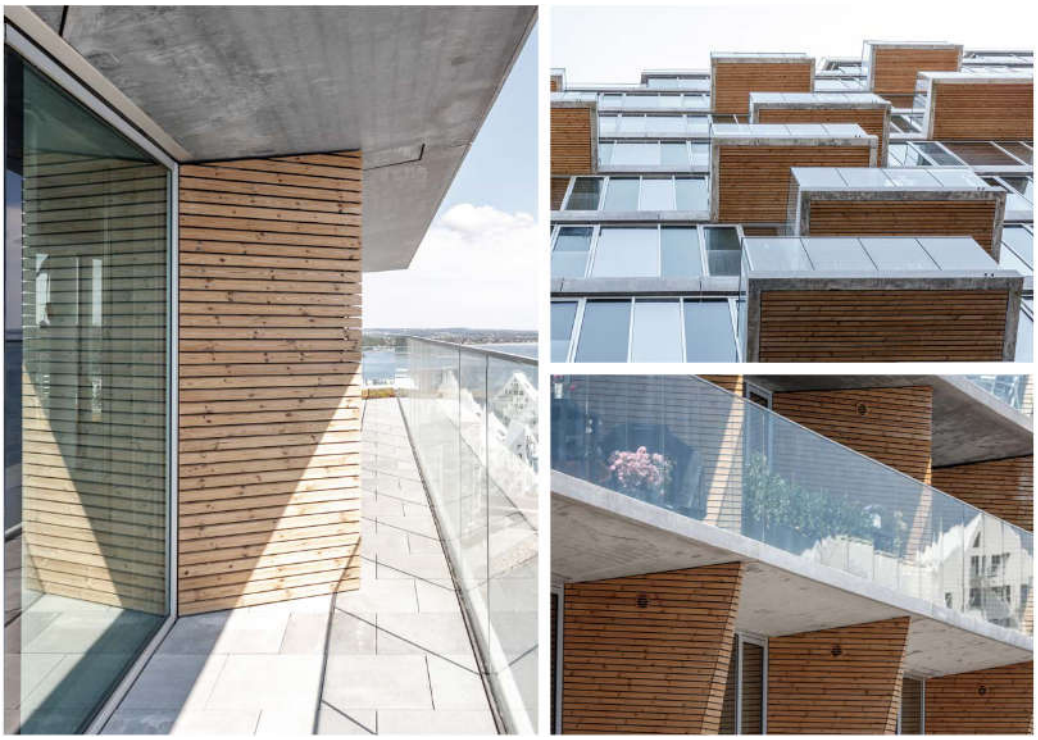
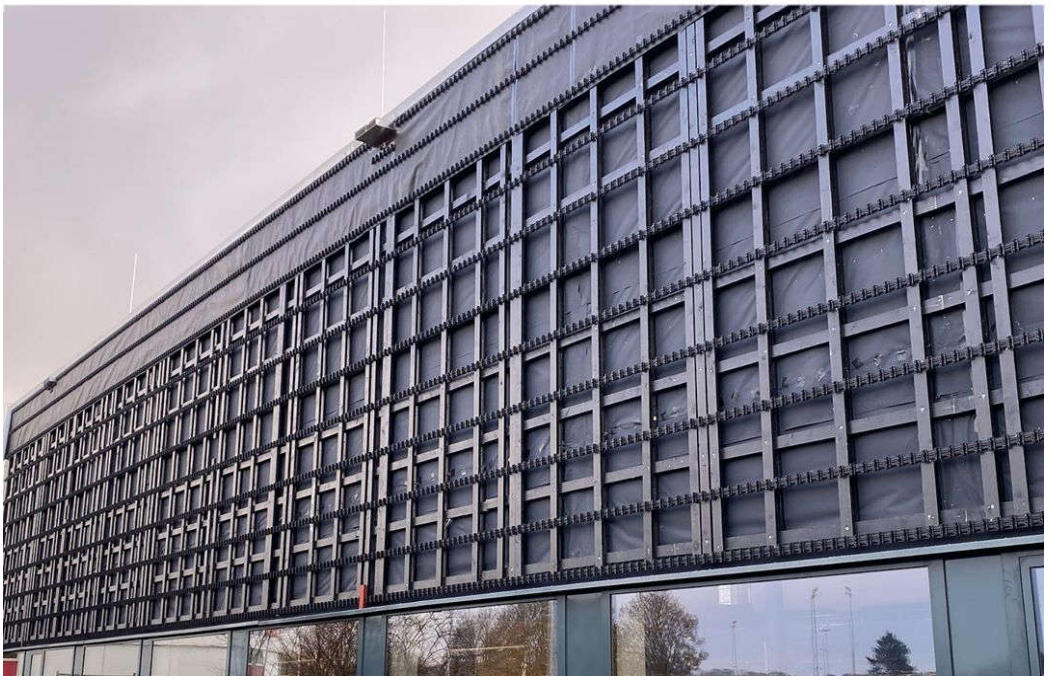
Installation Guide

Cladding with Flat Rails



Thermo pine / Apartments / Bjarke Ingels group- Aarhus - Dolle nordic a/s / Denmark / © photography Dolle.



Flat Rails / Netherlands / Contractor : Awood

Please read in full prior to using Grad® rails

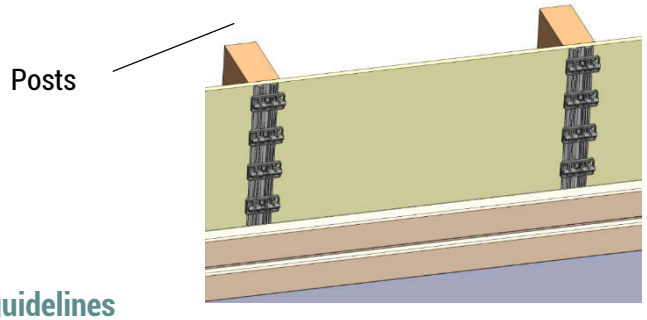
Guidelines

Transportation & Storage

- When transported, Grad® rails should be secured in their original packaging and should be stored indoors before installation.
- Grad® rails can be stored outdoors for short periods of time, just before being used on a project
- Avoid long sun exposure. No heavy object should be stored on top of the rails to avoid possible damage and/or distortion of the rails.

Applications

- The rails can be used for horizontal, vertical, diagonal cladding
- The rails should only be placed onto a flat, even, and hard surface
- Only use Grad® cladding as specified by the manufacturer
- For wooden houses and timber homes: the rails should be positioned where the posts on the timber frame are



Safety guidelines

- Wear protective clothing and safety equipment such as safety glasses, gloves, long sleeves, and a mask, particularly when cutting aluminium
- The installer is responsible for identifying and following all building codes and construction safety practices
- Grad® accepts no liability or responsibility for the improper installation of this product
- Grad® for cladding may not be suitable for every application, and it is the sole responsibility of the installer to be sure that Grad® cladding is fit for the intended use. Because all installations are unique, it is also the installer's responsibility to determine specific requirements for each cladding application.
- Grad® recommends that all applications be reviewed by a licensed architect, engineer or local building official before installation

Checklist

- The wall should be straight, levelled, and not damaged
- The rails can be placed either directly on a wall, studs, concrete, or any hard and flat surface, with the appropriate fasteners
- Boards used with Grad system must be compliant to local Building Code
- Each rail must be fixed onto a flat and hard surface (stud or wall) using the right fasteners. These shall be adapted to the surface the rails are secured onto.
- It is the user's duty to verify they have the right rails to match the boards they want to use and to make sure the rails they intend to use meet all their requirements
- Only material that has been grooved to Grad's specifications can be used with Grad® rails
- Installers must make sure that there are flashing and weather barriers, that they are installed in compliance with local codes, and that the installation meets manufacturer requirements especially in the following proper locations:
  - Openings (doors and windows)
  - Wall/ceiling junction
  - Chimney
  - Transition between another type of cladding surface

Recommended Equipment

- Pneumatic nailer or drill
- Compressors with adequate capacity to supply air for pneumatic tools
- Laser level
- Manual level
- Mitre saw
- Scroll saw
- Finish blade
- Hammer
- Plastic cap for hammer head
- Plyers
- PPE including goggles and gloves
- Stainless Steel screws type xxx

Disclaimer

Although this guide was designed with as much precision as possible, in accordance with current practices for wood cladding, we are not liable for any errors or omissions that may arise from the use of this guide. All users of this guide fully assume all risks and responsibilities associated with it.

This guide presents the best manufacturer installation practices. It supplements the codes and standards and manufacturer installation guides, but is not a replacement or substitute for these. As such, it is the installer's duty and responsibility to take all available documentation into account prior to completing work to ensure the validity of manufacturer warranties.

To ensure simplification, the technical drawings in this guide do not show all construction details to meet requirements of codes and standards.

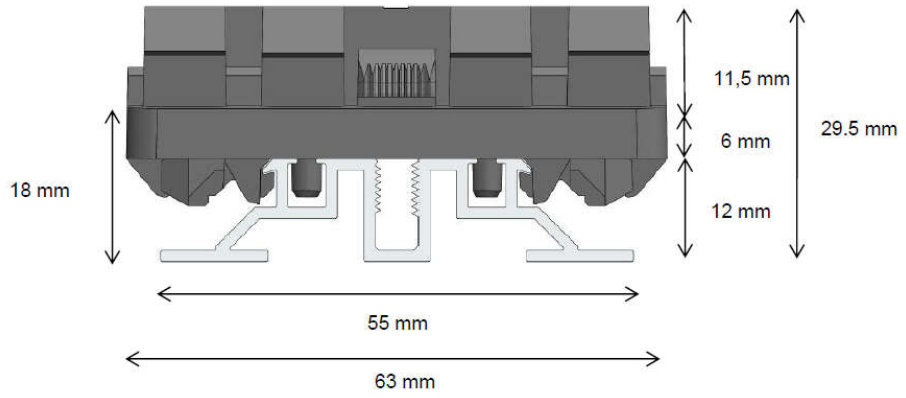
Finally, do not hesitate to contact us should you have any doubt or should any queries arise regarding specific applications of the Grad rails that would not be covered in this guide.

1. Index

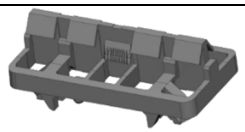
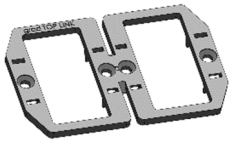
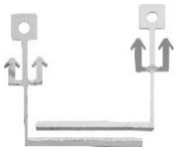
Guidelines

2. Main product

Flat Rail – with grad clips, aluminium profile 55/12

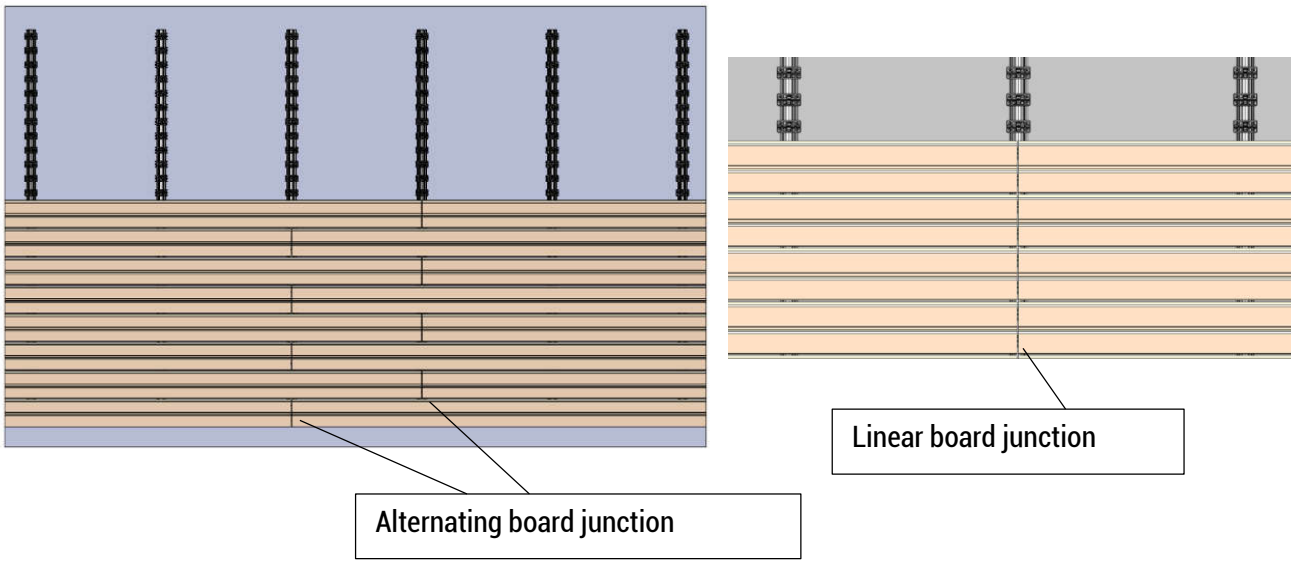


3. Accessories

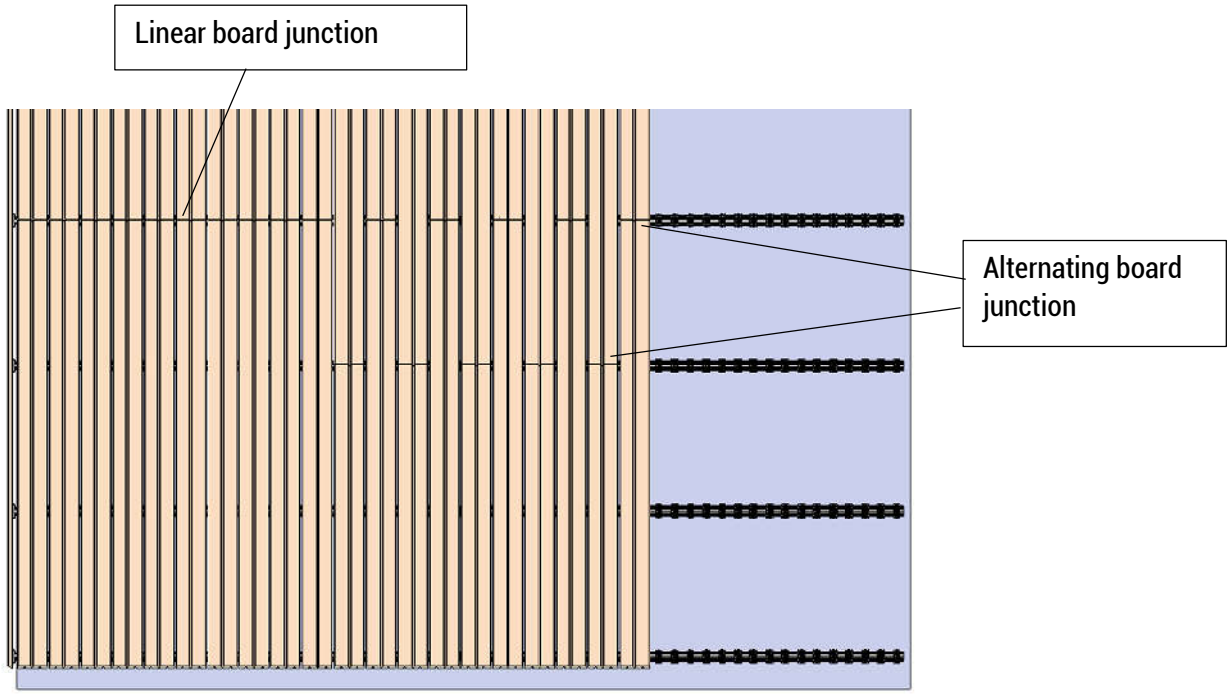
	Product reference	Description	Packing type	Raw material
	**1483**	Individual clip	Bag of 50 pcs	POM
	**1488**	TOP LINK, linking piece to use between 2 rails 20 pc	Bag of 20 pcs	POM
	**20356**	Cushion clip	Bag of 20 pcs	POM
	**1721**	Self-drilling screw for Cushion clip	Bag of 20 pcs	A2 Stainless Steel
	**968**	Keys to unclip the boards	Bags of 20 keys	

4. Standard Configurations

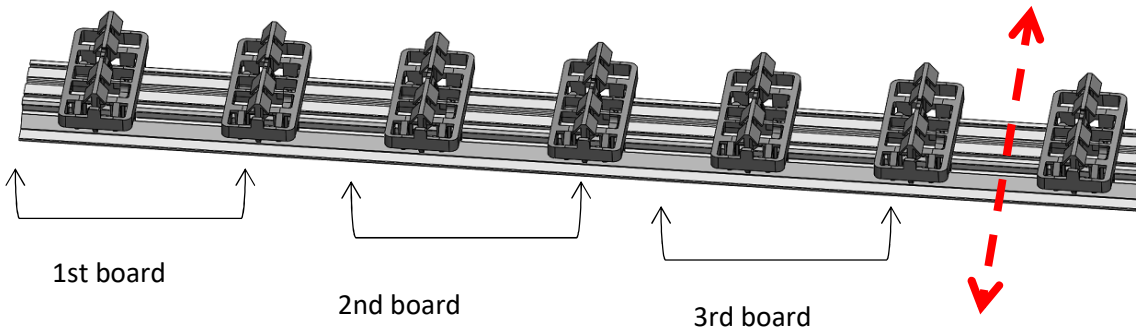
For horizontal claddings, rails must be placed vertically



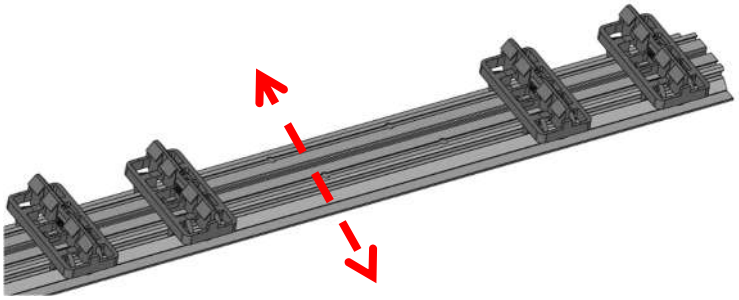
For vertical claddings, rails must be placed horizontally

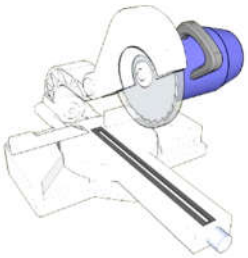


5. Tips: how to cut the rails

1. Rails may be cut when the height or the length of the wall (W) if W < 2m or
   2m< W < a multiple of 2m
2. For Horizontal cladding: Measure the height of the wall to cover (taking into account the rails must start at 5in mini from the bottom wall)
3. For Vertical cladding: Measure the length of the wall starting from where the first rail will be positioned near the wall extremity up to the other wall extremity
4. Cut the rails to match the length to cover
5. Always cut the rails in between two clips, making sure there are enough clips to attach the boards properly.
   Ex: with double-groove boards
6. 

7. If there is a clip where the cut needs to be: remove the clip with removal keys

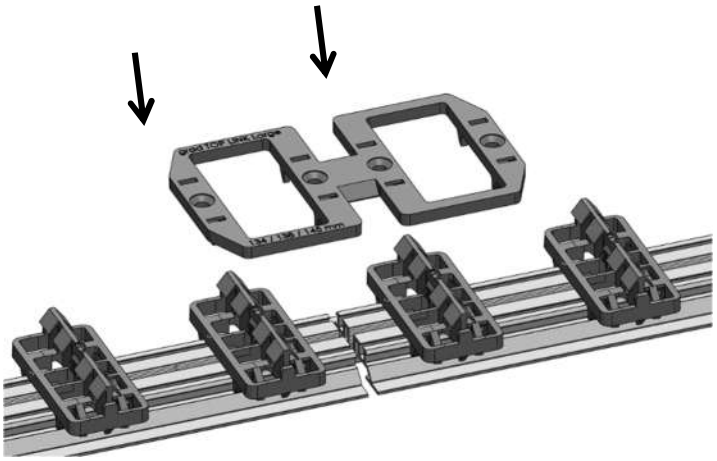


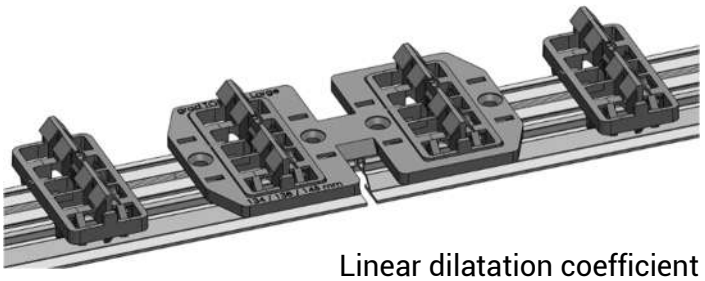


6. Tips: how to link two rails together

Top Links quickly align and connect rails in a snap (no need for screws) and ensure a regular gap is maintained between 2 rails to allow for aluminium expansion

1. Use Top Links as a guide to align two rails that should be placed one after another
2. No need to secure Top Links with screws
3. Make sure to fix the first rail with screws before aligning another one after it
4. Place the second rail after the first one
5. Position the Top Link as indicated
6. Use a manual level to make sure the second rail is straight and fix it on the wall as needed
7. Remove the Top Link, and re-use again

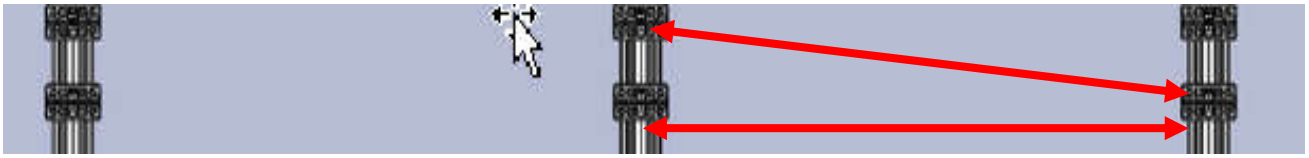




Linear dilatation coefficient : 24 10^{-6}/K

7. Tips: how to measure rail spans

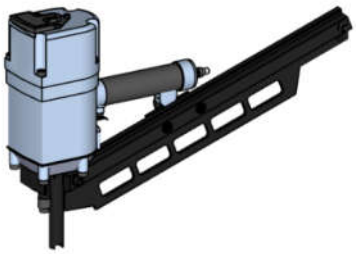
Rail spans are measured between **the centre** of each rail, ex with a 65 cm span:

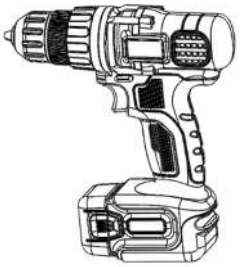


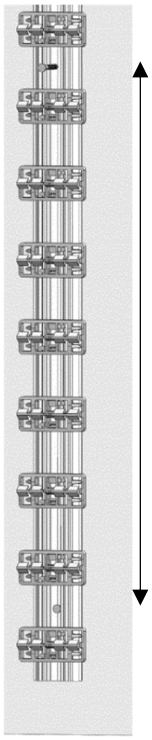
Correct measurement

Incorrect measurement

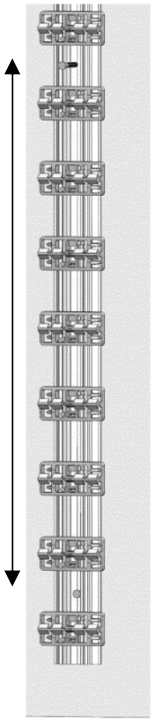
8. Fixing methods for the Grad® rails

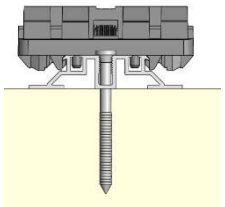




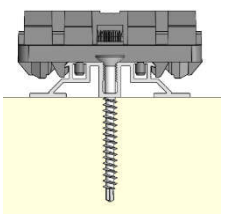


The distance between nails or screws may need to be adjusted depending on
- the height of the building,
- the wall construction,
- the terrain,
- the wind zone.





4/50 mm nail
stainless steel



5/50 mm screw
stainless steel

9. Distance between screws or nails in metres

To respect a maximum deflection of L/167, you need to meet these centre distances between fixing points:

Building height: 10 m Centre-to-Centre span: 650 mm											
	Wind Speed (m/s)	GENERAL CASE: Identical terrain over 1 km (orography coefficient: 1,0)					Heterogeneous terrain over 1 km (orography coef.: 1,15)				
		Surface Roughness categories					Surface Roughness categories				
Zone		0	II	IIIa	IIIb	IV	0	II	IIIa	IIIb	IV
1	22	0,57 m	0,61	0,67	0,73	0,75	0,52	0,55	0,61	0,67	0,68
2	24	0,54	0,57	0,63	0,69	0,71	0,49	0,52	0,58	0,63	0,65
3	26	0,51	0,54	0,60	0,65	0,67	0,47	0,50	0,55	0,59	0,61
4	28	0,49	0,52	0,57	0,62	0,64	0,45	0,47	0,52	0,57	0,58
GUAD	34	0,41	0,44	0,48	0,53	0,54	0,38	0,40	0,44	0,48	0,49
GUYANE		0,68	0,72	0,80	0,87	0,89	0,62	0,66	0,73	0,79	0,81
MART		0,45	0,47	0,52	0,57	0,58	0,41	0,43	0,48	0,52	0,53
REUNION		0,43	0,45	0,50	0,55	0,56	0,39	0,41	0,46	0,50	0,51
MAYOTTE		0,47	0,50	0,54	0,59	0,61	0,43	0,46	0,49	0,54	0,56

Building height: 28 m CC span: 650 mm											
	Wind Speed (m/s)	GENERAL CASE: Identical terrain over 1 km (orography coefficient: 1,0)					Heterogeneous relief over 1 km (orography coef.: 1,15)				
		Surface Roughness categories					Surface Roughness categories				
Zone		0	II	IIIa	IIIb	IV	0	II	IIIa	IIIb	IV
1	22	0,53	0,56	0,60	0,63	0,68	0,49	0,51	0,54	0,58	0,62
2	24	0,50	053	0,56	0,60	0,64	0,46	0,48	0,51	0,54	0,58
3	26	0,48	0,50	0,53	0,57	0,61	0,44	0,46	0,49	0,52	0,55
4	28	0,46	0,48	0,51	0,54	0,58	0,41	0,44	0,46	0,49	0,53
GUAD	34	0,37	0,40	0,43	0,46	0,49	0,34	0,37	0,39	0,42	0,45
GUYANE		0,63	0,67	0,71	0,75	0,81	0,58	0,61	0,65	0,68	0,74
MART		0,42	0,44	0,46	0,49	0,53	0,38	0,40	0,42	0,45	0,48
REUNION		0,40	0,42	0,45	0,47	0,51	0,36	0,38	0,41	0,43	0,46
MAYOTTE		0,44	0,46	0,49	0,52	0,56	0,40	0,42	0,44	0,47	0,51

Wind zones in France described in page 6

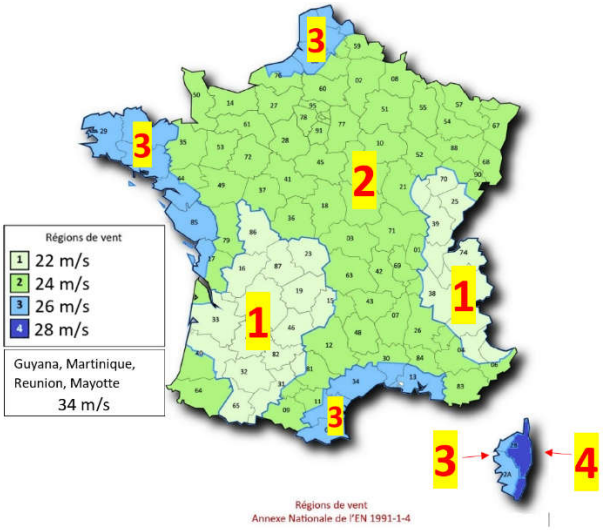
Roughness categories described in page 6

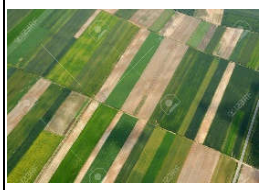
Identical terrain over a 1 km radius: Terrain composed of obstacles of various shapes and heights
Heterogeneous terrain over a 1 km radius: Terrain composed of individual and scattered obstacles (ex: cliffs, hills ...)

10. Wind loads in France

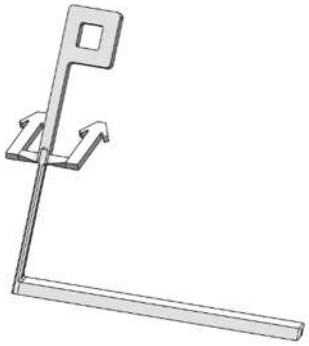
In the Eurocode rules, you need to take care of wind speed and roughness categories.

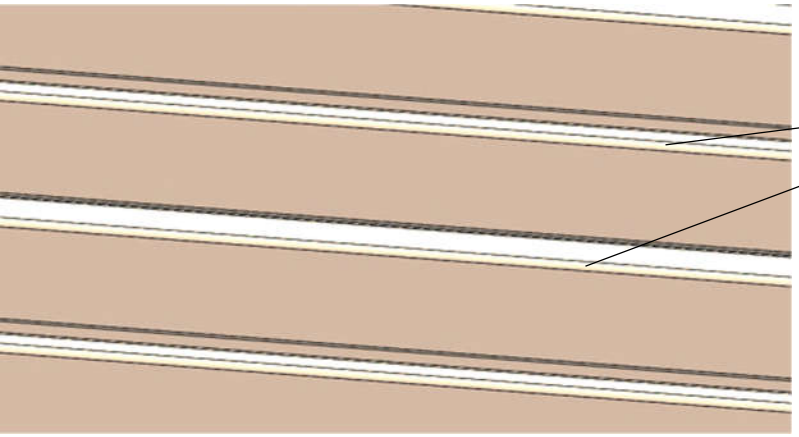
- Wind zones in France -



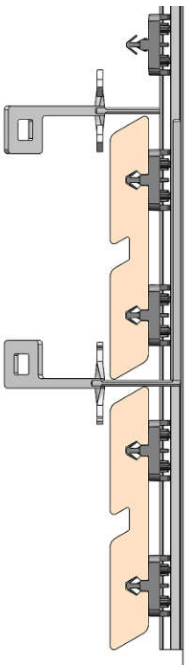
SURFACE ROUGHNESS CATEGORIES				
0	II	IIIa	IIIb	IV
Sea or coastal area exposed to the open sea	Lakes or flat and horizontal area with negligible vegetation and 0,01 1 without obstacles, airports	Area with low vegetation such as grass and isolated obstacles 0,05 2 (trees, buildings) with separations of at least 20 obstacle heights	Area with regular cover of vegetation or buildings or with isolated obstacles with separations of maximum 20 obstacle heights	Area in which at least 15 % of the surface is covered with buildings 1,0 10 and their average height exceeds 15 m
				
				

11. Tips: how to remove boards (for open-joint cladding only)



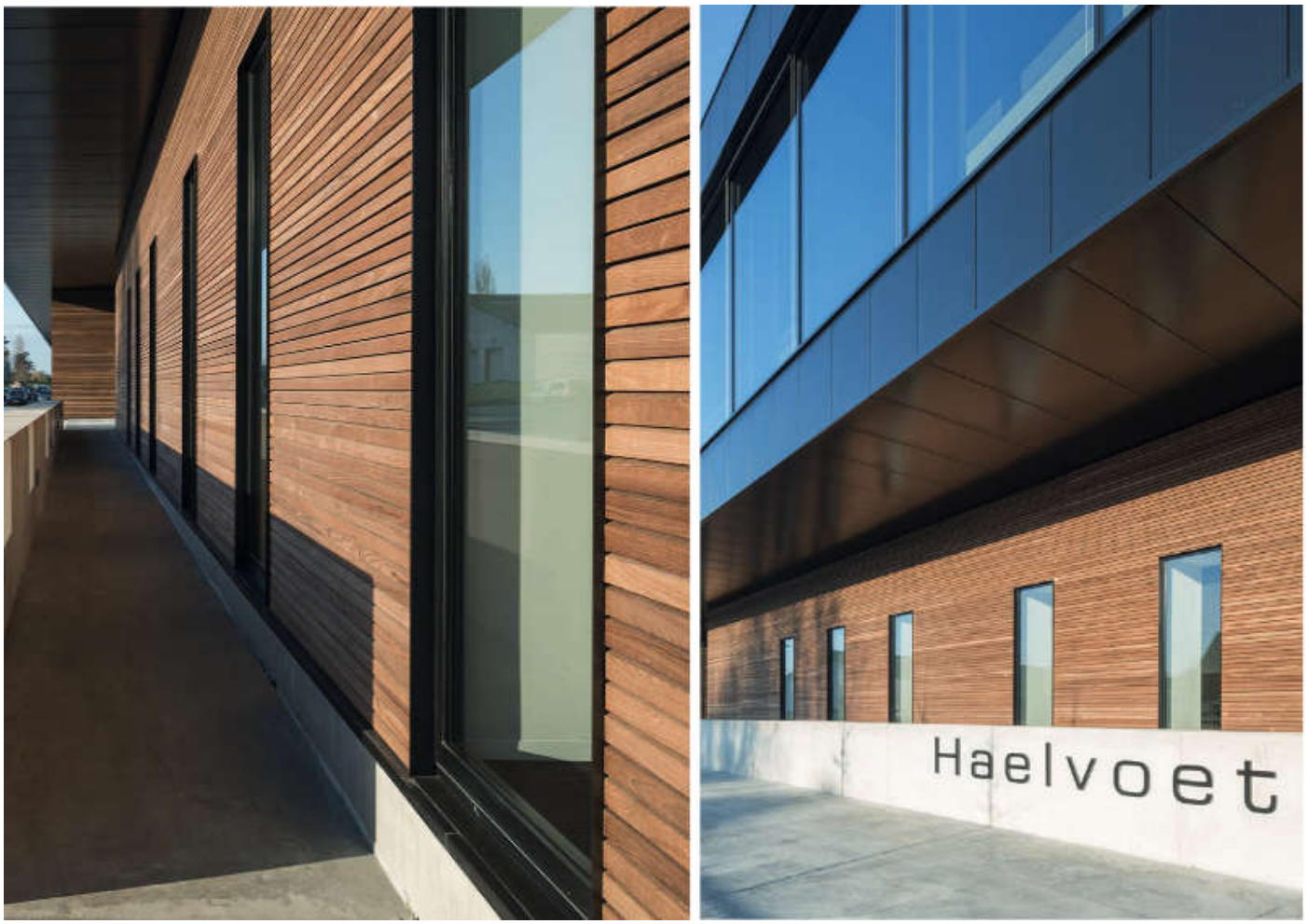


Keys must be positioned simultaneously on each side of the same board, at the level of the clips, onto the rails



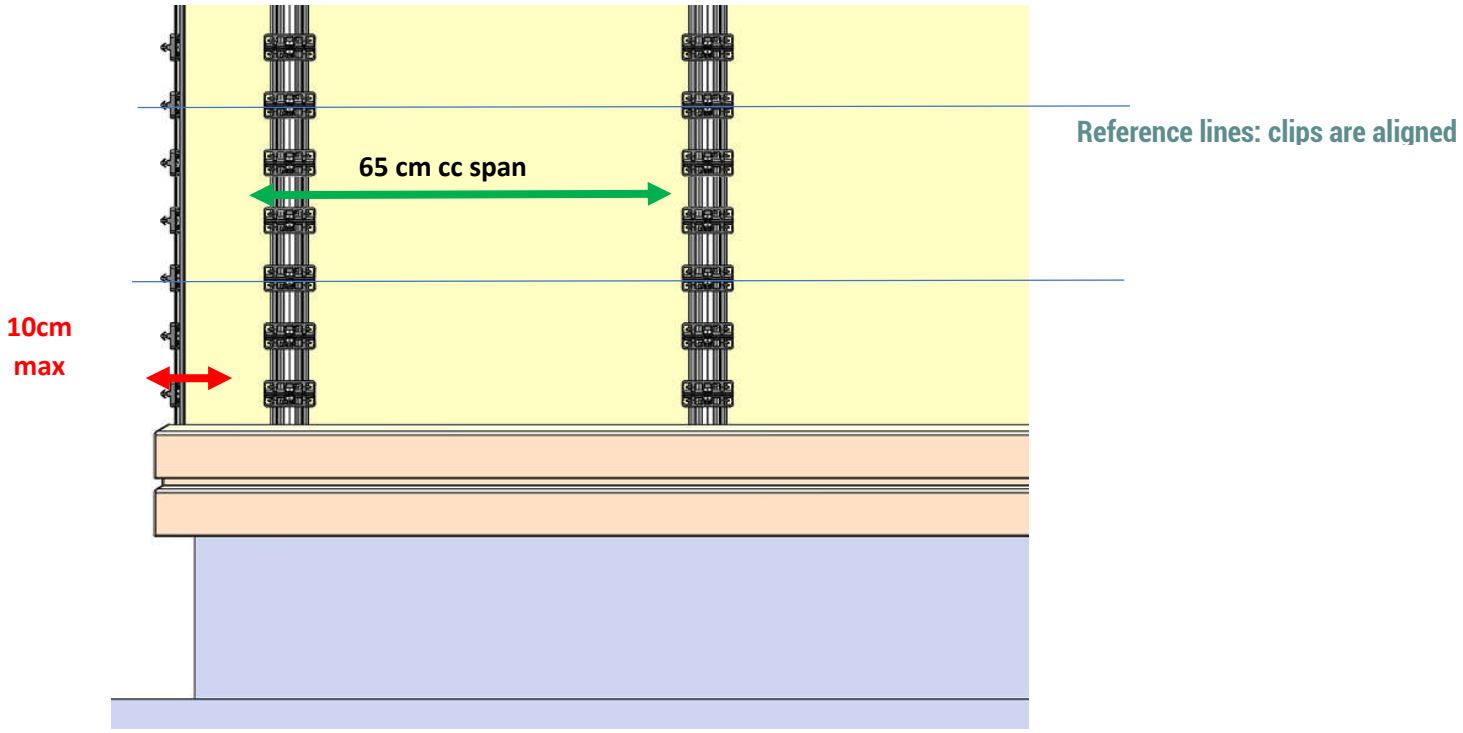
The space between each board must be at least 4 mm wide to insert the keys properly

12. Horizontal Cladding

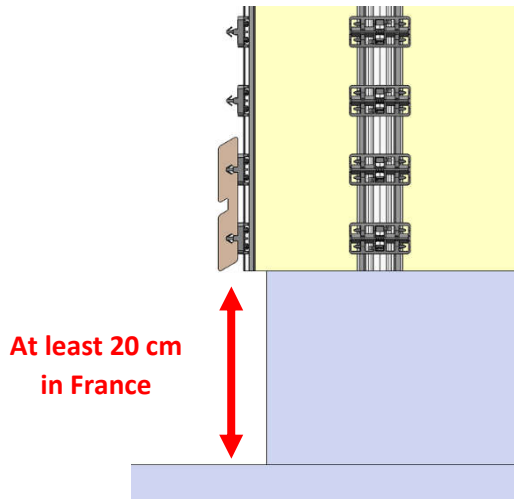


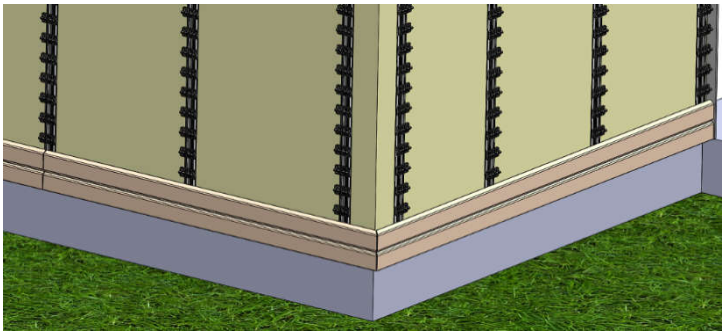
Thermo Ash / Offices / Carpentier / Belgium / © photography Haelvoet.

1. All rails are symmetrical and it does not matter which end you start with
2. The rails do not need to be pre-drilled if using Stainless Steel self-drilling screws
3. Measure the wall height: use full rails when possible and/or cut the rails to length when necessary, using adapted tools
4. Always cut the rails between two clips when possible
5. Use the full-length rails
6. Please refer to the guidelines of the outer cladding manufacturer to know at what minimum height the cladding should start from the ground
   Start on one wall extremity, position the first rail at a minimum of **20 cm away from the ground** and at a maximum of **10 cm away from the wall extremity**



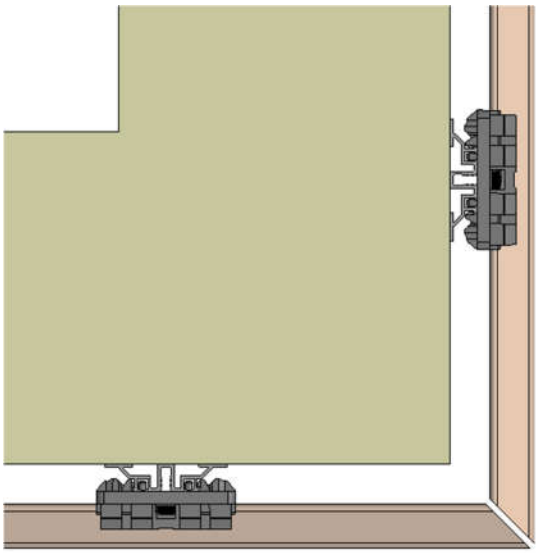
7. Use a manual level to ensure the rail is positioned straight onto the wall
8. Fix the first rail with screws as indicated on page 9.
9. With a laser level or a string, draw the reference line along the rest of the wall to make sure clips are aligned
10. Mark the rail spans
11. Install the other rails. They should be perpendicular to the reference line and parallel with the other rails

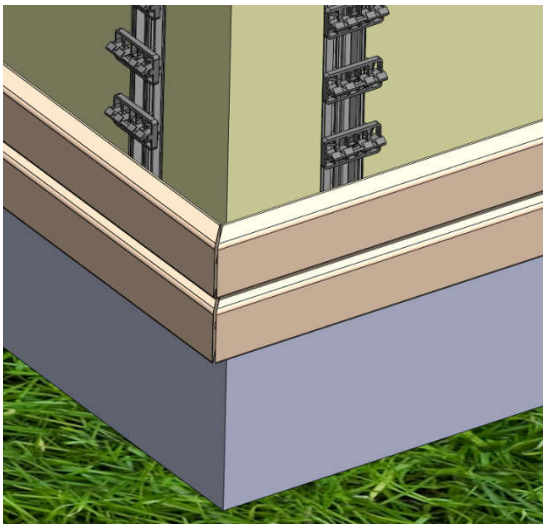




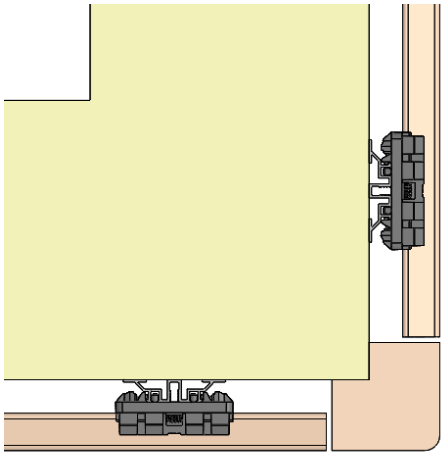
13. Horizontal Cladding: Base of wall and first row

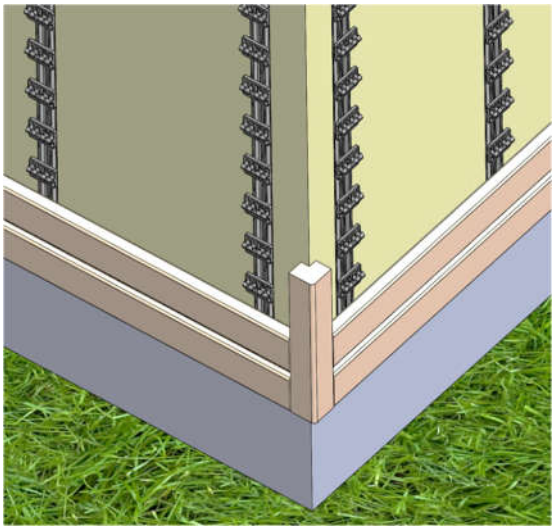
1. Check the angle where two walls meet
2. Define your solution to cover the angle joints
3. If finishing the walls with the boards only, cut angles at the end of the boards that will be used to cover the wall extremity





Other example with tailor-made finishing corner angle sections :



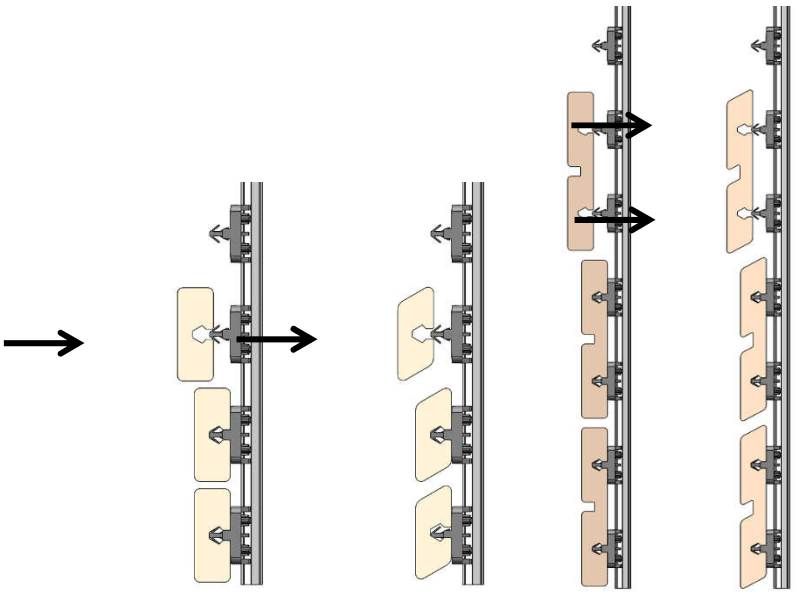


4. Install the first row of cladding by pressing the first board gently onto the rail clips at the bottom of the wall – the cut angle should be at the right place on the wall extremity

   Note : Boards with a double groove need to be snapped onto two clips
   Narrow boards that only have a single groove need to be snapped onto one clip only

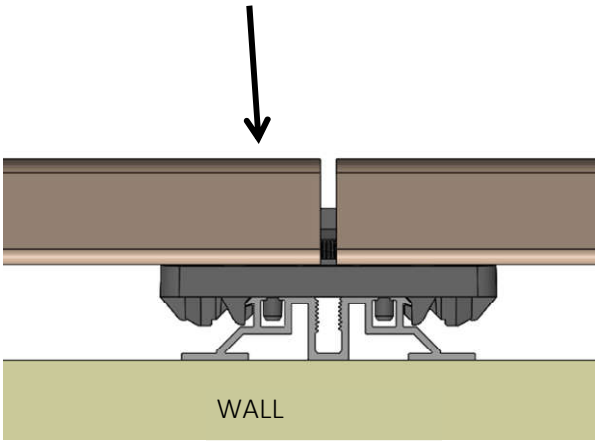
5. Complete the row with the other boards as needed
6. Move your way across the wall until reaching the other wall extremity

7. Start the second row above the first one using the next set of clips

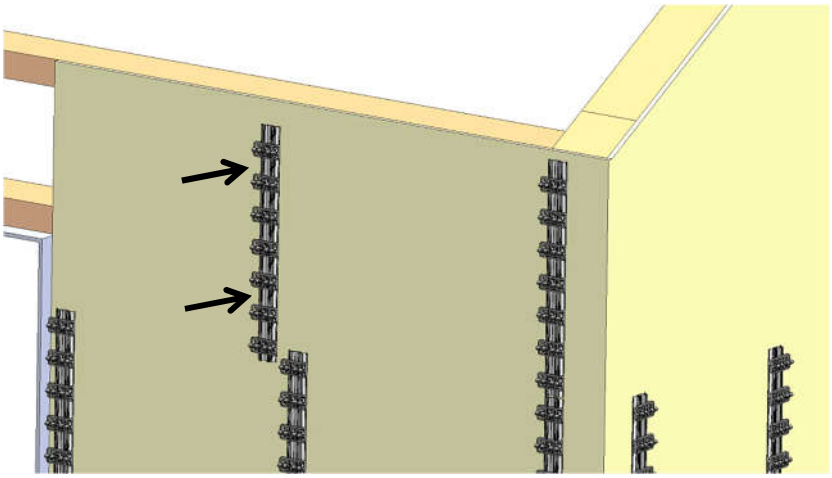


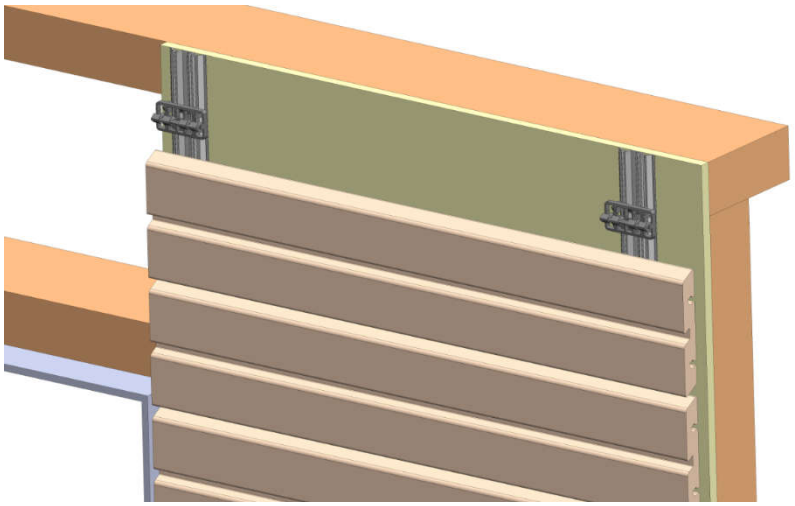
8. Two board ends must meet each other half way across one clip

   Note: follow board manufacturer's recommendations about minimum spacings between two board ends



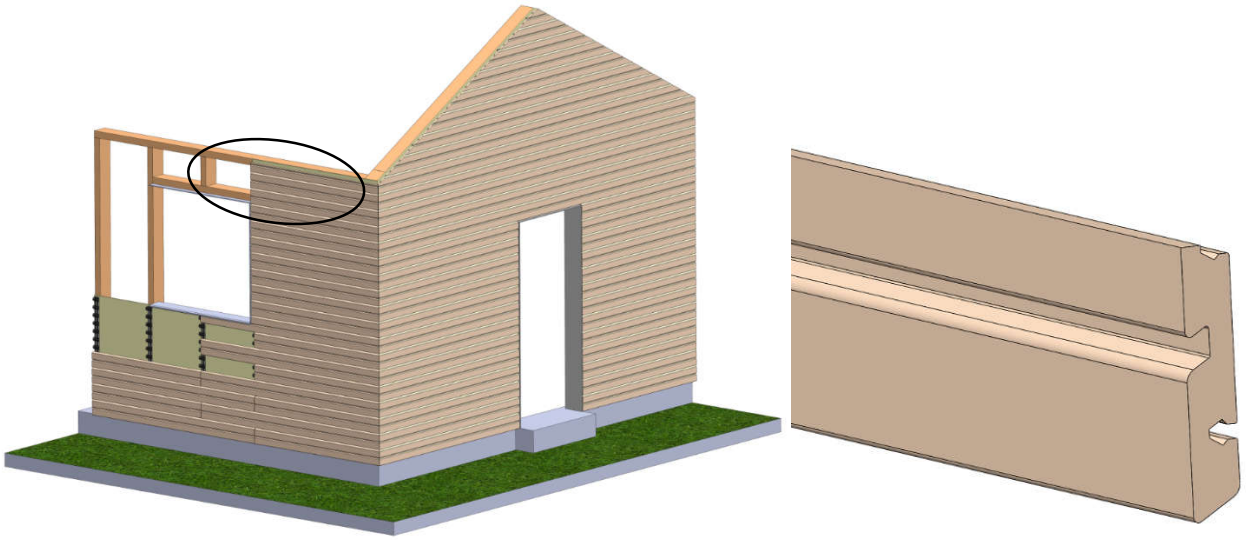
9. When one rail is not enough for entire wall height to be covered, cut the rails to length and apply them on the wall by following our installation recommendations as previously detailed



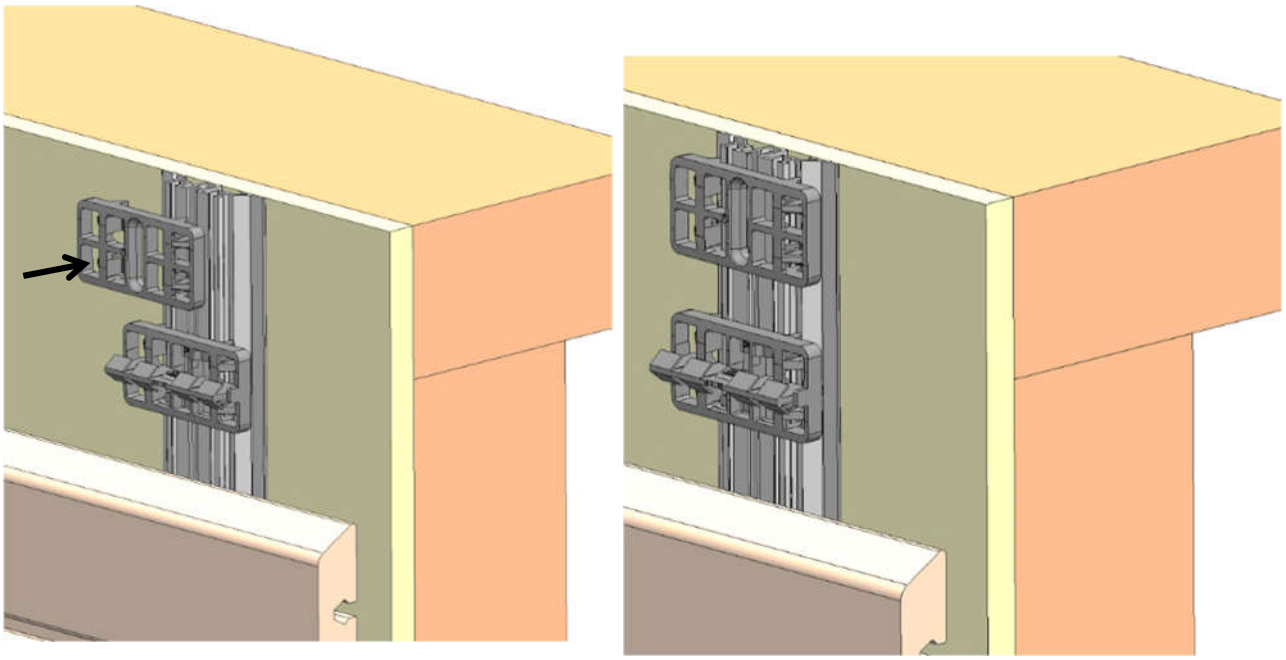


14. Horizontal cladding: finishing touch

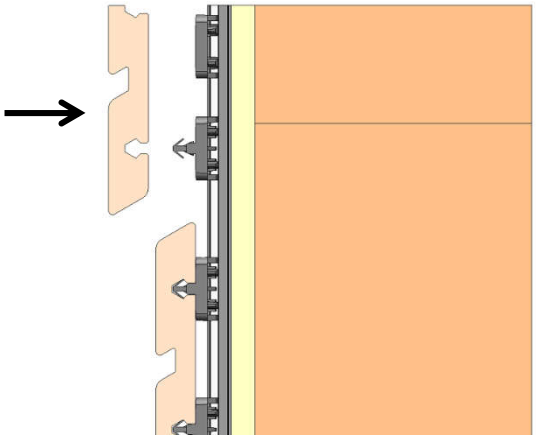
1. When the wall cannot be finished with a full-face board, top boards need to be re-cut to fit, in which case there may be just one utilizable groove left



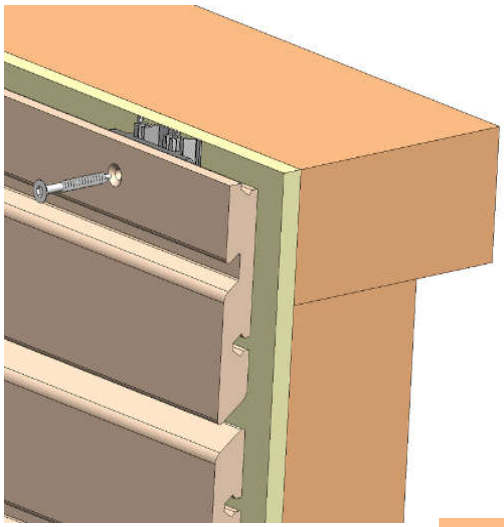
2. Where needed, fix one Cushion clip on each Flat rail for the board to rest onto

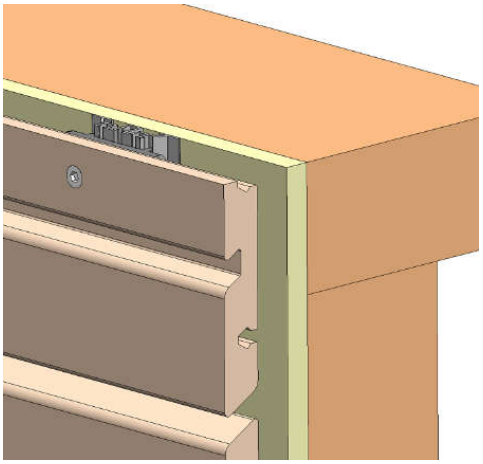


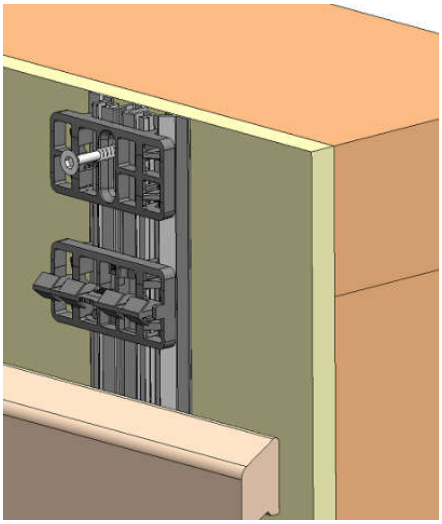
3. Snap the board on top of the clips as described



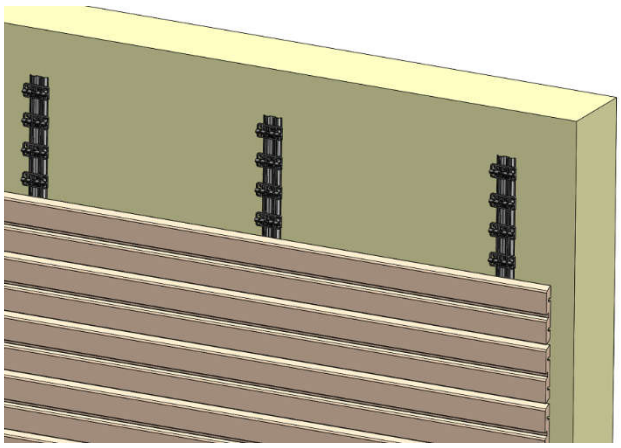
4. Secure the board by fixing it with a screw through the Cushion clip. Repeat as needed on every rail.

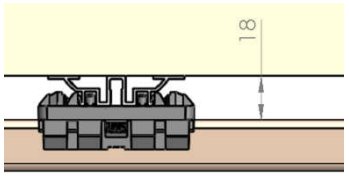




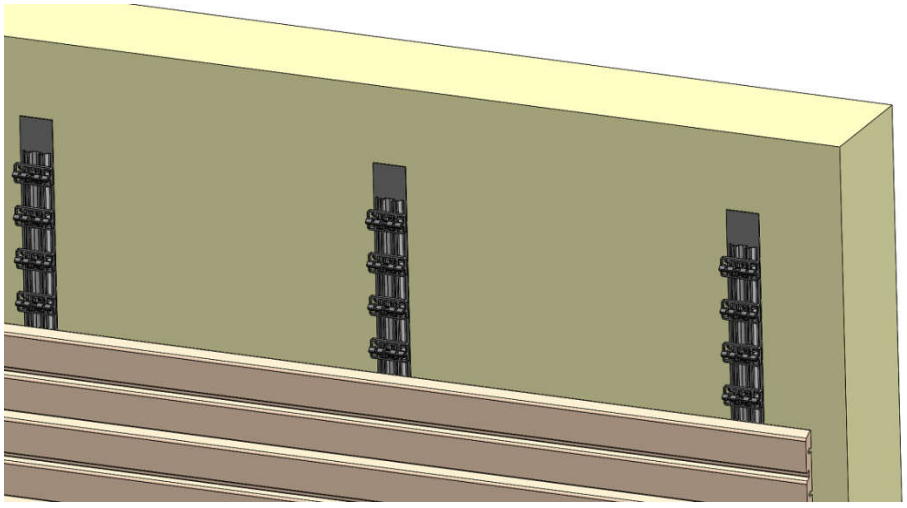


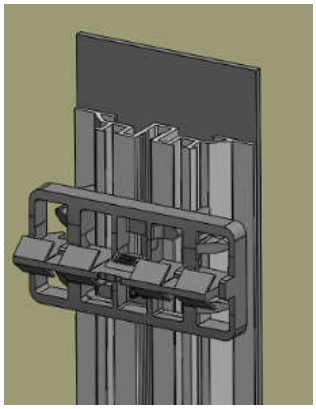
Flat rail with 18 mm ventilation:





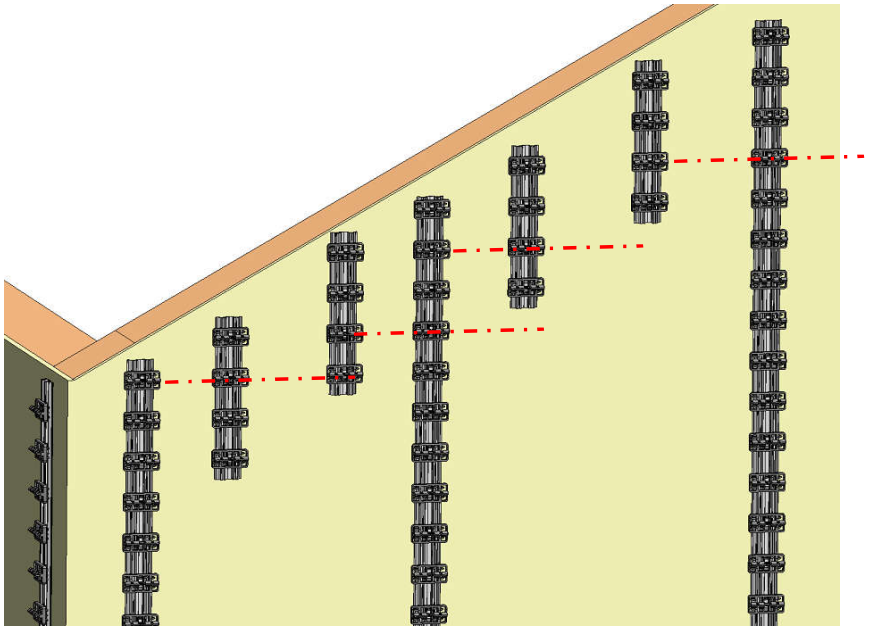
Flat rail with 20 mm ventilation (France 20 mm): adding 2 mm rubber.

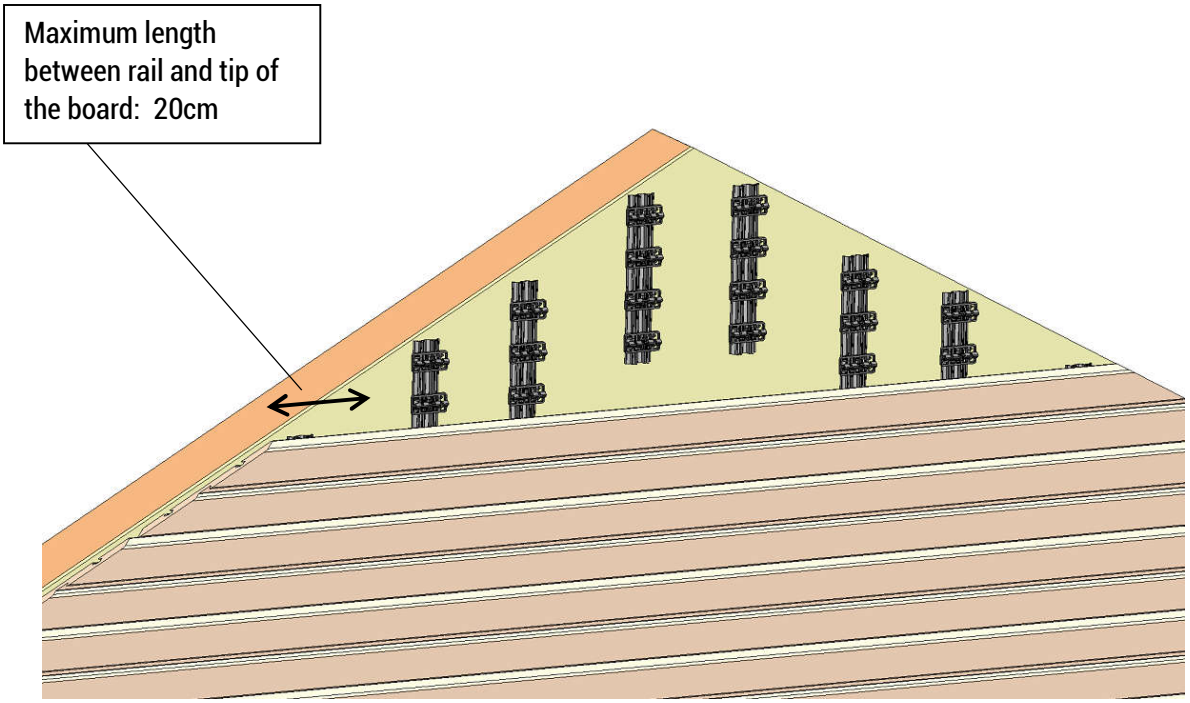




15. : Angle top rafter

Where full lengths of rails cannot be used, cut pieces of the mini rails and place them in different locations where they need to offer support for the boards being placed vertically



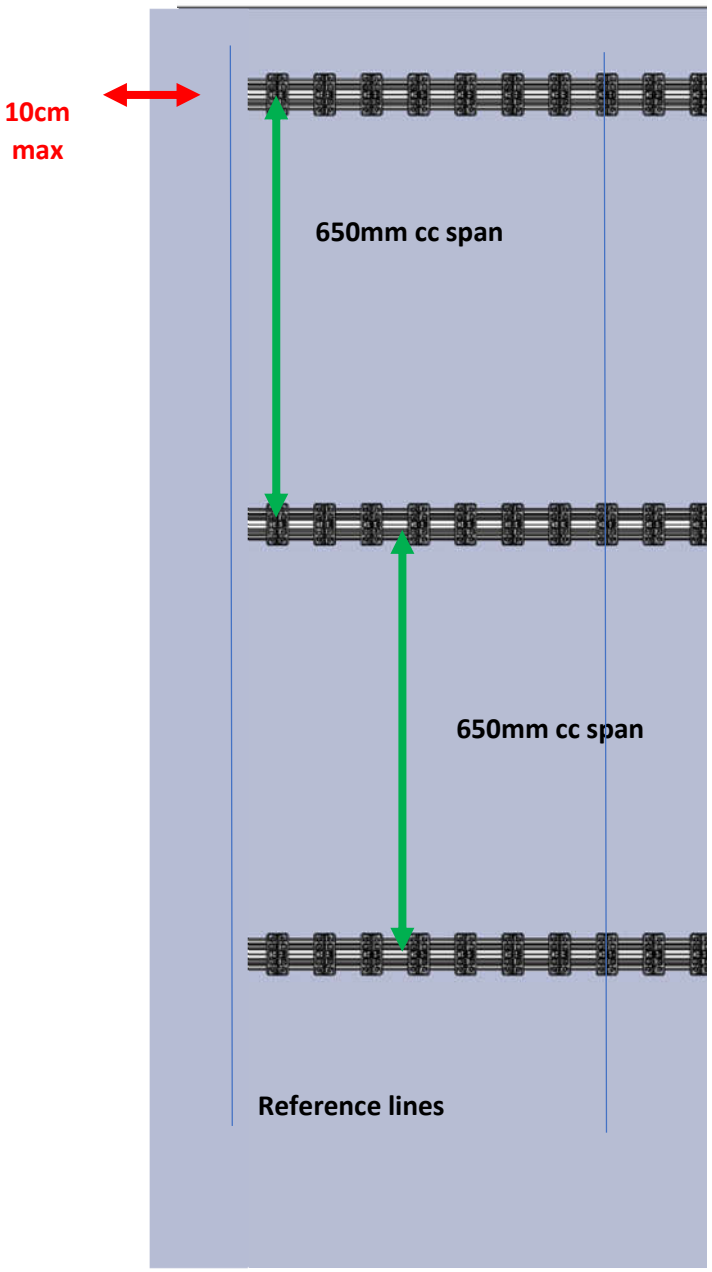


16. Vertical Cladding

Bamboo by Moso / Netherland / Architect: Spee Architekten / Partner: Awood - NL

1. All rails are symmetrical and it does not matter which end you start with
2. The rails do not need to be pre-drilled if using Stainless Steel self-drilling screws
3. Start at the bottom of the wall moving your way up

4. Please refer to the guidelines of the cladding manufacturer to know at what minimum height the cladding should start from the ground.
   Position the first rail at a minimum of 6in away from the ground and at a maximum of 4in away from the wall extremity

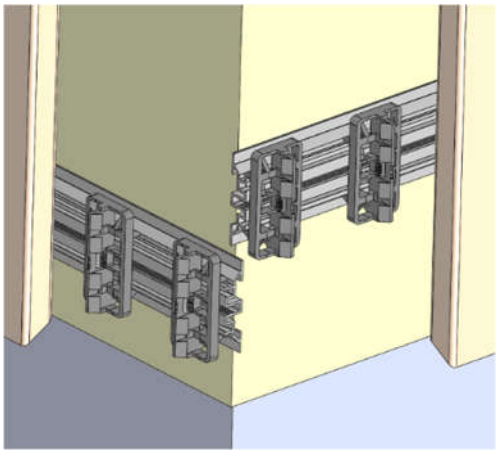


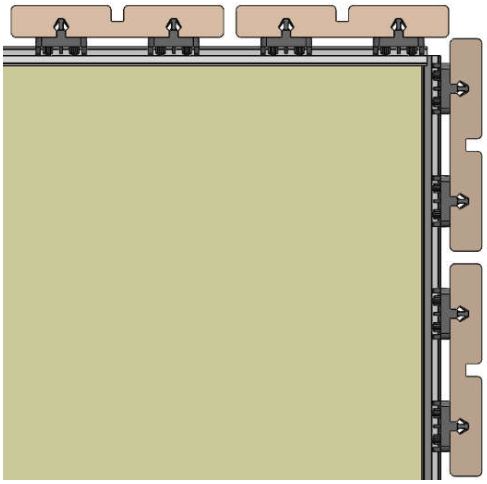
5. Use a manual level to ensure the rail is positioned correctly onto the wall

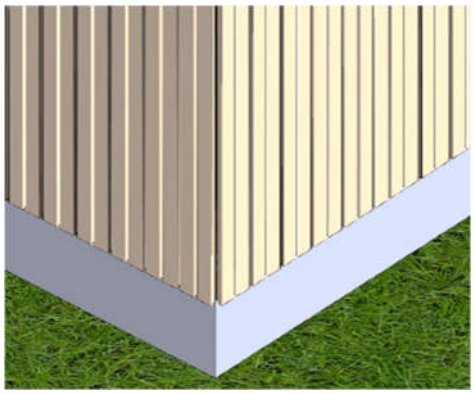
6. Fix the first rail with screws as indicated on page 9
7. With a laser level or a string, draw the reference line along the rest of the wall
8. Check the rail spans
9. Install the other rails. They should be perpendicular to the reference line and parallel with the other rails

17. Vertical cladding: start with the corners

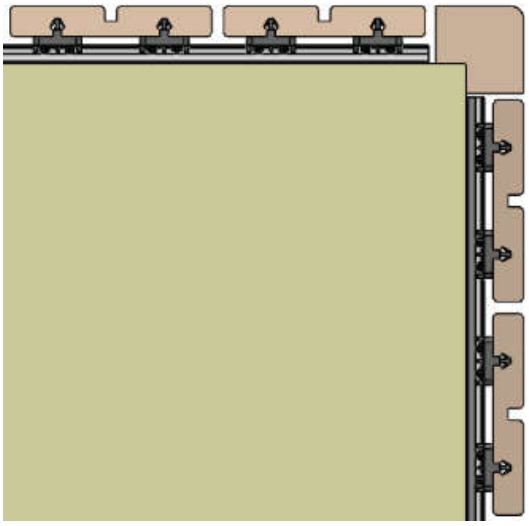
1. Check the angle where two walls meet
2. Define your solution to cover the angle joints
3. Position the rails accordingly

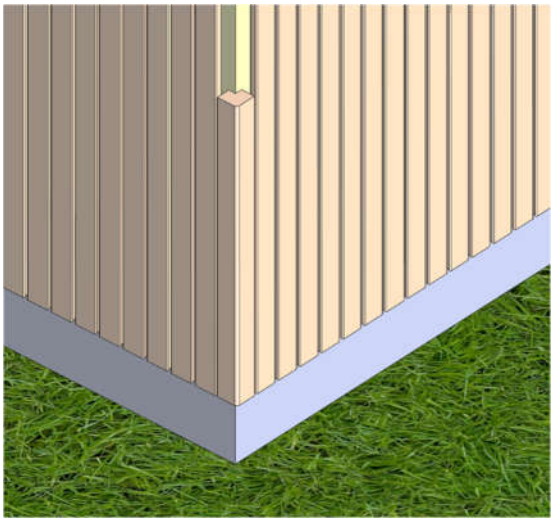






Other example with tailor-made finishing corner angle sections:





4. Install the first vertical line of cladding starting from the wall extremity by pressing the first board gently onto the rail clips at the bottom of the wall – the cut angle should be on the wall extremity

   Note: Boards with a double groove need to be snapped onto two clips
   Narrow boards that only have a single groove need to be snapped onto one clip only

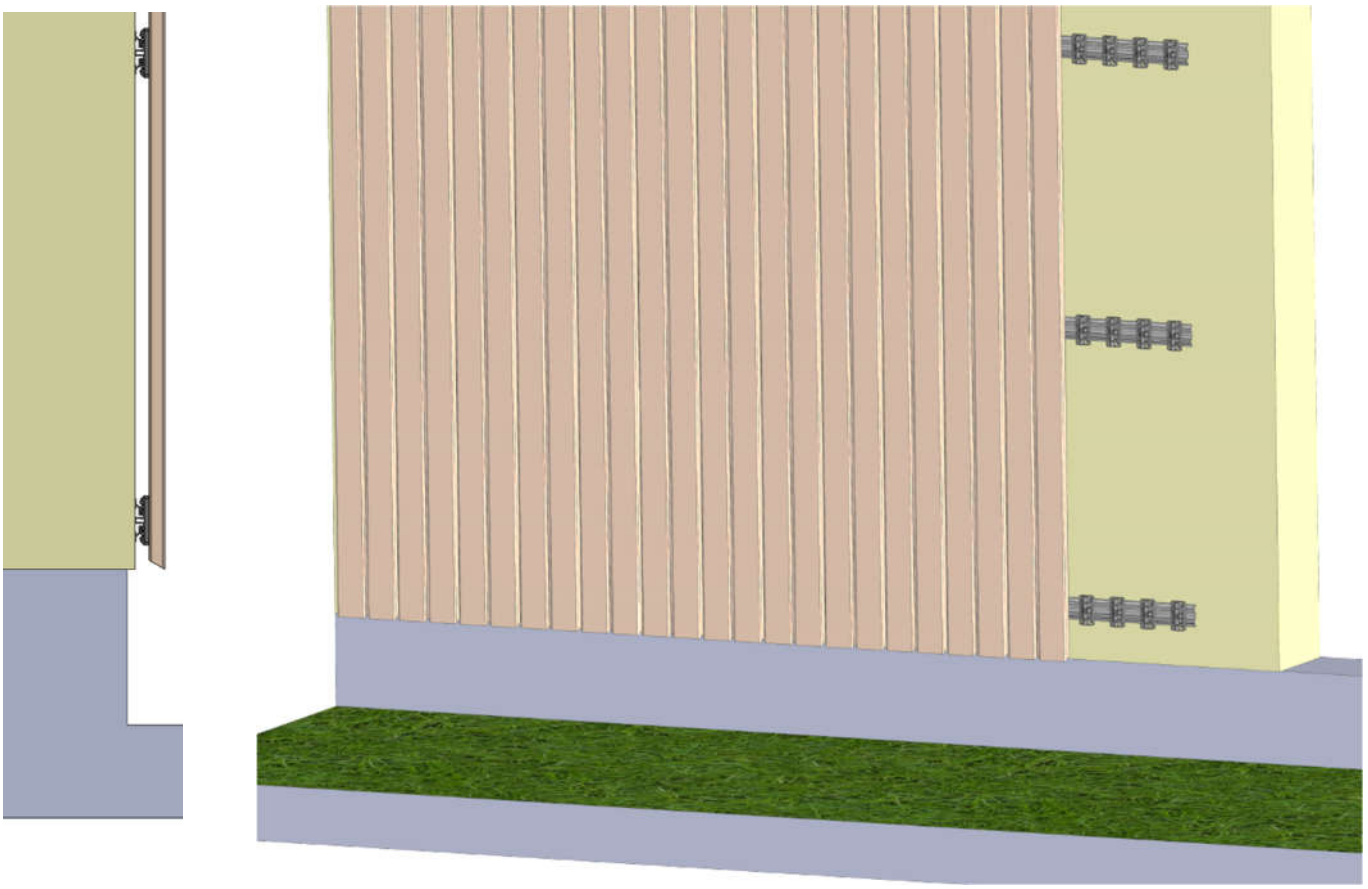
5. Complete the wall with the other boards
6. Move your way across the wall towards until reaching the other wall extremity
7. Start the second row above the first one using the next set of clips
8. Two board ends must meet each other half way across one clip

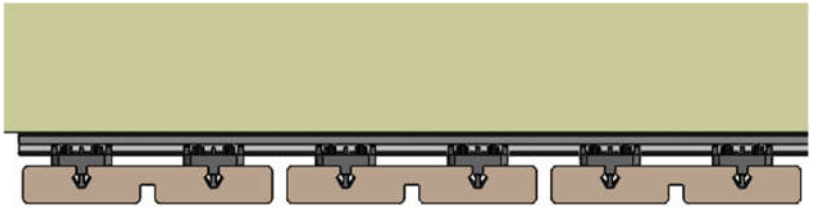
   Note: follow board manufacturer's recommendations about minimum spacings between two board ends

18. Vertical cladding: possible rail applications

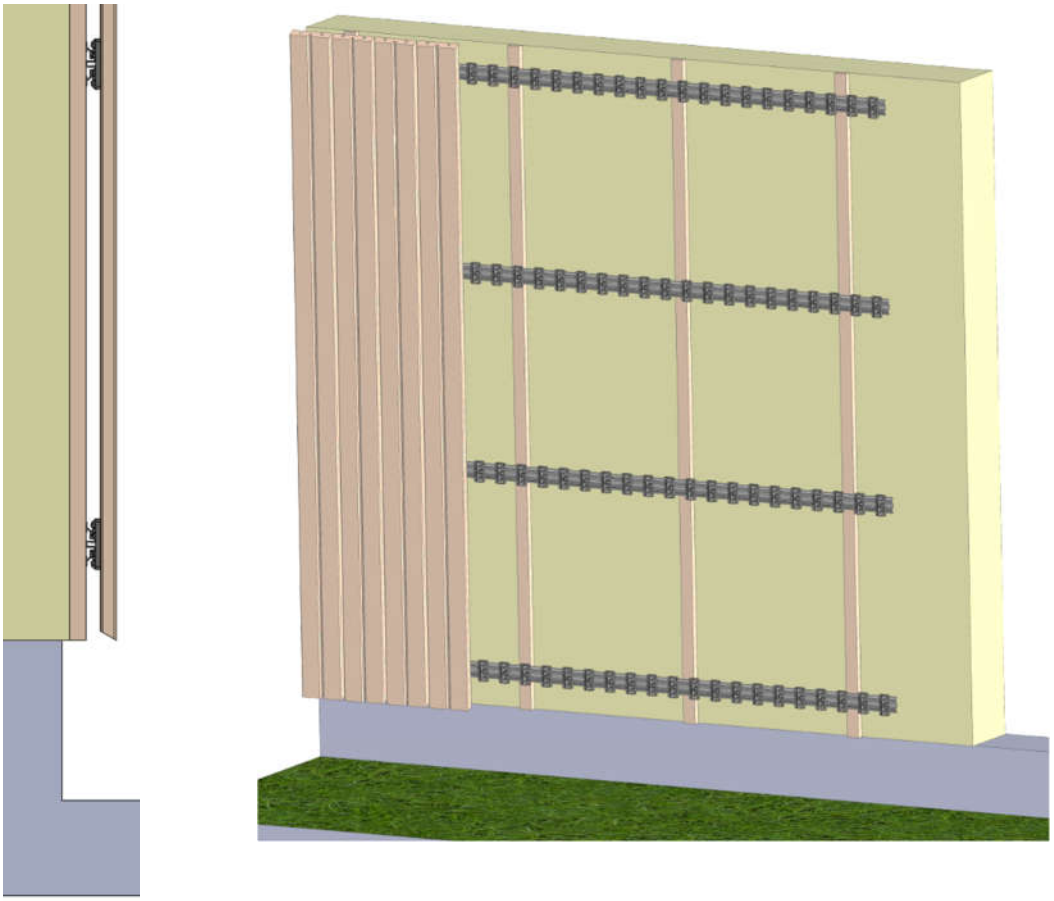
Direct onto the wall (please refer to the General guidelines, from page 2)

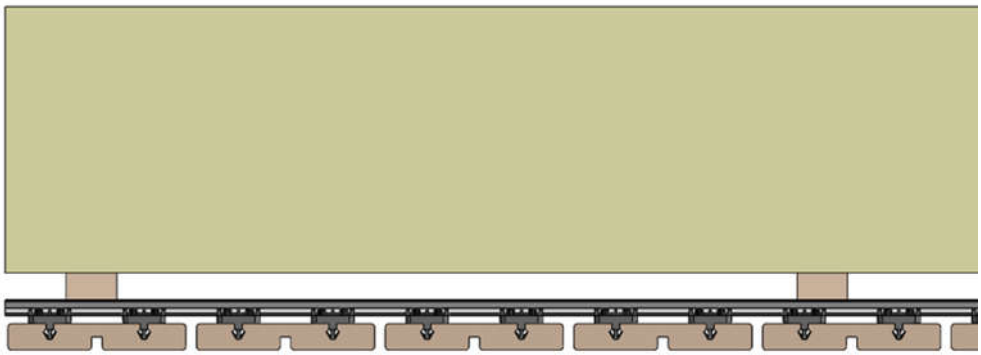
If boards don't neat ventilation between wall and board



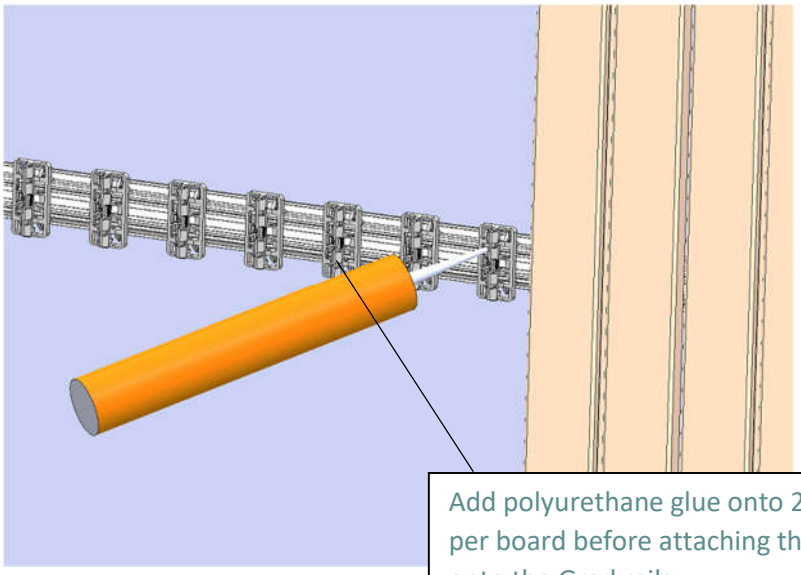


With double-furring if 20 mm ventilation is required (France):



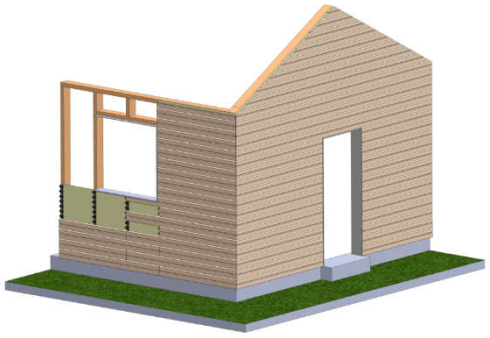
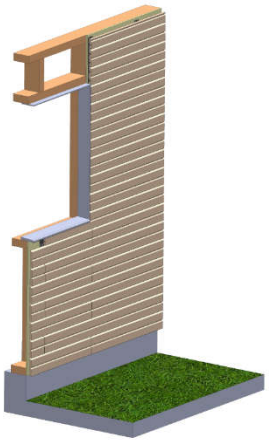
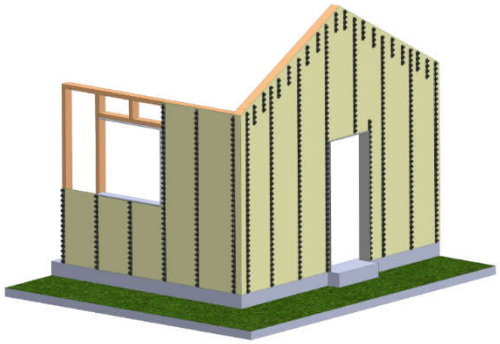
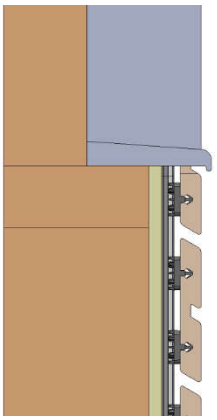
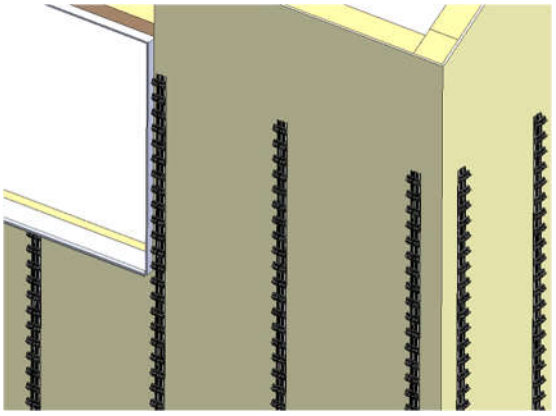


9. Add PU glue to avoid the boards from sliding down over time



Add polyurethane glue onto 2 clips per board before attaching them onto the Grad rails

19. Obstacles: windows and doors

Main view (example with horizontal cladding)	Detailed view
	
	
	 For more support, rails shall surround the window, even if it requires reducing the rail spans

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