essential strategy, especially if the sheet is self-supporting or not directly supported by a rigid structure.

The larger the area to be clad, the more essential it is to consider the following factors: choice of the most appropriate sheets for balancing the composite sheet, density, symmetry, and rigidity of the support. Ideally the sheets to be used for both sides of the finished composite sheet should be taken from the same sheet or from sheets from the same manufacturer and of the same type, thickness, colour, and production batch. It is important that the two sheet sides are cut in the same direction, i.e. in the direction of the paper, which is the same as the direction of sanding. Any dimensional changes to the sheet will then be minimal compared with what would occur if the sides were cut in the opposite direction.

Although not recommended as the risk of warping can then not be totally ruled out, it is possible, in standard and non-critical applications, to use materials other than FENIX on one side of a composite sheet provided, subject to correct balancing (e.g. HPL Arpa in 1.0 mm thickness for FENIX NTM in 0.9 mm, HPL Arpa > 1.2 mm thickness for FENIX NTM 1.2 mm, and a "dedicated" HPL Arpa in 1.0 mm for FENIX NTA in 0.7 mm).

Of course, it is important to choose materials with physical properties similar to those of FENIX, as the more these differ from those of FENIX, the more likely it is that stresses will be created due to the lack of symmetry.

VENTILATION AND HUMIDITY CONTROL

Both FENIX Thin and Solid sheets supplied by Arpa are always covered with protective film. In the case of Solid sheets, both sides are covered with protective film. To store them properly, the protective film should never be removed from just one side. It is also important to remember that FENIX sheets and wood fibre support are materials that are sensitive to humidity variations in the air. FENIX for example, expands by about 1.5 mm per linear metre in both length and width directions. Adequate space for expansion should therefore be allowed for between one sheet and the next.

FENIX SOLID PANELS: PROCESSING

Due to their composition, FENIX Solid panels can expand and shrink.

Temperature and humidity on front and rear sides should not differ over long periods of time.

The lower side of horizontal worktops and the rear side of vertical wall should therefore be well ventilated.

Panel edges should not remain wet for long periods of time.

If the panels are secured via profiles, these should be provided with draining elements. When fixing panels, it is important to allow for a maximum movement of 2.5 mm/m².

Drill holes and joints should be dimensioned accordingly. Do not tighten screws too much in order to allow the panels a minimum clearance.

FENIX Solid panels should be conditioned before processing and installation so that they can reach a balanced condition in their environment.

The homogeneous composition of the material makes it possible to machine both sides and the surface. FENIX panel machining is similar to that of high-quality hardwood.

The hardness of the panels makes greater demands on tools than when machining materials composed of softwood.

The use of hard metal tools is recommended. Diamond-tipped tools are recommended for large sized elements.

This ensures a very good finish and a long tool life.

CUTTING

FENIX NTM should preferably be cut with saws using blades with tungsten carbide inserts and diamond ones for FENIX NTA.

If the cutting perimeter is not well defined, FENIX NTA should preferably be processed using blades and tools dedicated to aluminium and general alloy.

During the cutting process, the material can produce inert powder. Staff performing the cutting process have to be adequately trained, and equipment used to cut the materials to size has to be adequate for the purpose at hand and well maintained and calibrated.

Every fabrication company working with the panels needs to make sure that proper risk assessments have been performed.

The following general guidelines apply to cuts made on FENIX panels using circular saws.

- Feed: 7 - 22 m/min (23 - 72 ft/min).
- Teeth: alternate or flat-top V-shaped teeth.

Positioning

Always position the teeth on the pigmented side of the panel.

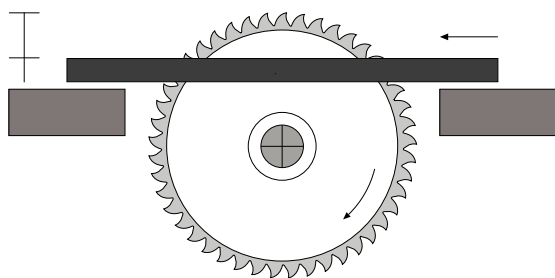
Edge cutting: best results are obtained using bench machinery.

Sharp edges can be rounded by means of sandpaper or a milling machine.

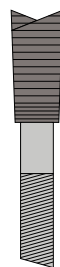
Rake angle: best performance is obtained with a 45° rake angle.

Use rubber shims to prevent the panels from sliding if the machine is not equipped with a mobile work top.

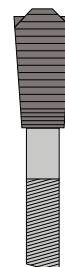
Saw blade height adjustment



Alternate teeth



Flat top V-shaped teeth



Cutting with bench circular saw

Keep pigmented side facing upwards when saw cutting, drilling and milling.

When a pigmented side must be slid over the machine's worktop while machining, we recommend placing a protective panel, for example of hardwood, on the worktop:

Diameter		Teeth	Rpm	Thickness of the blade		Blade height adjustment	
mm	inch			mm	inch	mm	inch
300	~12	72	~ 6.000/min	3,4	~ 1/8	30	~ 1
350	~14	84	~ 5.000/min	4,0	~ 3/16	35	~ 1
400	~16	96	~ 4.000/min	4,8	~ 3/16	40	~ 1

Cutting with hand-held circular saw

When using a hand-held circular saw, the panel side with no pigment should be facing upwards.

Diameter		Teeth	Rpm	Thickness of the blade		Blade height adjustment	
mm	inch			mm	inch	mm	inch
150	~ 6	36	~ 4.000/min	2,5	~ 1/8	15	~ 5/8
200	~ 6	36	~ 4.000/min	3,0	~ 1/8	20	~ 3/4

Jig saw

Jig saw (carbide-tipped): interior corners of cut-outs should be drilled first with 8 - 10 mm ($\approx$ 5/16 - 3/8 in) hole diameter. Consider the use of a specific jig saw blade for pigmented surfaces.

MILLING

Milling shapes:

- straight and slanted bits for cutting edges and bevelling
- hollow or round ground bits for rounded edges
- diamond circular saw blades for grooves

Material:

Hard metal or diamond cutters, manually operated milling cutter, or spindle moulder:

Diameter		Rpm		Speed		Feed	
mm	inch			m/s	ft/s	m/min	ft/min
20-25	~ 1	~ 18.000	~ 24.000/min	20 - 30	~ 65-100	5	~ 16
125	~ 5	~ 6.000	~ 9.000/min	40 - 60	~ 130-200	5-15	~ 16 - 50

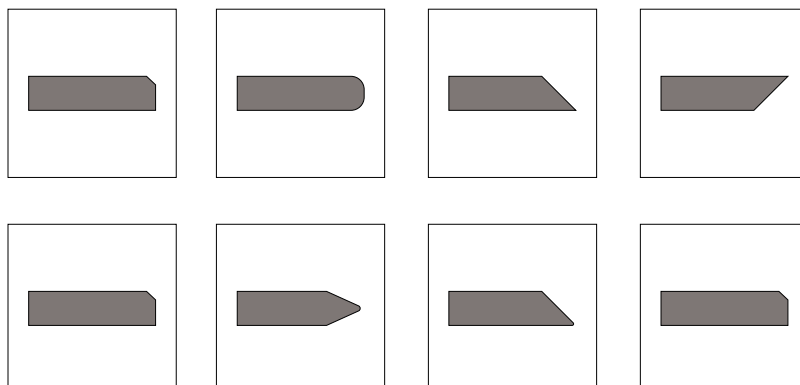
Edging/milling templates

Edges should be safe, free from saw marks and jagged edges.

For better appearance it is advised polishing edges.

Several edge treatments can be considered for functional and aesthetic reasons.

Some examples follow:



DRILLING

The use of carbide-tipped HSS-drill bits or diamond ones with a 60-80° angle is recommended. FENIX panels should be drilled using support sheets.



Large holes, e.g. for suspension and locking equipment, should be drilled using combination drill bits. The exit speed of the drill bit must be carefully selected so as not to damage the product surface. The feed rate must be reduced by 50% shortly before the drill bit exits the work piece. During drilling operations, the counter-pressure should be increased using hardwood or equivalent material in order to prevent the surface from breaking.

GLUING

FENIX Solid panels can be glued to each other and onto many materials using one or two-component adhesives, such as epoxy or polyurethane adhesive systems.

Gluing is often carried out together with a mechanical joint to provide sufficient pressure during drying.

Thickening the edges of panels with FENIX Solid strips:

- make sure panels and strips have the same "grain direction";
- pre-condition panels, strips and adhesive in the same way (temperature and humidity preferably adjusted in line with future conditions of use);
- remove grease from surfaces to be glued, roughen them slightly, and ensure they are dust-free;
- strictly follow the instructions provided by the adhesive manufacturer.

Type of glue	Application	Open time	Pressure	Set time
Epoxy adhesives	100-250 g/m ²	Depending on the type	0,2 N/mm ²	4-8 hrs at 20°C
Polyurethane	100-250 g/m ²	Depending on the type	0,2 N/mm ²	4-8 hrs at 20°C

It is advisable to carry out tests to check how the glue reacts and to follow the glue manufacturer's guidelines, which can differ for different glue types or environmental conditions.

INSTALLATION GUIDELINES

There are two major installation systems for FENIX Solid panels:

- mechanical (screws and rivets)
- chemical (glue)

Vertical application

FENIX Solid can be used as so-called suspended cladding elements. This means that the material is assembled on a supporting sub frame. The panel can be fixed visibly or invisibly.

When determining the sub frame, it is important to take the following points into account:

- the load-bearing requirements;
- maximum fixing distances for the panels;
- the necessary ventilation or moisture regulating measures;
- the tolerance for panels to move;
- the available panel sizes;
- the thickness of any insulating layer;
- the anchoring options in the building (wall) construction;
- the legal requirements.

Corner solutions

When joining two panels in a corner, it is important to take the panel movement into account. To avoid tension at the joint, it is advisable to keep the leg length of the corner element as small as possible (max 400 mm).

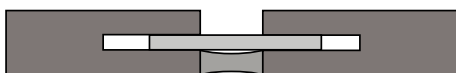
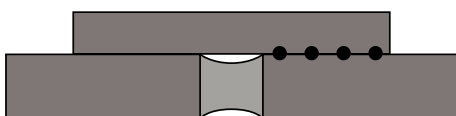
Compact panels can be joined together in corners in various ways:

- glued aluminium or plastic corner profile
- glued aluminium or plastic strip
- built-in strip and groove joint with support

Joints and connections

Solutions for vertical joints include:

- expansion joint
- built-in groove
- rebated joint



To allow for dimensional changes as a result of moisture and temperature fluctuations, joints should be left free both for vertical and horizontal connections such that the panel can move by a maximum of 2.5 mm/m.

Thanks to the excellent workability of the material, it is possible to accurately seal vertical and horizontal joints without auxiliary profiles.

For panel thicknesses from 8 mm or more, it is possible to make connections in the form of rebated joints or as built-in groove connections.

Horizontal joints: either built-in groove or rebated joint connections can be used for horizontal joints. Joints must be made in such a way that the panels can move by 2.5 mm/m maximum. The recess in the rebated joint must measure at least twice the width of the joint itself.

Vertical joints: built-in groove connections can be used for vertical joints. Panel thickness on each side of the groove must be at least 2.9 mm. If aluminium grooves are used, a panel thickness of 8 mm is sufficient.

Joint sealing using mastic

When FENIX panels are used for interior applications where high standards of hygiene are required, wall constructions with airtight seals are often preferred.

The joints are then sealed with an elastic mastic. This sealing material must be mould repellent according to ISO 846 and resistant to disinfectants if it is used in the aforementioned applications.

Furthermore, for maximum bonding between the sealing material and the panel, it is necessary to avoid draughts, damp, dust and dirt.

We recommend using FENIX Solid panels in combination with silicone or polyurethane mastic.

Important guidelines for applying elastic sealing material:

- The joint must be absolutely clean, dry and free of grease.
- If necessary, a primer should be applied to facilitate bonding.
- The sealing material must on no account adhere to the reverse side (bonding on three x sides) as this can cause breakage of the panel. It is advisable to use a separating film or a polyethylene tongue.
- To ensure that the sealing material is not under excessive strain, grout joints should be wide enough and their depth should not be greater than their width.

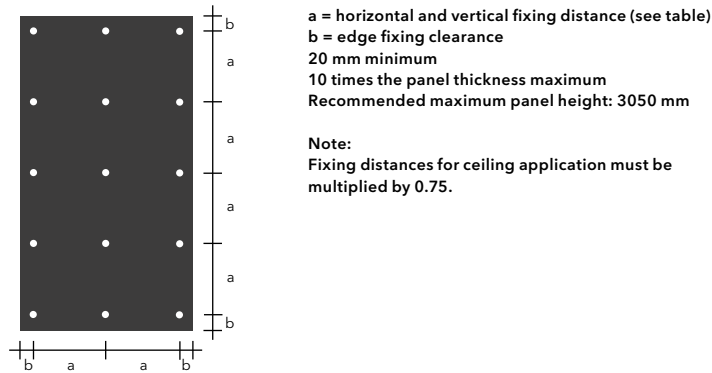
Visible fixing with screws or rivets

FENIX Solid panels can be fixed to a timber sub-frame structure using fast fix screws, or they can be fixed to a metal sub-frame structure using aluminium rivets.

The sub-frame structure must be assembled in such a way that the area behind the panel is ventilated. This ensures that the temperature and humidity will be the same on both sides of the panel.

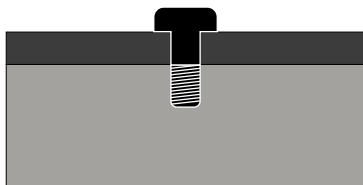
When fixing panels with screws or rivets, it is important to ensure that panels can move freely and evenly.

- The diameter of all pre-drilled holes in the panels must be 8 mm when using fast fix screws that have a diameter of 4 mm.
- When using rivets with a 5 mm diameter, one hole - centrally positioned in the panel - must be pre-drilled with a 5.1 mm diameter, and all other holes must be pre-drilled with a 10 mm diameter. A special nosepiece must be used on the riveting tool to keep the head of the rivet 0.3 mm away from the panel surface.
- All joints must be at least 8 mm wide.
- Panel thickness: minimum of 6 mm (for efficiency and performance purposes, a minimum thickness of 8 mm is recommended).

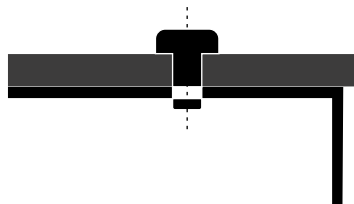


Maximum fixing centres (mm)	Panel thickness (mm)		
	6	8	10
2 fixings in one direction	450	600	750
3 or more fixings in one direction	550	750	900

Visible fixing on screws on wooden support



Visible fixing on screws on metal support



Invisible fixing with adhesive

FENIX panels can be fixed on to a timber or metal support using special adhesive systems that enable dimensional variation of both coating and support. The guidelines of qualified glue manufacturers must be followed in order to achieve high-quality connections.

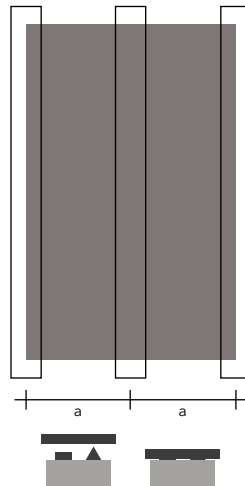
Arpa is not responsible for the selection or use of adhesives in fixing systems.

The sub-frame structure must be assembled in such a way that the area behind the panel is ventilated. This ensures that the temperature and humidity will be the same on both sides of the panel.

The adhesive must be applied only in a vertical direction and always over the full height of the panel. All joints must be at least 8 mm wide.

The maximum installation size of the panel is 3050 mm x 1300 mm. For efficiency and performance purposes, thicknesses under 8 mm are not recommended.

Adhesive system including double sided tape for temporary fastening while the adhesive sets:



Maximum horizontal fixing distances (a):

Maximum fixing distances (mm)	Panel thickness (mm)	
	8	10
2 fixings in one direction	600	650
3 or more fixings in one direction	650	650

Horizontal Worktops

FENIX Solid panels can be used as worktops or as table tops.

Thickness

Minimum thickness: 10 mm.

Panel thickness and fixing distances as well as expected load capacity are directly linked and must be calculated correspondingly.

Fixing

Assemble using inserts or threaded screws.

Maximum drill hole depth equals panel thickness minus 3 mm. Drill hole diameter in panels should comply with the instructions of the supplier of the fixing means and be capable of withstanding the shank of the screw.

Drill holes in the support construction must allow for the panels to move: either drill slotted holes or make sure that the diameter of the drill holes equals screw diameter plus 3 mm. If more than two panels are joined together (e.g. for long wall benches), slotted holes of sufficient length should always be made in the support construction.

Support

Steel or aluminium supports should be sturdy and rigid enough to prevent panel warping as a result of the load applied on the upper surface. If any other elements are fitted under the panel (drawers, boxes, pipes), then the support must be dimensioned accordingly.

The distance between the support and the processed panel edge should be lower than 25 cm.

MATCHED COLOUR CORE PANELS INSTALLATION

Processing FENIX Solid matched colour core panels is the same as processing FENIX Solid black core panels. Although these products are compatible with most of the tools and techniques used for the processing of normal panels, additional techniques are necessary in order to take advantage of their full potential.

Handling and storage

The composition of FENIX Solid matched colour core panels makes them slightly more fragile than FENIX Solid black core panels, and they should therefore be handled with extra care.

They should always be stored horizontally. Vertical storage is not recommended given the risk of damaging the edges. Edges and corners are particularly exposed and could be damaged as a result of impacts. Storage conditions are the same as those recommended for normal compact panels.

Machining operations

All traditional tools and machinery used for FENIX Solid black core panels can be used for FENIX Solid matched colour core panels, and we recommend following all the general recommendations regarding machining.

How to cut the panels

Use the same standard equipment as used for other FENIX Solid panels.

Cutting tools and saw blades should always be kept sharp to avoid chipping. As FENIX Solid matched colour core panels are more brittle, to avoid chipping on the lower side during cutting operations with circular saws, precautions should be taken such as:

- lowering the saw in the bench;
- reducing the throat of the saw by placing a piece of hardboard under the cut; changing the saw blade for one with negative angle teeth;
- simply allowing an extra amount for edge trimming.

Large sheets may be cut by scoring but extra care must be taken to prevent shattering.

Gluing

The use of non-pigmented or transparent quick drying adhesives are recommended to achieve a visually satisfactory end result.

Assembly

To obtain a good result when joining two panels of FENIX Solid matched colour core, it is advisable to use a mechanical fixing system.

Loss of structure

Various machining and scoring operations can be carried out on FENIX Solid matched colour core panels. However, please note that the scoring will alter the FENIX surface structure and lead to the loss of all specific characteristics of the product.