

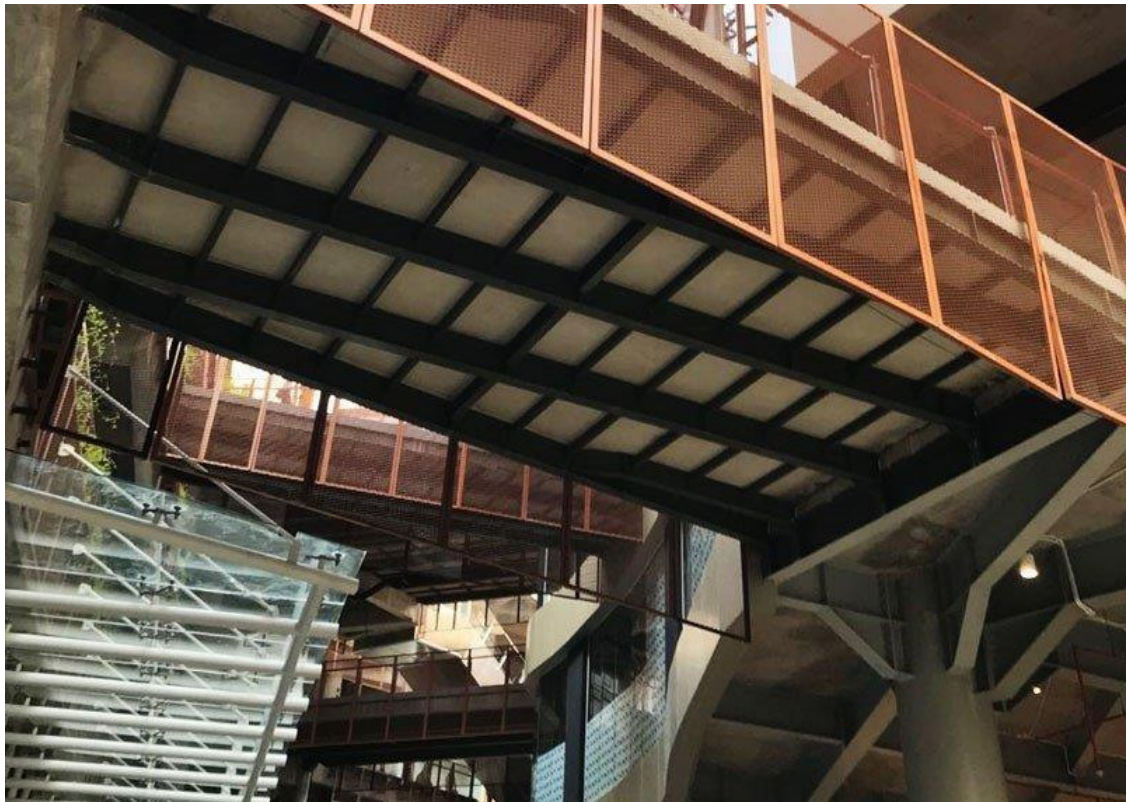
Basic guidelines for the specification of **KalsiFloor** for Flooring Application



KalsiFloor

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1.0 About KalsiFloor:

Product Description:



KalsiFloor is a non combustibile fiber cement panel, manufactured on Hatschek machine from a precise combination of cement, silica and natural organic reinforcing fibers. During the production, the boards are cured and stabilized in an autoclave process involving high temperature and pressure control, ensuring a final product with optimum dimensional stability and exceptional mechanical properties.

4. Dimensions and tolerances:

Available Dimensions

Product	Thickness (mm)	Width x Length (mm)
KalsiFloor	15.0	1200 x 2400, 1220 x 2440
	18.0	1200 x 2400, 1220 x 2440, 1200 x 1500, 1200 x 1800
	20.0	1200 x 2400, 1220 x 2440, 1200 x 1800

* 15/18mm by special order only and will incur shipping lead times

Surface finishes



Edge finishes



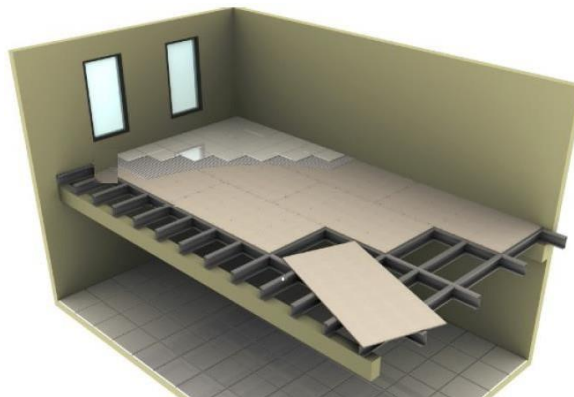
Application:

KalsiFloor provides a good alternative to concrete flooring where concrete casting is difficult (usually for retrofit works or construction in operating buildings). Compared to wood based panels, KalsiFloor is advantageous due to its superior moisture resistance while also, being an excellent substrate to ceramic tiles.

KalsiFloor considered its full sized panel (standard 1.2m x2.4m) is to be applied on an adapted steel or timber frame design;

- i. Steel profile dimension of certain base metal thickness or timber profile of certain width & depth
- ii. distance between framing support/ joist spacing,
- iii. with or without horizontal noggins (depending on floor spans)

such that the decking system meets a suitable structural stiffness and adequate resistance based on its intended use (its expected load capacity and established deflection criteria).



Generally, aside from its maximum allowable Ultimate Limit Strength (ULS) load capacity, the framing structure needs to be able to cater for a maximum deflection of $L/250$ span under the Serviceability Limit Strength (SLS) load and assessed to meet specific load requirements i.e. in terms of maximum allowable uniformly distributed load (UDL) and concentrated load (CL) as below:

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Joist Spacing	Load Applicator Size 115mm2 (kN)	Load Applicator Size 350mm2 (kN)
450mm	6.6	2.72
600mm	4.9	2.55

NOTE 1: Standards and codes may determine that higher loads may need to be considered. A registered structural engineer should be consulted in these instances.

NOTE 2: These tests satisfy the requirements for ultimate limit states as set out in AS/NZS 1170.1.

Note that it is the responsibility of the structural engineer to code-check the design of the floor system (plus its adjacent main structural elements) to its relevant/ applicable local codes and standards, thus, ensuring the performance of the framing system in which the KalsiFloor board will be laid on.

Kindly consult **Kalsi Technical** for further discussion.

2.0 Benefits of KalsiFloor:

KalsiFloor is an advanced green building material that is suitable for internal intermediate/ laid-on flooring applications;

- i. can be directly finished with carpeting or vinyl or tiles in residential or office projects
- ii. can be finished with reinforced mortar screed/ high performance coating in heavy duty applications

It is a superb alternative to wood-based panels and concrete slabs flooring by offering durable and incredibly lightweight solution with simple, fast and clean construction.

Kalsi is the perfect
balance of resistance,
durability, and
functionality.

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BENEFITS

- Resistant to the attack of termites, insects and other vermin
- Moist, mould and water resistant
- Speed of installation
- Impact resistant
- Lightweight solution
- Non-combustible
- Higher mechanical strength
- Durable
- Does not swell



Certifications:

All Etex Building Performance Indonesia products are manufactured in line with the ISO standards. Etex Building Performance Indonesia manufacturing facility achieved the certificates of ISO 9001:2008, ISO 14001:2015 and OHSAS 18001:2007. These certificates can also be downloaded from www.kalsi.co.id.



Best Installation Practices:

3.1 General Guidelines:

Storage



All Kalsi boards must be stored flat on pallets and placed inside covered and dry conditions, optimising protection for stored boards against exposure to weather and other unfavourable conditions.

Ensure the boards are stacked on flat ground and supported with level bearers. Improper stacking and/or on unlevelled surface may result in permanent deformation that causes unsightly appearance such as waviness (especially for planks).

Boards are preferably stored under a protected shade. If stored outdoors, it must be covered from effects of weathering agent such as rainwater and sunlight exposure. Allow wet boards/ planks to dry to equilibrium under natural ventilated condition prior to any installation.

Handling & Lifting the Floor Panels

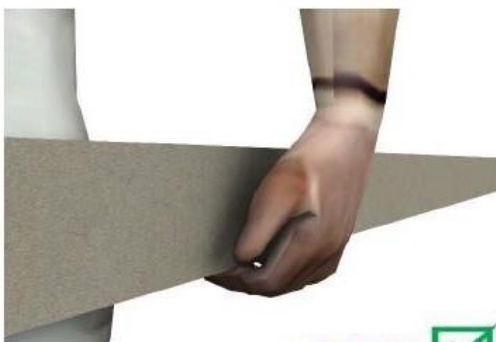
Never carry Kalsi boards/planks on flat and middle position, as this increases the likelihood of breakage.



Hold it vertically on the Edge as Figure above.

Hold it vertically on the Edge as Figure above.

When single person lifting, hold it vertically in the middle and spread hands as far as possible to provide maximum support to suit length of panel (up to 2,400mm)



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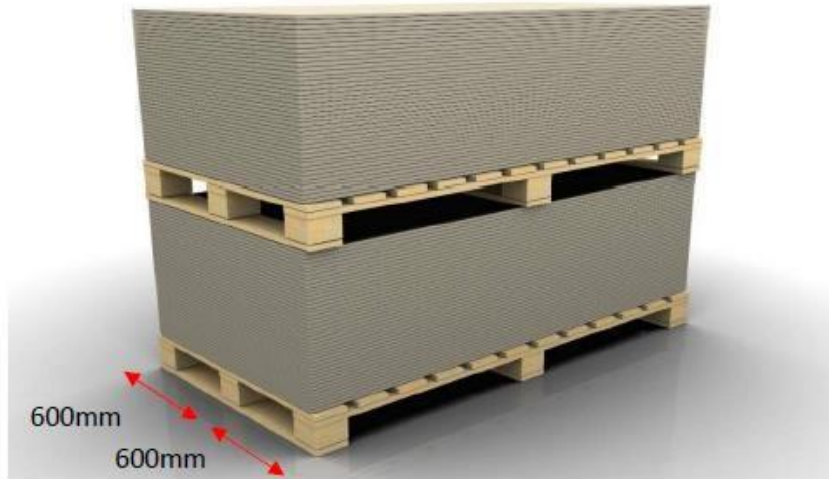


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Is recommended to be carried by 2 persons at two ends as in Figure 5.

On-Site Practices

Store sheets neatly on flat surface, clear off the ground to avoid damage and moisture ingress.
Bearers to be spaced at 600mm centre maximum as below;



Never install damp sheets, if the boards or planks have been wetted, allow to dry to Equilibrium Moisture Content before lifting and fixing the boards.

Kindly refer to fixing recommendation and framing details for the boards as per its intended application.

For best performance, the boards are recommended to be pre-painted before installation OR alternatively, to be coated as soon as possible after they are installed.

Ensure the boards are dry, clean from dirt and/or sanded prior to painting.

Recommended Tools and Equipment



Table saw (above) and circular saw (left) are both power cutting tools with a tungsten carbide tipped saw blade

Sawing machines such as Festool, Makita, Bosch, DeWalt etc work with a tungsten carbide tipped saw blade on a low speed electric motor and move over a fixed working table. Typically, used on site producing good results of cutting Kalsi Boards with thickness up to 20mm.



Vacuum cleaner is recommended for cutting with power saws. As additional safety precautions, always wear eye, ear and dust protection when using power tools of any type.

Cutting and Special Processes

It is extremely important to remember that Kalsi boards are made of abrasive materials that require special tools for cutting and machining.

Keep in mind the following recommendations:

- Use abrasion resistant cutting tools of tungsten carbide or diamond tipped saws.
- Avoid too much generation / inhaling of dust by cutting in well ventilated area.
- For higher thickness up to 20mm, use power saw machines such as table saw, circular saw or jigsaw.
- By using power jigsaw, boards can be cut easily into various shapes including curved lines.



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Important points to take note:

- 1) Ensure boards to be cut are continuous and well supported on either side of the cut.
- 2) Straight edge should be clamped in position to guide cutting operation
- 3) Cutting rate should be such that the blade is not labouring or over-heating.

- Drilling and Holes Opening

Boards can be perforated using any power drill with hollow drill bit of tungsten carbide tips OR by drilling successive small holes.



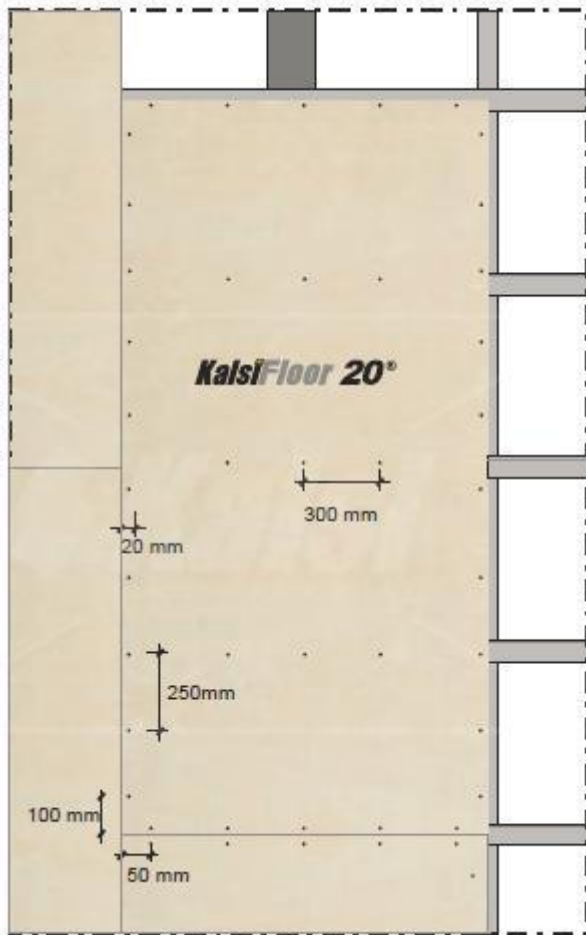
3.2 Layout & Standard Details

Fixing Details

Use self tapping screws (with self drilling head) to fix panel into studs or metal frame.

Minimum #8 or #10 of 38mm length for metal purlins and 45mm length for timber stud. Refer **Accessories**.

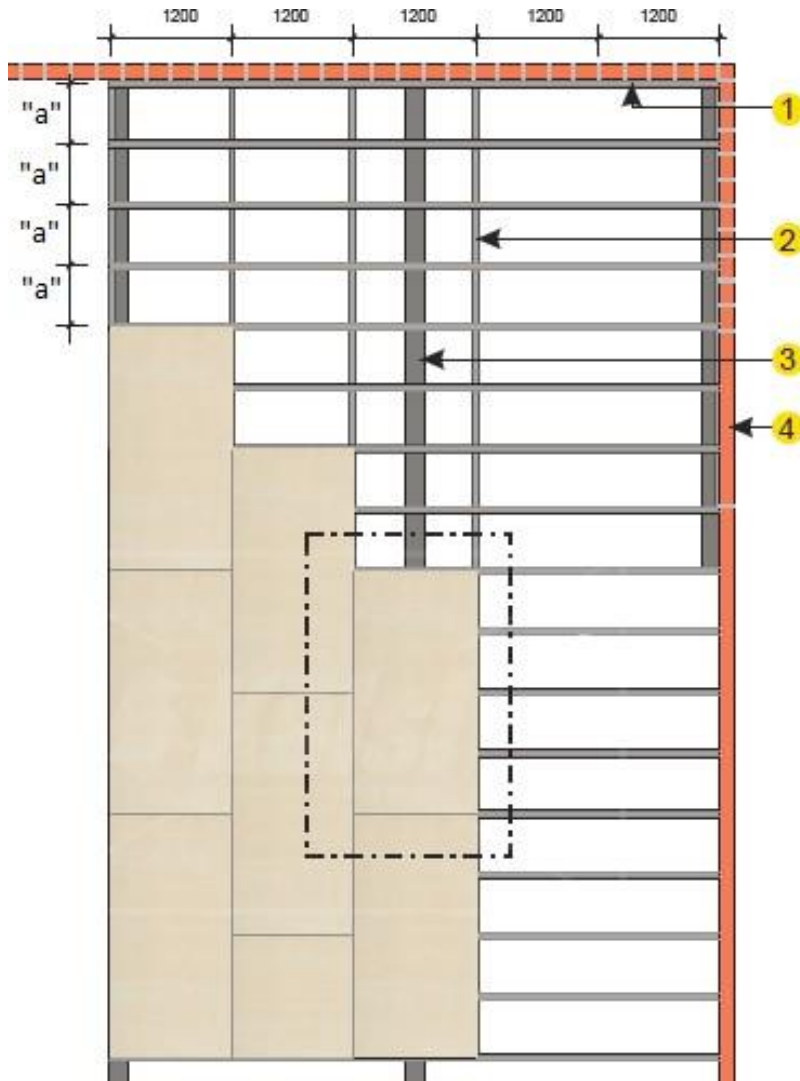
Recommended screw spacing and edge distance as shown in figure below:



For thick boards and/ or thickness of steel joist channel (if more than 1.0mm), it is recommended to pre-drill before screwing for better control of cracks. Screw to be covered up with filler before coating over it for aesthetic purposes and better protection against water ingress through screw points.

Installation Layout (Intermedia Flooring)

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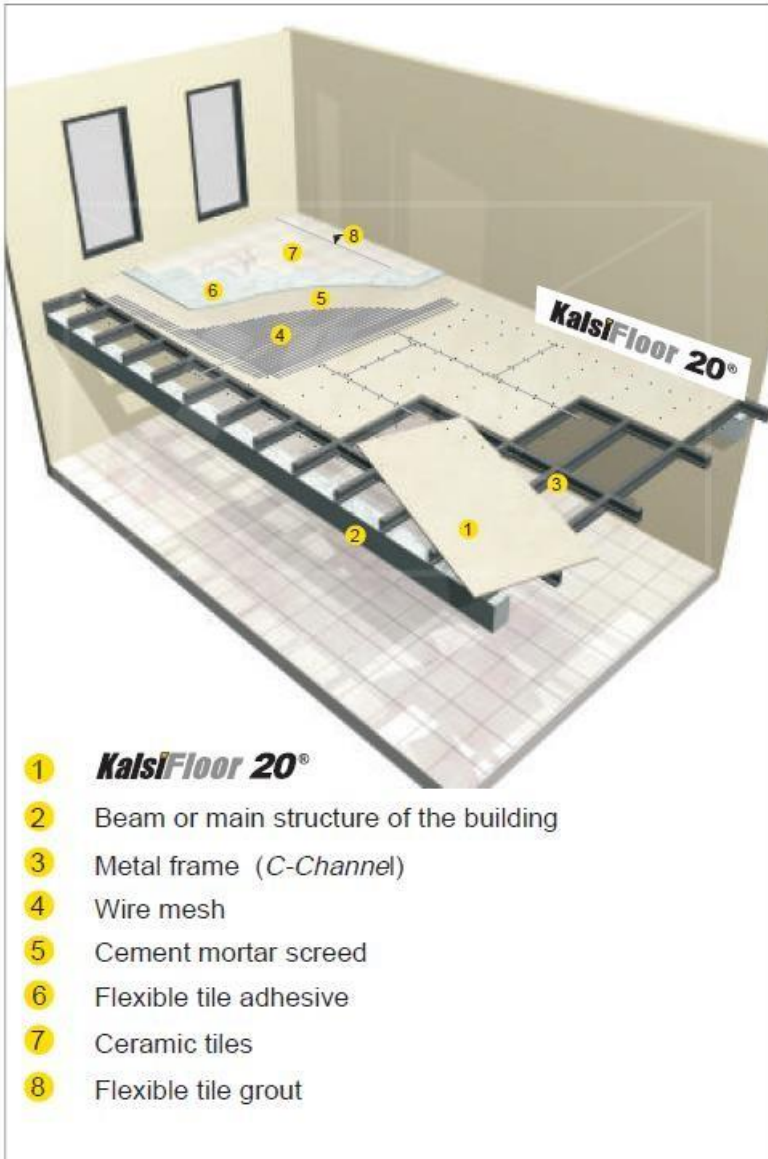


"a" = recommended joist spacing based on different expected load (300mm/ 400mm/ 600mm)

Staggered flooring arrangement is recommended to avoid jointing coincide at 4 edges of the boards.

Recommended 1-2mm gap between boards as allowance for lateral movement. Gaps to be filled with flexible sealant.

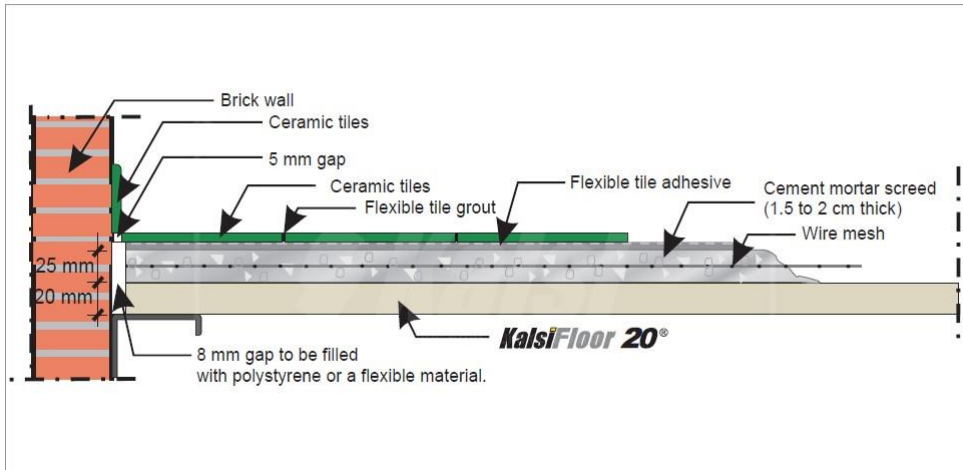
Wet Area Application (Tiling Finishes)



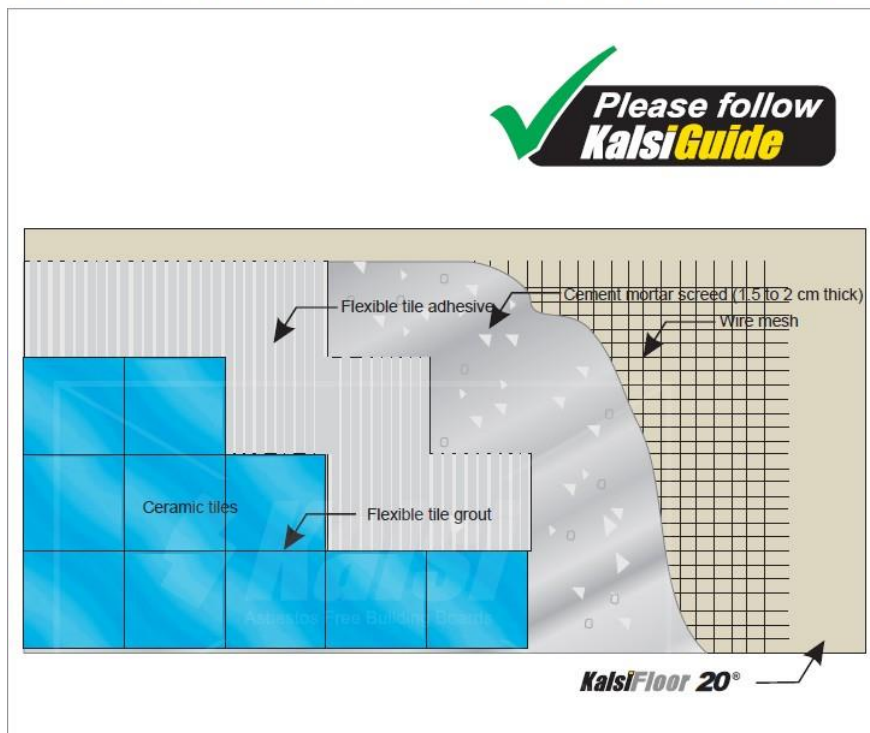
If is for **wet area** installation, it is also recommended to adjust floor support to allow for a minimum of 2% fall for water drain-off as long term water ponding is to be avoided.

Basic guidelines for the specification of **KalsiFloor** for Flooring Application

Side view: Finishing detail with ceramic tiles for heavy load:



Upper view: Finishing detail with ceramic tiles for heavy load:



Note:

Please follow the instructions of the manufacturers of mortars, tile adhesives and grouts, paints, etc, in order to obtain the best possible installation.

3.3 Framing Recommendation

Selected steel purlins or timber joists should be of minimum face width of 45mm for efficient bearing of panel, especially at joints.

Note: It is the responsibility of the structural engineer to code-check the floor framing design to its relevant/ applicable local codes and standards, thus, ensuring the performance of the framing system in which the KalsiFloor panel will be laid on.

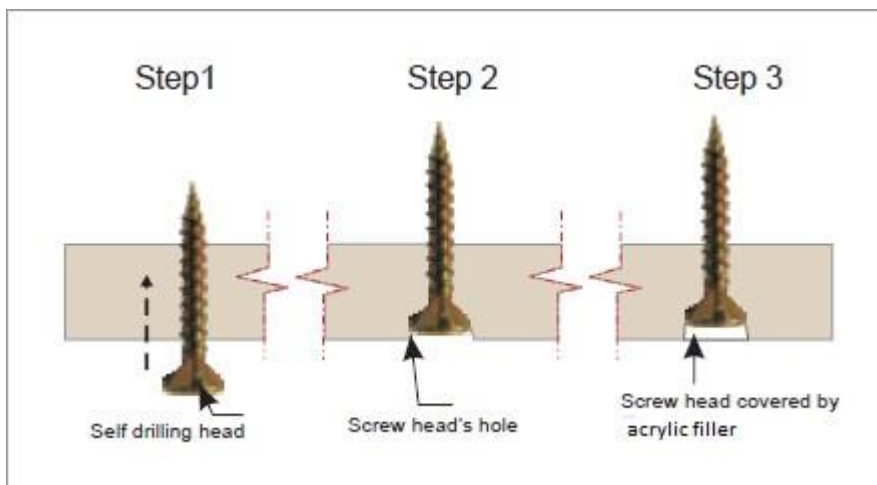
3.4 Accessories

a. Screws

Self tapping screws (with self drilling head) to fix into purlins (requires pre-drill if steel profile is too thick)

Minimum 8-10G size of 38~45mm length for decking (based on profile thickness).

Should be galvanised or non-corrosive for long term durability use, or to meet NZBC requirements for corrosion.



Screw to be covered up with filler before coating over it for aesthetic purposes and better protection against water ingress through screw points.

b. Rubber/ foam absorber (Optional)

Nominal 2.0mm thick rubber strips OR

3.0 to 4.0mm thick foam (compressible to 2.0mm)

as a layer between KalsiFloor and joist to serve insulation purposes

c. Flexible Joint/ Gap Sealant

Flexible sealant usually is polyurethane (PU) type is used to seal off gaps/ edges of between the floor to adjacent walls as gap allowance is provided by expected movement by the panels or surrounding elements due to thermal/ moisture exposure.

Note: If water penetration is critical, screw fixing points and other edge gaps/ opening shall be sealed off using water repellent flexible PU sealant for aesthetic purposes and better protection against water ingress through screw points/ gaps/ edges.



3.5 Finishing

Based on the room function which correlates to its final structure load, such as dead load and live load to be endured by the floor, note that usage of top coat, carpet, vinyl and parquet finishing is suggested only for minimal load spaces utilization such as residential, office or low traffic application.

In case of heavy-duty load area, high performance epoxy coatings to be used for wearing resistance etc.



Installing it as Raw/ Uncoated?

First and foremost, KalsiFloor surface is generally **NOT RECOMMENDED** to be left exposed and must be covered accordingly with suitable finishing material for assurance in durability and long-lasting desirable aesthetic.

The material itself can tolerate being installed raw/ uncoated as it passes all the weathering and aging test such as Heat-Rain, Soak-Dry, Warm Water and Freeze-Thaw cycles, however, kindly be advised that it **WILL NOT BE** aesthetically pleasing and could result in permanent damage after prolonged exposure.

Note (Internal Or Semi-External Application ONLY):

If it is to be installed raw, it is at customer's own consent upon clarifying the risks involved as some project or application has no concern over aesthetic and solely aims for functional need such as backer board, under roofing and etc. There should still be basic consideration in terms of protecting the board from any permanent water ponding condition or extreme (unusually high) exposure.

Painting/ Top Coats

Depending on level of exposure (interior or exterior), it is advisable to seek paint vendor/ manufacturer on recommendations that takes into consideration of the following;

- 1) Natural weathering agents such as rain, sun (UV)
- 2) Desired appearance like colour and gloss level (matte, semi-glossy, glossy)
- 3) Other specification like abrasion/ impact/ scratch resistance, anti-skid, chemical resistance etc



General recommendation is applying a minimum 2 layer of quality water-based acrylic coating on top face.

Coatings should be of vapour permeable type.

Other types of coat such as Polyurethane or Epoxy based coating is suitable as well but may require special preparation.

Note to follow instruction or recommendation of the manufacturer of paints/ coating on methods of application and maintenance in order to obtain the best possible installation.

Immediately after installation, boards are supposed to coated within **90 days** in an external environment.

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Ensure the boards are dry, free from dust, grease and other contaminants before applying the coating. Consider sanding if smoother surface is required.

Wet Area Consideration – Differential Humidity Exposure

Special attention on using KalsiFloor in wet areas (when not finished by tiles) such as open area recreational park, pool deck and etc i.e. close to water source or directly exposed to water source;

Primer should be applied on the boards before applying the top coat for the following purposes;

- a) For improved adhesion between coat and substrate
- b) For reduced water absorption and improved moisture resistance should the top coat tears off



Especially in intermediate flooring application (refer Figure above) where exposure to humidity will **NOT ONLY** from the top surface but also prone to water splashing (where there is no water shedding provided from sides) or vapour seeping from below, it is important to coat and protect all six sides of the floor boards.

Such practice is meant to avoid any differential exposure to the board that can possibly lead to warping/ deformation, excessive hydric movement and/ or drop in strength of the boards in the long run.

Where water drain-off is critical, note that is most recommended to adjust floor support to allow for a minimum of 2% fall (slope).

Note:

For accessories, waterproofing and/or finishing coatings, note that if they are all NOT products manufactured or supplied by Kalsi or Etex group. Kindly consult the vendor/ manufacturer for their recommendation on product compatibility with Kalsi, performance, installation and maintenance guidelines respectively.

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Disclaimer:

The sole purpose of images, references and recommendations in this document is to illustrate the functionality and versatility of the products and solutions from Kalsi and the proven international expertise of Etex Group. Note that the successful performance of the product & solutions depends on numerous factors outside Etex Building Performance Indonesia's control (quality of workmanship, design, handling and storage procedures, etc.)

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