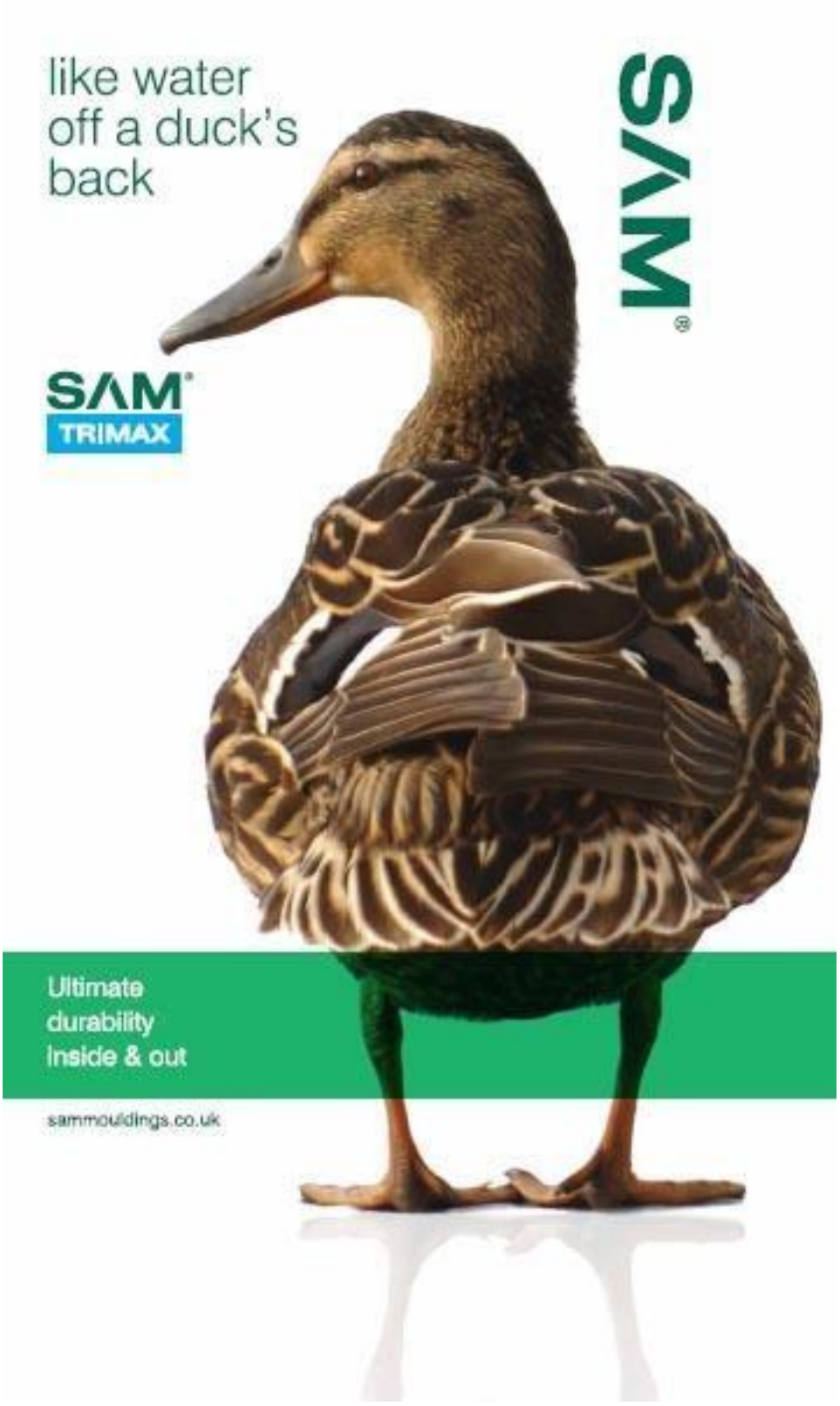
SAM Trimax – Technical Manual



EXTREME

medite tricoya

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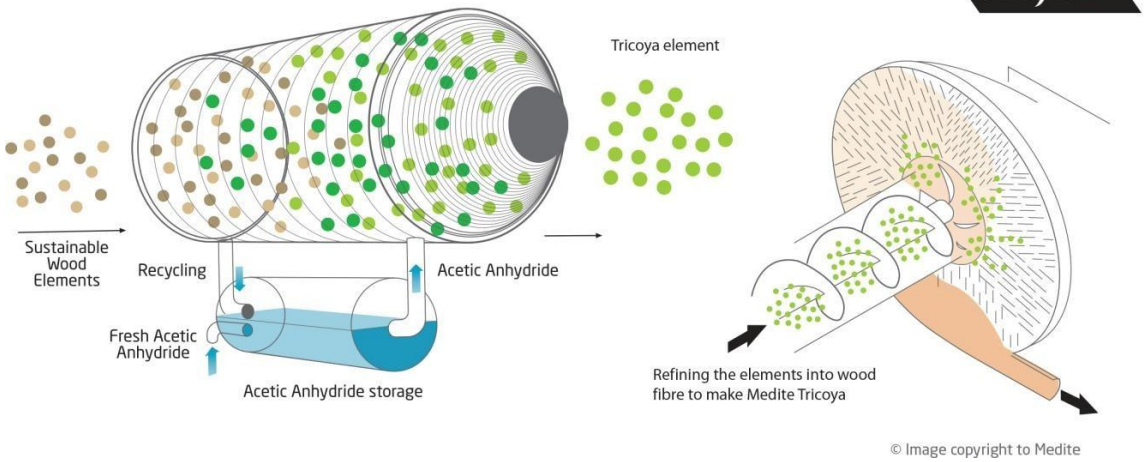


ABOUT SAM TRIMAX

SAM Trimax is manufactured from **Medite Tricoya Extreme** which is a completely new innovative form of panel product. It demonstrates outstanding durability and stability in the most extreme and challenging environments – both exterior as well as interior wet applications. The product uses proprietary acetylation wood technology and a modified fibre board manufacturing process to create a wood panel product with outstanding durability and stability. This was developed by challenging the most fundamental reason for wood swelling and decay: water absorption onto hydroscopic wood fibres due to the presence of hydroxyl groups. The hydroxyl groups (water loving sites) can bind or release water molecules causing wood to swell or shrink.

Acetylation is a non-toxic, sustainable process which increases the number of naturally occurring hydrophobic acetyl groups in the wood swells using actic anhydride. The process exchanges the hydroxyl groups (chemical formula:-OH) with acetyl groups (chemical formula - $COCH^3$) preventing water absorption at these sites, and thus enhancing the dimensional stability and durability of the wood.

Apart from creating an exceptional dimensional stability, the process enables Medite Tricoya to achieve Class 1 Durability, leading to resistance to biological decay which exceeds oak.

SAM Trimax offers a solution for specifiers and consumers in environments of wet, high humidity or fully weather exposed applications to deliver superior performance in versatile large panel form.

PROPERTIES

SAM Trimax is a new class of durable wood panel product with enhanced dimensional stability, suitable for a wide range of exterior applications such as cladding, façade panelling, fascias, soffits etc. SAM Trimax can be cut, machined and installed using techniques and equipment commonly used throughout the building industry and require very low maintenance thereafter. The flexibility of SAM Trimax offers endless design opportunities so that it can be cut to size, machined, painted, wrapped etc. without impacting on its unique properties.

Moisture content

SAM Trimax is supplied with a moisture content of between 3% - 5%. The moisture content of the panels at the time of installation should be as close as possible to the in-service moisture content. If a measurement shows a moisture content of 8% or more this may indicate the presence of "free water" and the SAM Trimax should be allowed to dry before processing, gluing or coating.

CE Marking

All Medite MDF products supplied for use in the construction and civil engineering industries are CE marked according to the requirements of the harmonized European standard for wood based panels EN 13986. This provides the necessary assurance to customers and users that SAM Trimax conforms to the European MDF standard, EN622-5 and meets all the essential requirements for the Construction Products Regulation (CPR) that are relevant to the product.

Reports and Certificates

The Fraunhofer Institute for Wood Research (WKI), conclude that the performance of Medite Tricoya is so outstanding that it will allow an MDF type panel board to be used in applications that have not previously been possible.

Building Research Establishment (BRE) performance testing indicates that Medite Tricoya Extreme achieves durability class 1 under EN350-2. Durability is equivalent to teak and more durable than oak.

SP Wood Technology tested the product's ability to resist wood destroying basidiomycetes (white and
brown rot).

British Board of Agrement (BBA) assessment concludes that Medite Tricoya Extreme is suitable for internal and external non-structural applications (BBA Assessment number M2/49109).

PHYSICAL PROPERTIES	RANGE	TEST METHOD	UNITS	VALUE
Density	+/-30	EN 323	kg/m³	720 (9, 12 mm) 700 (15, 18 mm)
Dimensional Stability				
Coefficient of thermal expansion		NPL	mm/m °C	0.0137
Per 10% RH change		NPL	mm/m	0.25
Thermal Conductivity		EN 12664	W/m K	0.095
DIMENSIONS				
Width	± 1 mm/m	EN 324-1	mm	1220
Length	± 1 mm/m	EN 324-1	mm	2440
Thickness	± 0.15	EN 324-1	mm	9, 12, 15, 18
MECHANICAL PROPERTIES				
E-modulus		EN 310	N/mm²	≥ 3000 (9 mm) ≥ 2500 (12, 15, 18 mm)
Bending Strength		EN 310	N/mm²	≥ 30 (9 mm) ≥ 25 (12 mm) ≥ 20 (15, 18 mm)
Tensile Strength		EN 319	N/mm²	> 0.8

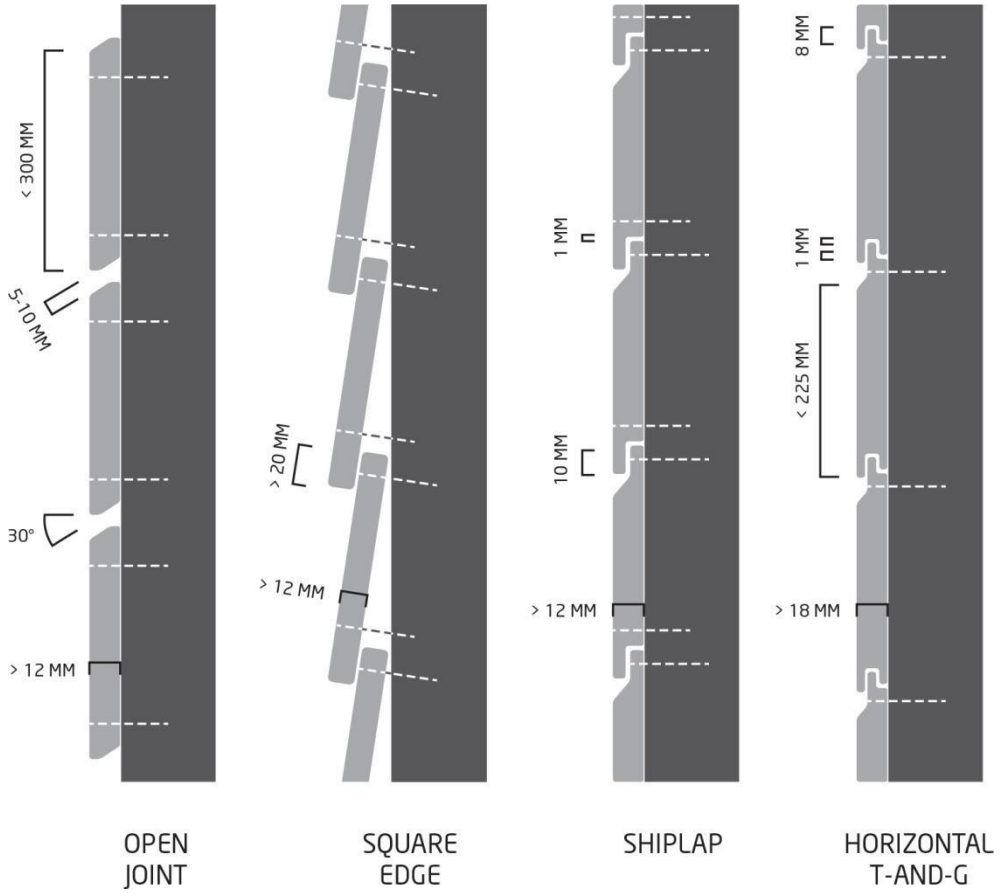
THE RESULTS LISTED ABOVE ARE BASED ON THE MINIMUM SPECIFICATION REQUIREMENTS FOR MEDITE TRICOYA MANUFACTURED BY MEDITE EUROPE LTD. ALL PARAMETERS ARE IN COMPLIANCE WITH EN 622 PARTS 1 & 5. AS PART OF THE MEDITE EUROPE ONGOING PRODUCT DEVELOPMENT PROGRAMME, THE RIGHT TO MODIFY THESE PRODUCT SPECIFICATIONS WITHOUT NOTICE IS RESERVED. MEDITE TRICOYA CONTAINS NO ADDED FORMALDEHYDE AND THE FORMALDEHYDE CONTENT IS LESS THAN 1.0 MG/100 G USING EN 120 TEST METHOD, WHICH IS FAR BELOW THE LOWER LEVELS REQUIRED BY CARB PHASE 2.

BOARDING

If using the SAM Trimax board in a system which resembles a wooden cladding system there are a number of jointing techniques as with regular cladding which can be considered depending on the final appearance of the façade.

Traditionally normal wood type cladding measures 150mm wide with a recommended limit of 190mm due to cupping issues. The width of the SAM Trimax board is not restricted by cupping and can therefore be wider, leading to a strong visual appeal unobtainable with traditional wood.
SAM Trimax is suitable for standard cladding types, and in general, the installer should follow the same recommendations for fitting as with traditional wood boarding, requiring no special detailing or tools. As with traditional wood boarding, a ventilated cavity needs to be present behind the boards.
SAM Trimax panels can be cut, profiled, embossed or routered to specified designs without encountering restrictions or issues associated with the instability of traditional cladding products while maintaining its durability.
The most popular designs are:

- Open jointed
- Square edge
- Shiplap
- Tongue and groove



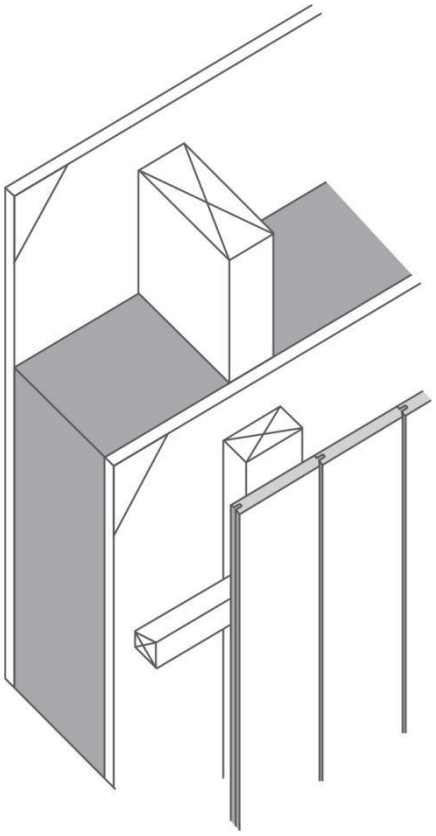
Horizontal Boarding

When mounted horizontally, the fixing can be made invisable.

<300mm face width

For horizontal boarding not exceeding 300mm face width, the open joint chamfered boards should have a 5-10mm gap between the boards at the outer face. The vertical overlaps of square and feather edge should be at least 20mm.
When choosing a shiplap profile, the minimum vertical overlap can be reduced to 10mm, but there should be at least a 1mm gap between rebate and board/up stand below.
<225mm face width

Horizontal tongue and grooved boards should not exceed 225mm face width. The depth of the tongue should be at least 10mm, with at least a 1mm gap between tongue and groove shoulders. The boards should always be installed with the tongue upwards, to prevent water penetrating the profile.



Vertical and Diagonal Boarding

The board designs suitable for vertical boarding are (overlapping) square edge, shiplap and tongue and groove.

When installing the profiles vertically at least two fasteners per board are necessary and at least one of these fastners, such as a nail will be visible. It is recommended to limit the board lengths to the storey height, and end joints must relate to batten positions.

A double sub frame is best practice where horizontal fixing battens are fastened on vertical counter battens (see figure above). The horizontal battens should be chamfered at the top side, shedding water into the cavity. The lowest batten should slant inward at the bottom, creating a drip lip at the intersection with the counter battens.

If only horizontal (fixing) battens are used, additional measures need to be taken to ensure sufficient ventilation. For example, making cut-outs in the battens or interrupting the battens at regular intervals and staggered relative to each other. In this case it is preferable if the horizontal battens are chamfered on the top edge to shed any water outwards.

Water penetration at the end grain of vertical battens should be avoided by applying a sealer.

<225mm face width:

For vertical boarding not exceeding 225mm face width, the overlap distance for board on board fixing should be at least 15mm. Board widths can vary between the inner and outer layer, but fixings through the outer boards should never pass through the board behind, to avoid splitting.

It is also possible to use an open joint, with a 5-10mm gap between boards. The edge sides of the boards should be slanted outward, with a gap of at least 5mm between board ends. Note that by leaving the joints open, the cavity and sub-frame is visible, and a UV-resistant breather membrane must therefore be applied.

<175mm face width
The face width of the shiplap profile should be limited to 175mm (15mm thickness), while the face width of the tongue and groove profiled boards should not exceed 150mm (18mm thickness). The groove should be at least 10mm deep, with a 1mm gap between tongue and groove shoulders.

GROOVED PANELS

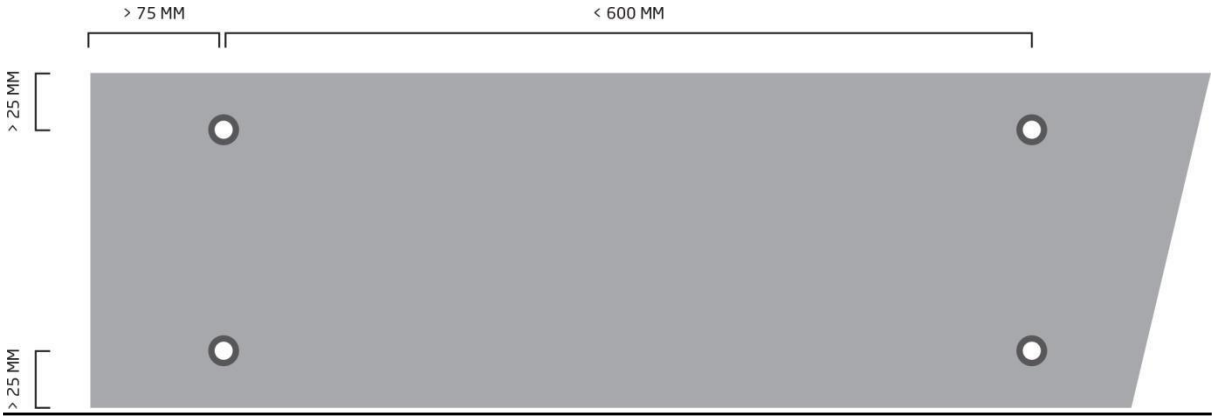
Full panel utilisation width and length can be used and may include design requirements such as routering into the surface to create the impression of traditional joint types or novel artistic design.
Please note that when fixing this type of panel to the sub-frame, it is recommended using a fixing system suitable for panels. In any case, the pull-out strength of the total fixing system of the grooved panel should be checked by an engineer.

Ventilation

To ensure that rain water and condensation behind the boarding is removed and the insulation behind the panels will not lose its effectiveness, a continuously ventilated cavity should be present behind the outer decorative layer. This cavity is ventilated at the top and bottom of the façade (at least 200mm2 per m2 cladding).
It is recommended that the depth of the cavity behind the cladding should be at least 20mm.
Note that the cavity depth as well as the minimum size of the ventilation in-and outlets must be in accordance with applicable building standards and regulations and that a water repellent, breathable membrane (UV reistant when joints are left open) is applied at the back of the cavity. An insect mesh might be required in ventilation in-and outlets and/or in case of open joints.
Although not a technical requirement for SAM Trimax, it is recommended for aesthetic reasons that cladding boards are positioned on the façade in such a way that no direct contact with the soil can take place. Furthermore, mounting the boards in the splash zone, between ground level and a height of 200 to 250mm, will lead to a reduction in service life of any coating (in case of a paved surface). Applying a gravel section below the cladding is recommended.

Joints

SAM Trimax cladding boards need to be installed with a mutual distance of at least 1mm. When meeting other construction elements and/or between the lengths of two boards, a free space of 5mm should be allowed for.



Fasteners and Placing

SAM Trimax can be face fixed (and in some cases secret) onto the wooden sub-frame with a ring shank (or other improved) nails or screws (raised heard or round head), made of stainless steel type A2 or A4.
Stapling is not recommended, not is it to drive the nail or screw heads into the wood. T-nails should not be used for external cladding as they offer little resistance to axial withdrawal. Lost head nails should also be avoided as they offer little resistance to pull-through.
When using screws, it is recommended to predrill the holes in SAM Trimax with a diameter which is 1mm smaller than the screw shank. Nail holes should be predrilled to 80% of the diameter.
The recommended point side penetration of nails into the timber battens is:

- Smooth nails: 12d (d = shank diameter of the fastener
- Ring shank and other improved mails: 6d (grooved panels: at least 10d)

If the nail head is at least 2d it is assumed pull-through will not occur, because the pull-through resistance exceeds the withdrawal resistance. As a general rule, the length of a standard nail (and therefore also the minimum sub-frame thickness) will be approximately 2,5 x board thickness and with a ring-shank and other improved nails, standard nails approximately 2 x board thickness.
Screws have a greater axial strength than nails, and are therefore recommended for use with grooved panels. There are as yet no general guidelines on withdrawal capacity for the most common dowel type fasteners like screws used with standard timber cladding.
To ensure a durable and lasting fixation, the boards should be fixed with at least 75mm clearance to the end of the board (predrill hole to 1mm less than the shank diameter or 80% of the nail diameter). The minimum distance to the top and bottom edge of the boards is 25mm.

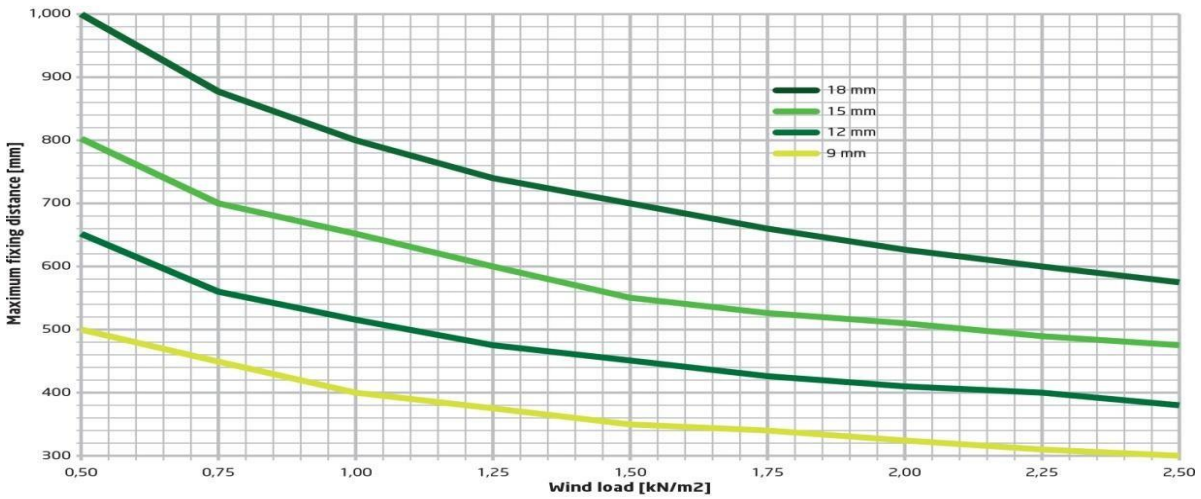
Fixing Distance
Support battens should not exceed 600mm spacing, whether vertical or horizontal, to limit the span of the cladding board. For diagonal boards the spacing of the support battens should not exceed 400mm, unless the battens are installed diagonally also.

PANEL CLADDING

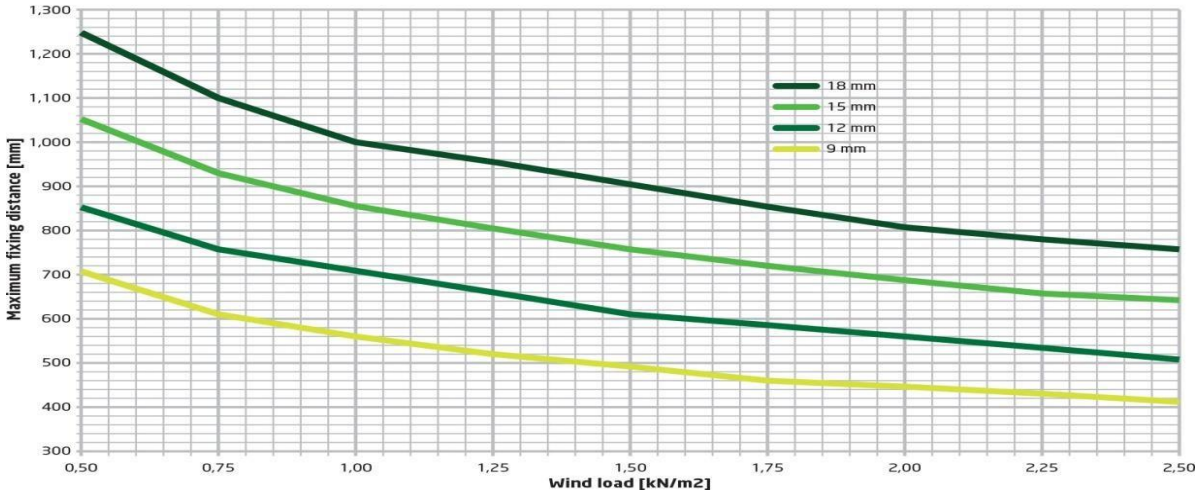
When considering a rain screen system with panel style cladding, there are certain issues that need to be considered, amongst which are the fixings used to make up the system. The fixing methods to consider for SAM Trimax include adhesive and screw fixings.
Please be advised that all recommendations in this brochure are guidelines, and should be checked by the proper authorities on conformity with local circumstances, building codes and standards and checked by a licensed engineer.
Please take note of the guidelines on possible fixing systems, ventilation, sub frames, joints and fasteners described in this brochure when designing cladding with SAM Trimax, and ensure that the recommended fixing positions and fasteners are used.

Screw Fixing on a Timber Sub-Frame
Screw fixing is the most traditional form of fixing and is likely to be the least expensive system to be considered as a SAM Trimax façade rain screen system. Screws can pass through the cladding panel and into timber battens placed behind the cladding.
Sub frame
Vertical timber battens, no smaller than 38mm x 38mm in section, should be used to support the cladding to the supporting wall or cladding structure. For the outer corner, a corner infill piece can be used to protect and finish the corner of the façade.
For the inner corner, a shadow gap of no less than 3mm is normally used; with the rear battens masked using a flexible back or dark grey joint cover strip material.
Fasteners
Screws for face fixing should be made of stainless steel A2 or A4. The length of the screw should be at least 25mm + panel thickness (+ any spacers). If the screw head diameter is at least 5mm bigger than the hole diameter, it is assumed pull-through will not occur, because the pull-through pull-through resistance exceeds the withdrawal resistance. Holes for the fasteners should be predrilled, slightly over-sized (> 120%) compared to the shank diameter, to allow for panel and sub-frame expansion.
Screws should be positioned at least 25mm from the edge of the panel and at least 75mm from corners. The maximum edge distance for this type of fixing 15 x panel thickness.
For further design guidance and pull out strengths, the fastener manufacturer should be contacted.

Single span

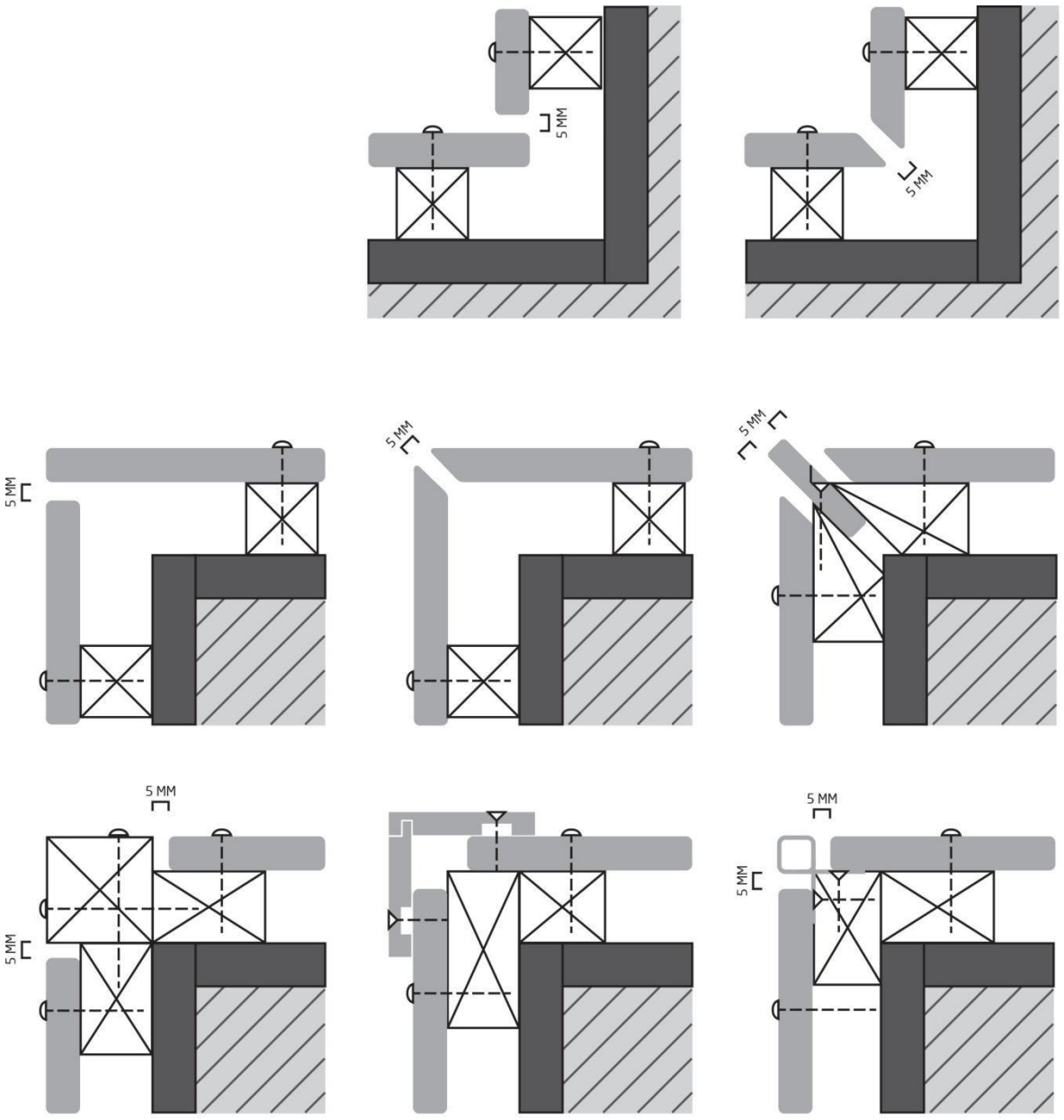


Multiple span



CORNER DETAILS

Corner solutions for SAM Trimax as cladding can be detailed in numerous ways, both with and without incorporating profiles. When a board meets another construction part (or another board) a gap of at least 5mm should be provided. Depending on the applicable national building code, to which you should refer, cavity barriers may be needed at corners.



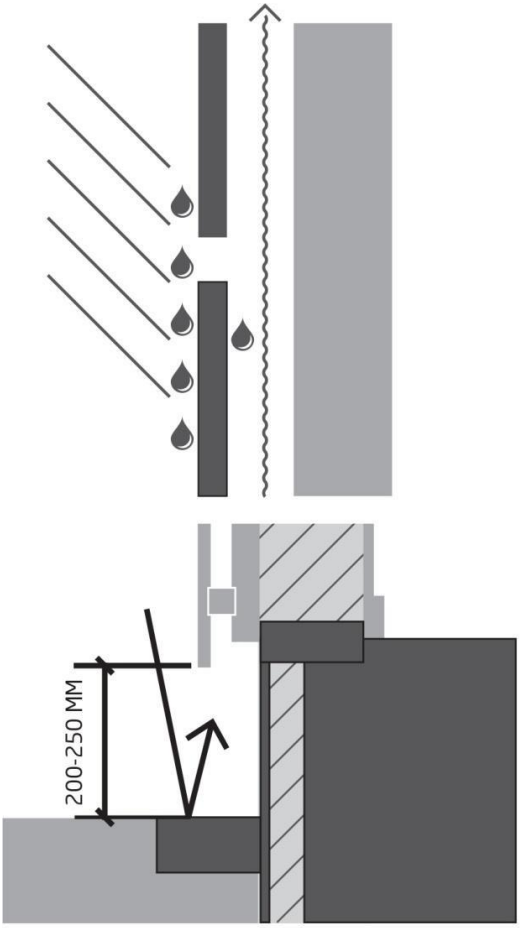
Ventilation

SAM Trimax is suitable for installation in a ventilated façade system.

This type of façade system is characterised by continuous ventilation behind the outer decorative layer, through the ventilation in – and outlets situated at the top and bottom of the façade (at least 200m2 per m2 cladding). This way, rain water and condensation behind the cladding is removed and the insultation behind the panels will not lose its effectiveness. It is recommended that the depth of the cavity behind the cladding should be at least 20mm.

Note that the cavity depth as well as the minimum size of the ventilation in – and outlets must be in accordance with applicable building standards and regulations and that a water repellent, breathable membrane (UV resistant when joints are left open) is applied at the back of the cavity. An insect mesh might be required in ventilation in – and outlets and/or in case of open joints.

Although, not a technical requirement for SAM Trimax, we do recommend for aesthetic reasons that panels are positioned on the façade in such a way that no direct contact with the soil can take place. Furthermore, mounting panels in the splash zone, between ground level and a height of 200 to 250mm, will lead to a reduction in service life of any coating (in case of a paved surface). Applying a gravel section below the cladding is recommended.



Note that panels should be fitted with spacers and not fitted flush to any masonry or brickwork.

Joints

Considering the circumstances that SAM trimax is used in, the panels will not expand or shrink more than 1.5mm/m in practice. However, the material will be mounted onto a sub-frame that shows a significant expansion and shrinkage due to changes in temperature and/or humidity, which needs to be taken into account.

OTHER EXTERIOR APPLICATIONS

Fascia and Soffits

SAM Trimax can be used for soffit or fascia finish for roof ends. Although different sub-frames are possible, the application onto battens (timber sub-frame) is the most usual. It is recommended to limit the maximum height of the boards vertically at two places. The roof lining boards can be fastened visibly with wood screws, or they can be glued onto the sub-frame.

	Panel Thickness	
	9mm	**12mm**
Board Height <	250mm	400mm
Horizontal fixing distance <	500mm	500mm

	Panel Thickness			
	9mm	**12mm**	**15mm**	**18mm**
Fixing Centres - Fascia	300mm	450mm	600mm	750mm
Fixing Centres - Soffit	225mm	330mm	450mm	550mm

It is also possible to fix the boards invisibly by using scews at the top of the board (which will be concealed by the roof trim) and fitting the tongued bottom edge into continuous (aluminium) U-shaped rails.

Curved panels

Because of its superior properties, SAM Trimax can easily be curved and bent. Curved boards can be fixed with the fasteners described in the chapter on cladding panels. In case of adhesive, the outer sides need to be fastened additionally with wood screws.

Spandrel Panels

Due to it's durability and enhanced dimensional stability, SAM Trimax is suited for the application of walling between structural members eg. a timber framed building. The panels can as large as the numbers in the table below, provided the panels are fitted in a (sufficient stiff) window frame on all edges. The sizes of the panel is limited in one direction only (either vertical or horizontal).
Panels with a length and width exceeding 1 metre should have an intermediate support installed. For the resulting two surfaces, the limits in the table below apply.

Panel thickness	Max panel width
9mm	550mm
12mm	700mm
15mm	850mm
18mm	1,000mm

Dimensions	6mm	9mm
Curve	2440mm	2440mm
Radius (R)	620mm	977mm
Angle (Ø)	120mm	145mm
Chord	1100mm	1900mm
Level	900mm	750mm
Battens (c.t.c)	300mm	400mm
Fixings edge (c.t.c)	270mm	300mm
Fixings intermed. (c.t.c)	300mm	300mm

Exterior ceilings

SAM Trimax is also suited for use in horizontal applications like exterior ceilings (e.g. shopping centres, car ports and overhangs). The fixing systems described in the previous pages can be used:

- Cladding boards
- Screw fixing on a timber sub frame
- Visible or Invisible fixing

COATINGS

There is no need to finish SAM Trimax from a technical performance perspective, in respect of attributes such as decay resistance and dimensional stability. However, SAM Trimax is susceptible to weathering outdoor circumstances. Uncoated panels used outdoors will weather and roughen due to UV and biological processes that take place within the wood fibres and it's surface. Where a lasting aesthetic appearance is required, a high quality coating system will protect against this weathering effect and minimise discolouration.

SAM Trimax is all-natural and non-toxic so mould growth can occur if SAM Trimax is left uncoated, though any moulds, stains, mosses or algae will not cause rot within SAM Trimax. Common mould growth can be avoided by using a suitable outdoor primer which addresses mould growth. Staining and discolouration can be avoided by using a high quality UV resistant coating. This also protects the wood from accidental staining.

The compatibility of SAM Trimax with various coating systems compares well with wood in general and it may be finished with commonly used products.

Please note: coating formulations vary from supplier to supplier and, of course, processes vary depending on the application equipment used and end-product design. Despite our excellent record of compatibility, we highly recommend having your coating suppliers involved in the process as they have an in-depth knowledge of their products, application and how to determine the performance of the finished product.

Preparation

- The moisture content of the SAM Trimax to be coated should be dry (below 8% moisture content)
- The surface to be coated should be clean, dry and free from dust and grease
- It is recommended finishing the panels on all sides before mounting them, to prevent staining.
- It is recommended to round off the corners with a radius of at least 3mm
- For aesthetic reasons, it is recommended the edges of the panels to be treated with end-grain sealer (white or transparent), before applying the final coating
- When using a primer, a high quality product that contains resin-bleed blockers and fungicides is recommended.

Paint Finish and Warranty

The products are offered with either a one coat "primer" (1No top coat) or fully finished with a Sikkens paint system (WF360) in various RAL colours however fully finished material would only be supplied in full packs (quantity TBC). We are able to offer the product in any RAL colour from the Sikkens range. We are able to offer up to 10 years on the paint system**.

	Primed	**Fully Finished**
	1 Coat – WF360	**1 Coat – WF360**
Wet Film Thickness	75 micron	75 micron
Dry Film Thickness	40 micron	160 micron

SIKKENS PRODUCT PERFORMANCE WARRANTY ON JOINERY & CLADDING PRODUCED FROM SAM Trimax -

Product Performance warranty available for SAM Trimax:

- Cladding elements, panels, cladding

Covers:

- Embrittlement, Flaking, Cracking

Resulting from:

- Faults resulting from manufacturing the used coatings.

The warranty is based on extensive testing in combination with the following external aspects:

- Indicated stability of the Medite Tricoya Extreme substrate
- Sikkens state of the art paint system
- Cladding produced and installed according to best practices
  - Design
  - Transport
  - Storage on site
  - Installation

(Norms used in industry: EN927, EN942)

Instructions/Construction

Cladding must be constructed in a professional manner. The construction must be designed so that water is led away. All edges on external components must be rounded off, as sharp edges produce excessively thin paint films. All exposed edges on the material shall be rounded to a 3mm rounding. The cladding components must be designed and assembled so as to prevent moisture absorption via the end grain, rear or other parts of the components, for example with a suitable coating system.

Surface Treatment

The coating system is applied in strict accordance with Sikken's instructions valid at the time. Cladding components must be treated according to a specially drawn up operating schedule as regards application, film thickness, drying conditions etc.
A logbook must be kept in which important parameters are continually noted.
Important parameters for the operating schedule and logbook must be specified for SAM Mouldings.
The application of putty or fillers to external surfaces should be avoided. If it becomes necessary to apply putty, this may only be done to a small extent in the form of filling minor damage and cracks. The surplus must be scraped and/or ground off.

Maintenance

Cladding must be inspected as soon as possible after assembly. Any damage to paint films or joints must be repaired immediately so as to prevent moisture penetration.
After this, all joinery must be inspected annually. Minor damage must be repaired immediately.
When complete repainting is deemed to be necessary, this should be carried out in accordance with Sikken's maintenance instructions.

MAINTENANCE CYCLES DEPENDING ON WEATHERING AND INSTALLATION

Roof Projection (Overhang)	Installation	Climate Conditions		
		Normal Altitude 1st-2nd Floor	Detached or above 2nd Floor	Mountain or Coastal
		1 – 2 Floor 	2nd Floor > 	>500 m 
Large >1.5 m 	Set Back Installation >15 cm	0	0	1
	Level Front Installation <5 cm	1	1	2
Medium 0.5-1.5 m 	Set Back Installation >15 cm	1	2	3
	Level Front Installation <5 cm	2	3	4
Small <0.5 m 	Set Back Installation >15 cm	2	3	4
	Level Front Installation <5 cm	3	3	4

WARRANTY PERIOD

Warranty in years depending on weathering/installation				
0	1	2	3	4
(no)	(light)	(medium)	(strong)	(extreme)
10	10	8	6	6

KEY FEATURES

- 50/10 Warranty – 50 years on the material core* and up to 10 years on the paint finish**
- 60 Year serviceable life
- Easy to recoat
- Dimensionally very stable
- Easy to work with – no need for special saws or drill bits, just standard woodworking tools
- Lower maintenance costs
- Sustainably sourced – FSC certified

*50 Year warranty for material 250mm above ground level, anything less that 250mm than it has a 25 year warranty. **10 year warranty applies depending on exposure or if close to industrial or coastal location.
All subject to change with prior notice.

SAM® Giving You The Edge

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Declaration of Performance

SAM TRI-MAX

Medite Tricoya MDF .H-2

Springfarm Architectural Mouldings Ltd
Newpark Industrial Estate
Antrim BT41 2RU

Product Type	Intended Use	AVCP*	Notified Body referance
MDF.H-2	External use as non-structural components	4	Not Applicable
*Assessment and verification of constancy of performance system according to Annex V of regulation (EU) No305/2011			

Declared performance

Essential Characteristics	Performance					Harmonised technical specification
Thickness Range (mm)	3 to 6	>6 to 9	>9 to 12	>13 to 15	>15 to 18	EN 13986:2004
Internal Bond (N/mm2)	0.8	0.8	0.8	0.8	0.8	
Internal bond after boil test (N/mm2)	0.65	0.65	0.65	0.65	0.65	
Swelling in thickness (24hrs) %	2.5	2.0	2.0	1.5	1.5	
Release of formaldehyde	E1	E1	E1	E1	E1	
Reaction to fire	NPD	NPD	D-s2,Do	D-s2,Do	D-s2,Do	
Water vapour permeability μ	NPD	NPD	NPD	NPD	NPD	
Airborne sound insulation (Surface Mass) IR	NPD	NPD	NPD	NPD	NPD	
Thermal Resistance R value m2K/W	0.056	0.085	0.114	0.150	0.180	
Biological durability	Use classes 1 & 2					
Release (content) of pentachlorophenol (PCP)	≤ 5ppm	≤ 5ppm	≤ 5ppm	≤ 5ppm	≤ 5ppm	

The performance of the product identified is in conformity with the declared performance

Based on Medite Europe Ltd data subject to factory production control

Manufactured according to EC Directive 89/106/EEC (Construction products Directive)

Conform with EN13986, Annex ZA

Date: 1st July 2013

Signed for and behalf of the manufacturer by:

Mark Kirkpatrick, Operations Director
Springfarm Architectural Mouldings Limited

Registered in N. Ireland No. NI24953