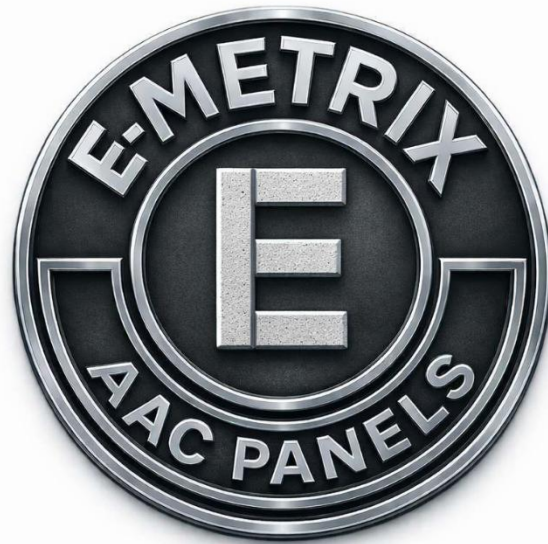




75 mm E-METRIX® Panel Wall

Reinforced AAC panel

External Wall System

for

Low-rise building applications

Technical Manual

Version: 1 - 2026



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Introduction

The use of reinforced autoclaved aerated concrete (AAC) in buildings has been widely accepted throughout Europe for over 70 years. It was first introduced into Australia over 30 years ago and has gained significant popularity and acceptance in the building industry due to its unique set of benefits.

The E-METRIX® brand of reinforced autoclaved aerated concrete (AAC) panels are suitable for many different building applications including external or internal walls for low-rise and high-rise construction. The superior performance of the reinforced AAC panels with regards to fire resistance, thermal efficiency and sound reduction make it an appealing choice for builders, developers and the like. This is especially so when the increase in speed of construction that the panel provides is taken into account.

The E-METRIX® reinforced AAC panels are produced by German engineering in a modern manufacturing plant located in Vietnam. The finished panels are packaged and shipped to Australia.

Scope

This E-METRIX® reinforced AAC external wall Technical Manual for low-rise building applications is intended for use by qualified and experienced architects, engineers and builders for the design, specification and construction of external walls for low-rise residential buildings. These buildings are assumed to be Class 1 or 10 buildings as defined in the National Construction Code – Building Code of Australia (NCC) and include the following which are not located above or below another dwelling or another Class of building other than a private garage:

- Two or more attached dwellings, separated by a fire-resisting wall e.g. a row house, terrace house, town house or villa unit.
- A boarding house, guest house or hostel with <300m² floor area and <12 residents.
- 4 or more single dwellings located on one allotment and used for short-term holiday accommodation.

The technical manual is strictly for use with the 75mm E-METRIX® reinforced AAC panel (Model EPL-550/30075) and shall not be used with any other product or manufacturer. Any variation of the system/components outlined in this manual is considered outside the scope and must be evaluated by the relevant professional consultant.

Limitation

The technical manual does not replace the need for qualified designers (e.g. engineers & architects) to specify project specific information, and it is their responsibility to confirm the suitability of using E-METRIX® reinforced AAC products for a particular project. E-METRIX® accepts no liability for errors or omissions in this technical manual, and it is the user's responsibility to ensure that the current edition of the manual is being used.

What is reinforced AAC?

Reinforced AAC is a precast building element, usually in the form of panels, consisting of cured AAC material and welded steel reinforcing mesh.

The raw ingredients of AAC are fine sands, cement, lime, water and an expanding agent. These are mixed to and placed into a casting bed along with sheets of welded reinforcing mesh that have been coated in a film to reduce corrosion. While in the casting bed, the AAC mix expands due to a chemical reaction with the expanding agent that forms very small air voids throughout the material. The expansion causes the material to rise and cover the reinforcing mesh. The forms of the casting bed are then removed and the reinforced AAC block is sliced into numerous panels as required.

Finally, the sliced reinforced AAC block is placed into large chambers at high pressure and heat to allow the curing to take place (autoclaving).

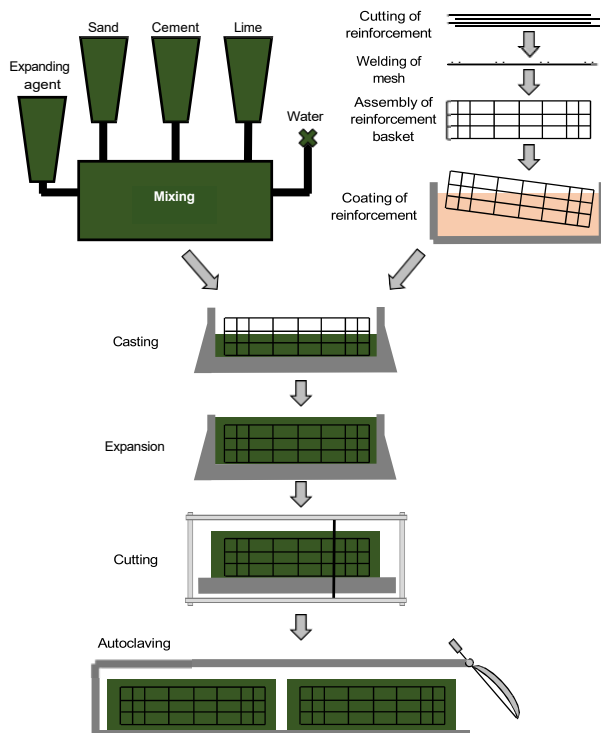


Figure 1 - Reinforced AAC manufacturing process

Material Properties

For external walls in low-rise residential buildings, the 75mm E-METRIX® reinforced AAC panel is recommended. This panel contains a single layer of reinforcement that is located centrally in the panel depth. The various properties of the panel are outlined below.

Table 1 - 75-mm E-METRIX® properties

Property	Value
Reinforced Panel	
Panel thickness	D 75 mm
Panel Length	L 1.2 - 3.0 m
Ult. bending capacity	ϕM_k 0.6 kNm/m
Thermal resistance	0.51 R-Value
Density for design	$\rho_{d,sup}$ 634 kg/m ³
	$\rho_{d,inf}$ 521 kg/m ³
Density for transport	ρ_{trans} 782 kg/m ³
AAC Material	
Dry density	$\rho_{m,g}$ 530 kg/m ³
Compressive strength	f_{ck} 2.5 MPa
Thermal expansion coefficient	8.0 $\times 10^{-6}/^{\circ}\text{C}$
Reinforcement	
Bar size	ϕ_{sl} 5 mm ϕ
No. of longitudinal bars	n 4
Bar corrosion protection	Sand-loaded viscous paint

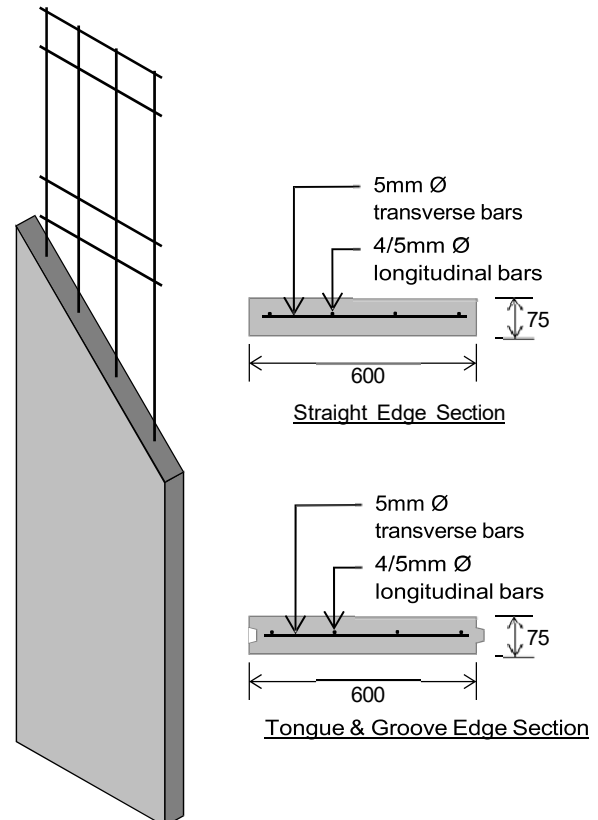


Figure 2 - 75mm E-METRIX® Diagrams

System Overview

The 75-mm E-METRIX® external wall system for low-rise buildings consists of a single 75-mm E-METRIX® fixed to a structural frame using steel tophat battens forming a cavity external wall system. The external side of the structural frame has a pliable membrane attached to it while the internal side has plasterboard attached. The system provides the necessary weatherproofing, thermal, fire resistance and sound attenuation required by the NCC. An overview of the system is illustrated in Figure 3 below.

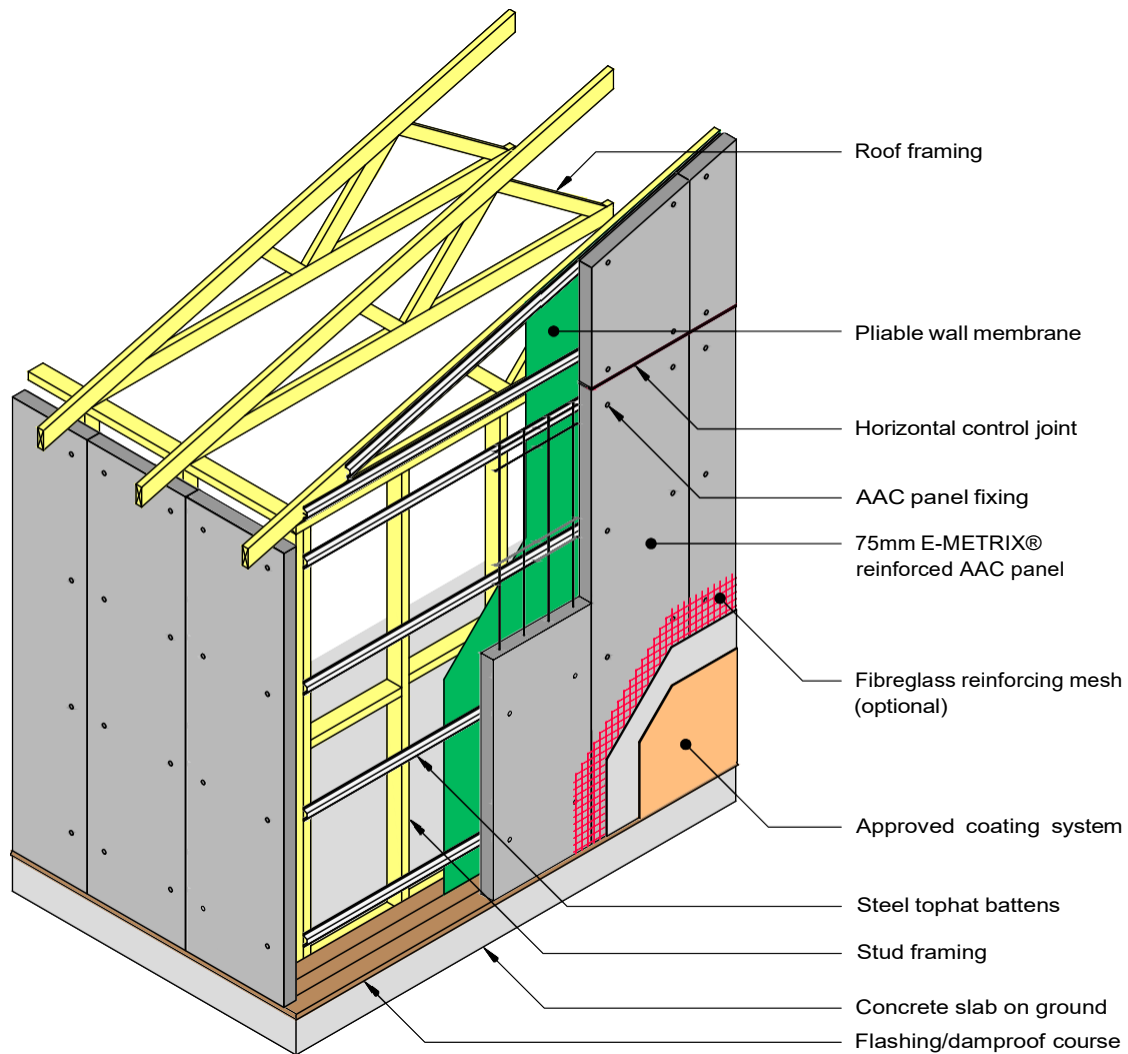


Figure 3 – Low-rise external wall system overview

System Performance

National Construction Code

The National Construction Code – Building Code of Australia (NCC) sets out the requirements for building construction work in Australia. For external walls of low-rise residential buildings, Volume II of the NCC applies. The 75mm E-METRIX® wall systems detailed in this manual comply with the following performance requirements of the NCC Volume II.

Table 2 - NCC compliance

NCC Vol. II Section	Performance requirement
Structural	P2.1.1
Weatherproofing	P2.2.2
Fire Resistance	P2.3.1
Thermal	P2.6.1

Structural

The 75mm E-METRIX® component of the low-rise external wall system is a non-loadbearing component, it does not support vertical load other than its self-weight. It is the stud framing that is the load-bearing component. However, the 75-mm E-METRIX® and its attachment back to the stud framing are required to resist lateral (out-of-plane) loading which typically caused by wind.

The various mechanical properties of the 75mm E-METRIX® reinforced AAC panel have been independently tested by a NATA accredited laboratory in accordance with AS 5146.2-2015. The lateral wind load capacity for the 75mm E-METRIX® for ultimate and serviceability limit states is illustrated in Figure 4. The serviceability limit capacity is calculated based on a maximum deflection limit of L/250.

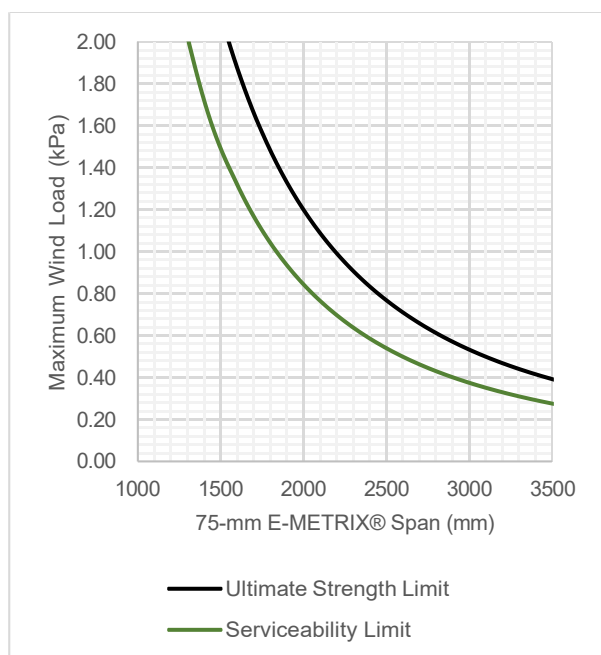


Figure 4- Lateral load capacity of 75mm E-METRIX®

The ultimate capacities of attachment system back to the stud framing have been theoretically calculated. The 75-mm E-METRIX® shall be fixed to the stud framing using the tables in the Fixing section of this manual.

The stud framing component of the wall system is required to support all permanent and imposed vertical, out-of-plane and in-plane (racking) loads. It shall be designed and installed in accordance with AS1720 or AS 1684 series of standards.

The plasterboard lining and fixings shall be designed and installed in accordance with the relevant manufacturer.



Figure 5 - Structural testing of 75mm E-METRIX®

Weatherproofing

The weatherproofing of the external wall system has been successfully tested in a NATA accredited laboratory in accordance with AS/NZS 4284 for a serviceability pressure of ± 1.00 kPa. Thus, it is suitable for wind classifications N1, N2, N3 & C1 as per AS 4055.



Figure 6 - Weatherproofing testing of 75mm E-METRIX®

Fire Resistance

Part 3.7.1.3 of the NCC states situations where the external walls of a class 1 building must achieve a fire resistance level (FRL) of 60/60/60 due to reduced separation to another building or allotment boundary.

The 75mm E-METRIX® reinforced AAC panel is the main fire resisting element in the low-rise external wall system detailed in this technical manual. However, the internal plasterboard lining and fire rated sealed joints are integral to the overall fire performance. The 75mm E-METRIX® has been tested by CSIRO in accordance with AS 1530.4 and the low-rise external wall system assessed to provide an FRL performance of 90/90/90 which exceeds the NCC requirements.



Figure 7 - Fire testing of 75mm E-METRIX®

Thermal

The 75-mm E-METRIX® provides significant thermal performance resulting in comfortable living spaces for low-rise residential buildings. The thermal resistance of the wall system using various types of insulation is outlined in Table 3 below.

Table 3 - Thermal performance

Membrane	Wall insulation	R-Value	
		Summer	Winter
Semi-reflective	R1.5 (70-mm)	2.60	2.81
Semi-reflective	R2.0 (90-mm)	3.09	3.34
Reflective	R1.5 (70-mm)	2.76	3.00
Reflective	R2.0 (90-mm)	3.26	3.53

Acoustic

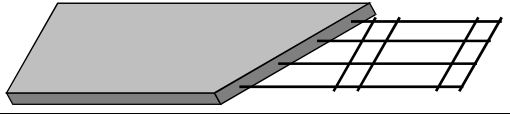
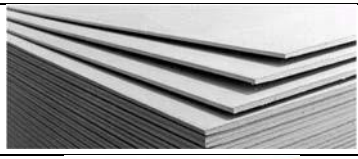
Where a class 1 building is constructed close to a road or rail corridor, the acoustic performance of the external wall should be an important consideration.

The 75mm E-METRIX® has been tested by CSIRO in accordance with AS/NZS 1276.1 and the low-rise external wall system assessed by a leading Australian acoustic firm. If the insulation and internal wall lining components of the low-rise external wall system are changed slightly a significant increase in acoustic performance can be achieved as shown in Table 4 below.

Table 4 - Acoustic performance

Insulation	Internal wall lining	Acoustic Performance
75-mm glasswool insulation (14 kg/m ³)	10-mm standard grade plasterboard (6.4 kg/m ²)	R _w = 38
	13-mm fire-rated plasterboard (min. 10.4 kg/m ²)	R _w = 45
	2 x 13-mm fire-rated plasterboard (min. 20.8kg/m ² total)	R _w = 52

Wall System Components

Product	Description	
75mm E-METRIX®	75-mm thick reinforced AAC panel available in lengths from 1200-mm to 3000-mm in 5-mm increments.	
Tophat batten	24-mm deep x 0.42 BMT steel tophat batten of grade G550 with AZ150 coating. It is recommended to use Rondo 303 of Studco M303	
AAC panel fixing screw	For fixing the 75mm E-METRIX® to the tophat batten use 14-10x90 Type 17 hex head screws in accordance with AS 3566.1. Corrosion class shall be in accordance with AS 3566.2 as follows: • Class 3 for moderate & mild environments • Class 4 for marine, severe marine & industrial environments.	
Stud frame fixings	For fixing the steel tophat battens to the stud framing use 12-11x45 Type 17 hex head screws in accordance with AS 3566.1. Corrosion class shall be in accordance with AS 3566.2 as follows: • Class 3 for moderate & mild environments • Class 4 for marine, severe marine & industrial environments.	
Pliable membrane	Pliable membrane fixed to the stud framing to be in accordance with AS/NZS 4200.1 with water barrier classification.	
Plasterboard	Plasterboard shall be either 10-mm standard grade (min. 8.4 kg/m ²) or 13-mm fire-rated grade (min. 10.4 kg/m ²). Refer to acoustic performance section. It is recommended to use Gyprock, Knauf or USG Boral brands.	
Stud framing	The load bearing timber stud framing shall be either 70-mm or 90-mm in accordance with AS 1720 or AS 1684 series.	
Insulation	75 or 90-mm glasswool wall insulation consisting of an R-Value that is suitable for the required thermal performance. For acoustic performance use 75mm thick with a minimum density of 14 kg/m ³ minimum. It is recommended to use fletcher, Bradford or Knauf brands.	
Panel Adhesive	Cement based tile adhesive for all 75-mm E-METRIX® joints excluding control joints. Approved product is Dunlop AAC concrete block adhesive.	
Anti-corrosion paint	When panels are cut the exposed ends of the reinforcement must be treated with corrosion protection paint. It is recommended to use a zinc rich paint, e.g. Dy-Mark Zinc Guard	
Sealant	An external grade sealant shall be used for all control joints. For walls that require fire resistance, use a fire-rated sealant. Approved product is Selley's Flame Flex.	
Backing rod	To maintain the correct thickness of sealant in joints use backing rod. The thickness of the backing rod is to be suitable for the joint thickness.	

Detailing

Control Joints

Control joints must be installed through the 75-mm E-METRIX® internal wall systems to minimise the risk of damage occurring to the external wall due to movement of the building. This ensures the FRL of the wall system remains valid for the life of the wall. Movement in structures can occur due to various causes including:

- movement of the foundation material
- shrinkage/expansion of the building materials
- long term shrinkage of the timber members
- long term deflection of suspended members (e.g. concrete slabs)

All control joint requirements should be project specific and prepared by the project structural engineer prior to any E-METRIX® installation.

Vertical Control Joints

It is recommended that vertical control joints should be located:

1. At the maximum spacing for walls without openings listed in Table 5 below.

Table 5 - Vertical control joint spacings

AS2870-2011 Site Class	Max. horizontal spacing
M / M-D	6.0-m
H1 / H1-D	5.5-m
H2 / H2-D	5.0-m

2. For openings greater than 600x600-mm but less than 3000-mm long; along one of the vertical edges for the full height of the E-METRIX® wall; and
3. For openings greater than 3000-mm long; along both vertical edges of the opening for the full height of the E-METRIX® wall.
4. Within 1200-mm of all corner intersections.
5. All changes in wall height.
6. Changes in wall thickness or material types.
7. At the location of movement control joints in the supporting structure (e.g. slab joints).

Horizontal Control Joints

It is recommended that horizontal control joints are located at the level of each floor or ceiling level, this includes:

1. Between the underside and the finished level of the ground floor framing.
2. Between the ceiling and finished level of any upper floor.
3. At the level of the ceiling below the roof (e.g. gable ends).

Fixing

The 75-mm E-METRIX® is fixed to the stud framing through the steel tophat batten which forms a cavity. The fixing method is illustrated in Figure 8 below.

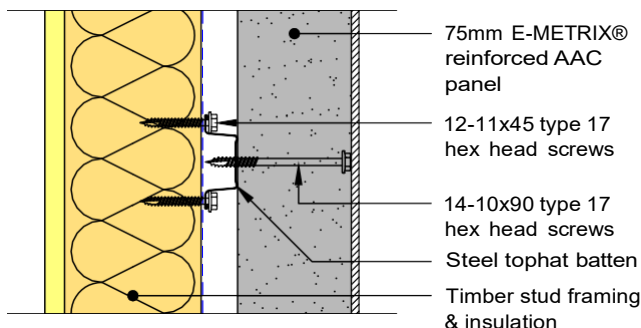


Figure 8 - Fixing detail

The steel tophat batten shall be fixed at each batten/stud intersection using the screws nominated above in Figure 8 above.

The vertical spacing of the tophat battens and number of 75-mm E-METRIX® fixings per panel shall be in accordance with Table 6 below for the relevant wind classification. Refer to Figure 22 for fixing set out. Stud spacing shall be 600-mm for N1 to N3 then 450-mm for N5, N6 and C1 to C3.

Table 6 - Span and fixing table

Wind Class (AS4055)	General areas More than 1.2m from corners		Corners Less than 1.2m from a corner	
	Max. batten spacing (mm)	No. fixings per panel per batten	Max. batten spacing (mm)	No. fixings per panel per batten
N1	1200	2	1200	2
N2	1200	2	1200	2
N3	1200	3	1200	3
N4	1200	2	1100	3
N5	825	3	750	4
C1	1200	2	1200	3
C2	1200	3	1100	3
C3	825	3	750	4

Note: for panels not supported at their base by a slab or lintel, decrease the batten spacing by 20% and increase the number of fixings per panel per batten by 1.

Coating system

All installations of 75-mm E-METRIX® external wall system for low-rise buildings shall include an exterior coating as specified in Table 2.5(A) and either clause 2.8.4 or 2.8.5 of AS 5146.3. The purpose of the exterior coating is to ensure the 75-mm E-METRIX®S remain durable for the life of the building.



Installation Guide

Prior to any construction

1. Ensure the work area is clean and tidy prior to commencing work.
2. Confirm that all system components obtained for the installation are those listed in the technical manual specification.
3. Confirm the wind classification for the building and select the correct batten spacing and number of E-METRIX® fixings.

Preparing for panel installation

4. Ensure the stud frame has been completed to the point of being ready for installation of the panels. This includes checking that the frame is plumb and straight, with special attention to corners of framing.
5. Ensure the stud spacing is no greater than 600-mm.
6. Plan the panel installation, starting from one end allowing for control joints as per the Control Joints section of this manual or as specified by the design engineer.
7. Install the flashings as appropriate and in accordance with the manufacturer's instructions.
8. Install the pliable wall membrane in accordance with the manufacturer's instructions ensuring that:
 - a. The perimeter of the wall is sealed against the concrete structure, or similar, using waterproof sealing tape.
 - b. It wraps around the stud framing perimeter of every wall opening. Provide waterproof tape at the corners of each wall opening.
9. Measure from the bottom of the rebate or as appropriate to determine the batten locations, and mark these around all framing where E-METRIX®'s are to be installed. Extra battens may be installed beyond the requirements of Table 6 if required for irregularities in framing or similar.
10. Fix the battens to each stud in accordance with Figure 8 - Fixing detail, ensuring the batten follows the locations marked previously. Packing of the stud framing may be required to ensure that the battens are plumb and straight. Ensure the battens are discontinuous at vertical control joint locations.

Installing the first panel

11. Starting from a location as chosen in the planning stage, cut the panel to the required height to match floor joists or roofing levels. For any reinforcement that has been exposed, apply a suitable protective treatment as listed in the Wall System Components.
12. Place the first E-METRIX® into position by pushing it against the battens. Ensure that the panel is level and plumb, then screw fix the E-METRIX® to the battens in accordance with the fixing section of this manual. Each screw should be installed so that the top of the hex head is slightly beneath the face of the E-METRIX®. Care should be taken to not over tighten.

Installing subsequent panels

13. Cut the next panel to the height required. For any reinforcement that has been exposed, apply a suitable protective treatment as listed in the System Components.
14. Prepare the panel adhesive in accordance with the manufacturer's details. Do not use adhesive that has passed its use by date.
15. Apply panel adhesive, approximately 2 to 3-mm thick, along the full edge to be joined. Where the panel joint is a control joint, instead leave the edges of the E-METRIX® reinforced AAC panels clean and leave a 10-mm nominal gap.
16. Lift the next panel into position as per point 6 above and then slide it hard against the adhesive coated edge. The battens should keep the panels aligned but still ensure the new panel is level and plumb. Ensure adhesive is fully coating the joining edges of the panels, then remove excess adhesive that has been squeezed out of the joint. Repeat the fixing method outlined in step 12.
17. Repeat the above steps for all further panels.

Wall finishing

18. Apply an external coating or membrane as per the Coating system section of this manual. The coating shall be applied in accordance with the manufacturer's details.
19. Install the external grade and/or fire-rated sealant at the control joints as shown in the details of this technical manual. All joints shall be a minimum of 10mm thickness. Use backing rod to assist in achieving joint size.
20. Install bulk insulation in between the studs in accordance with the manufacturer's details.
21. Install the internal lining plasterboard in accordance with the manufacturer's details.

Plumbing and Electrical services

Plumbing and electrical services can be fixed to the external face of the 75-mm E-METRIX® external wall system. Please contact E-METRIX® for further advice regarding each type of attachment.

Penetration or chasing of the external wall system is strictly prohibited in fire-rated applications as it is likely to reduce the fire resistance level. Any penetration or chasing in the external wall required to have an FRL shall only be undertaken under the strict guidance of an experienced and qualified fire engineering consultant.



Delivery, Storage & Handling

Delivery

Before delivery of E-METRIX® reinforced AAC panels on site, an appropriate unloading area should be designated.

The unloading area should be:

- Capable of supporting the weight of the E-METRIX® reinforced panel packs. Consult the project's structural engineer if required.
- On level support and elevated off any surface that may have water run across it (e.g. outside ground, interiors without roofing).
- Kept dry either by storing inside or protected from the rain (e.g. by use of plastic wrapping).
- Large enough to contain all E-METRIX® reinforced panels for the construction stage without stacking packs on top of each other.
- As close as possible to the installation area, to minimise the additional lifting required. This may mean designating additional unloading areas depending on the project size.

Storage and Handling

Wherever possible, E-METRIX® reinforced AAC panels should have faces, corners and edges protected from damage. Whenever moving panels, the following precautions should be taken:

- Before lifting packs, ensure that the panels are securely strapped.
- Personnel operating lifting machinery (e.g. forklifts, cranes, trolleys) must use the appropriate techniques and equipment.
- When opening packs, appropriate measures should be taken to prevent panels from falling.
- Any opened packs are protected from the weather and secured while not in use.
- All workers have appropriate personal protection equipment (PPE) for the worksite conditions. Recommended PPE includes but is not limited to:
 - Hearing & eye protection
 - Safety clothing (e.g. safety boots, well-fitting clothing)
 - Respiratory protective equipment
 - Sun protection (hats, long sleeves, trousers, sunscreen)
- All workers are trained in an appropriate manner for the tasks undertaken. For example, proper equipment maintenance and usage, material safety and good lifting techniques would fall into this category.
- The sequence of installation should be planned to minimise panel movements and ensure installers will have appropriate room to lift the panels.
- Whenever manually lifting single panels, a minimum of two people should carry each panel, and the panel should be carried on its side (not flat). Good lifting techniques (detailed below) and a clean worksite should be maintained to minimise injuries.

Good lifting techniques

There is no proven 'best' way of lifting, as it will vary with the weight and shape of the object being lifted. The better options available are a 'deep squat' and 'semi squat' lift. The deep squat is done by bending the knees and hip to their maximums, while keeping the upper body approximately vertical. The semi squat is done by leaning the upper body forwards (while keeping the spine straight) and bending the legs to a lesser degree than the deep squat. The basic principles of good lifting are:

- Minimise the distance between the load and the body
- Bend the knees, allowing for use of the leg muscles
- Keep the back as straight as possible

For more details refer to the relevant state based safety regulation documentation (e.g. Work Cover).

Health & Safety

E-METRIX® reinforced AAC panels, like all concrete members, contain crystalline silica (also known as silica dust). Prolonged exposure via inhalation can cause silicosis in the long term, among other possible conditions. As such, proper PPE usage during construction is necessary to create a safe work environment.

While E-METRIX® reinforced AAC panels are left undamaged and intact, there is no potential health risk. As such, touching the material with bare skin is not an immediate problem. Protection may be suitable, however, to prevent abrasion from skin contact. However, when the material has been broken down by any process such as cutting, drilling, chasing or sanding silica dust is generated. As such, this generates an increased risk of health problems. Long term exposure increases this risk, so it is advised that precautionary measures are taken.

Either protective masks or dust extraction are recommended for usage as a preventative measure during any process that breaks down the E-METRIX® reinforced panels. Wet cutting of the panels is not recommended. Protective respirators should be of class P1 or P2 (to AS/NZS 1715 and AS/NZS 1716) and recommended for dust, at a minimum. Dust extraction systems should be appropriately filtered as required by local council regulations. The site should also be cleaned at regular intervals (e.g. daily) to prevent dust accumulation. Other preventative measures not related to the inhalation of silica dust may include:

- Eye protection in accordance with AS 1336.
- Protective footwear in accordance with AS 2210.
- Ear plugs/earmuffs to an appropriate rating for the tools being used, in accordance with AS 1270.
- Protective clothing such as long sleeve shirts and trousers, or overalls to prevent possible skin irritation. This will also have the added benefit of protecting outside workers from the sun.

Construction Details

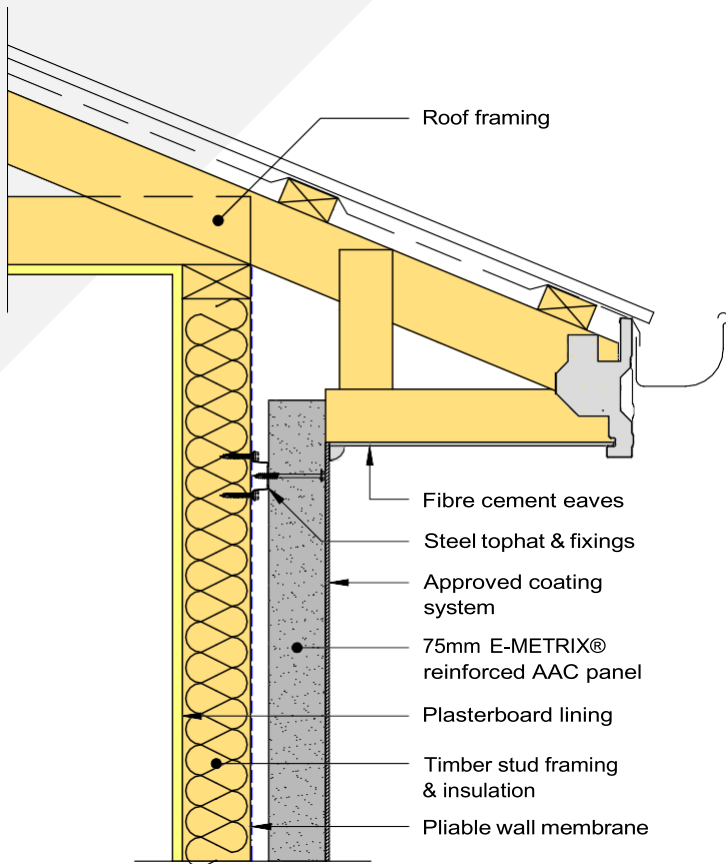


Figure 9 – Top of wall eaves detail

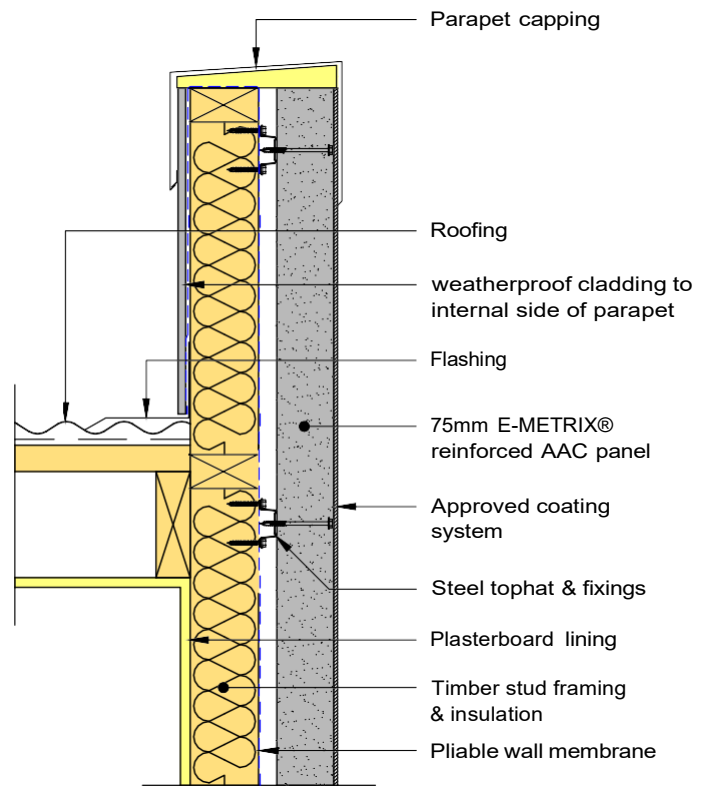


Figure 10 – Parapet wall detail

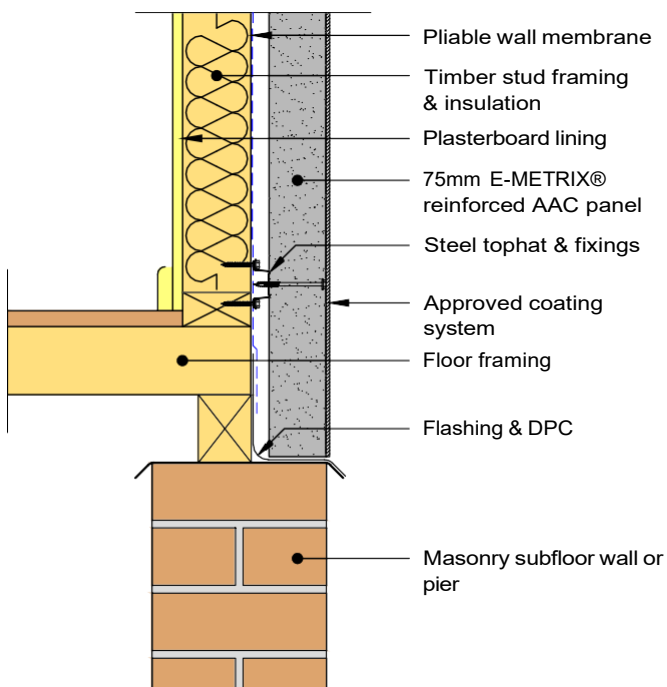


Figure 11 – Base of wall on masonry subfloor detail

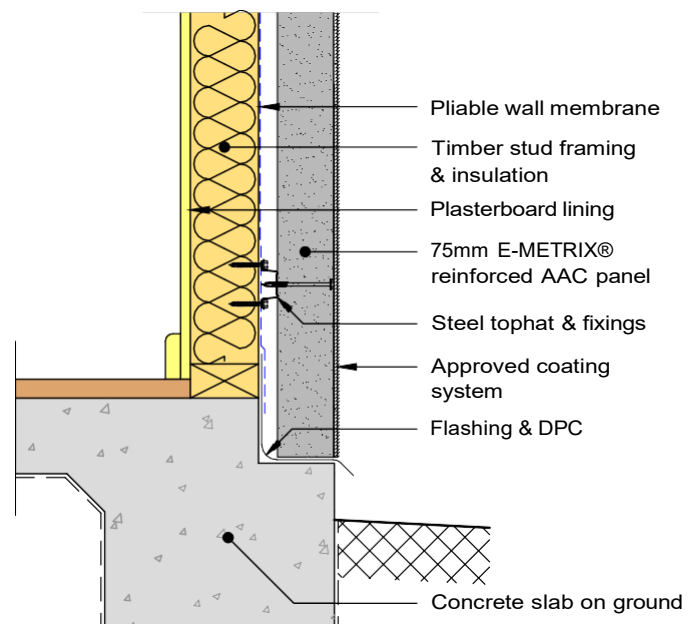


Figure 12 – Base of wall on slab edge detail

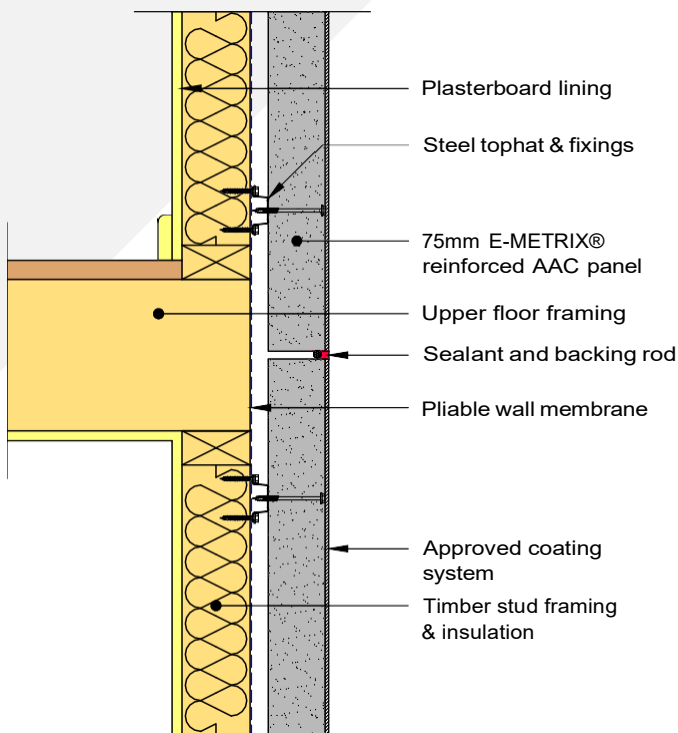


Figure 13 – Upper floor horizontal joint detail option 1

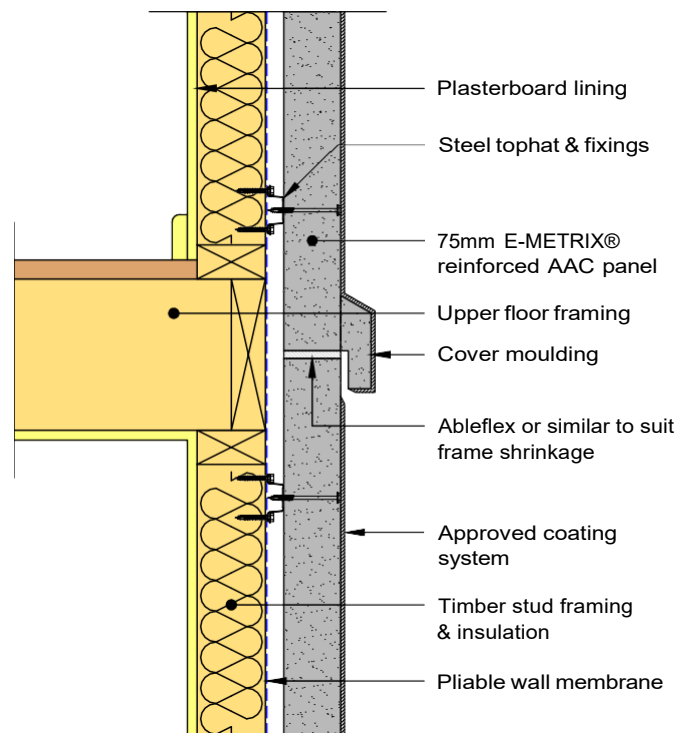


Figure 14 – Upper floor horizontal joint detail option 2

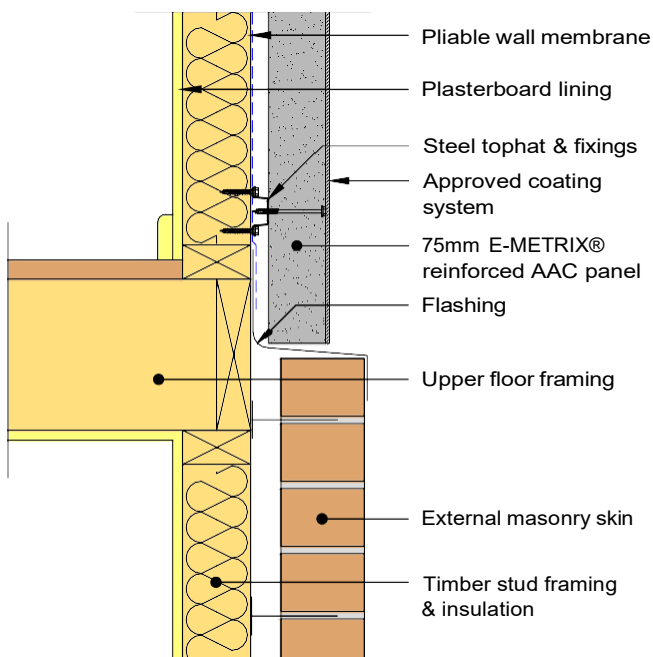


Figure 15 – Upper floor cladding change detail 1

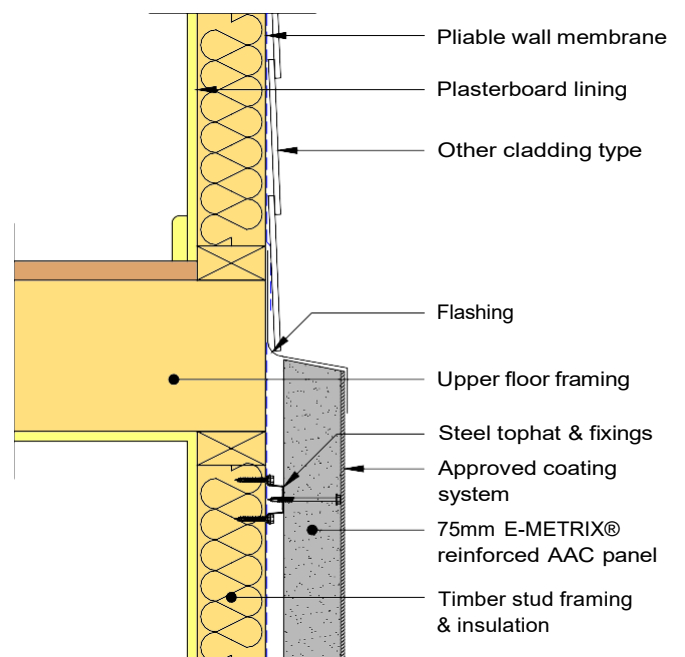


Figure 16 – Upper floor cladding change detail 2

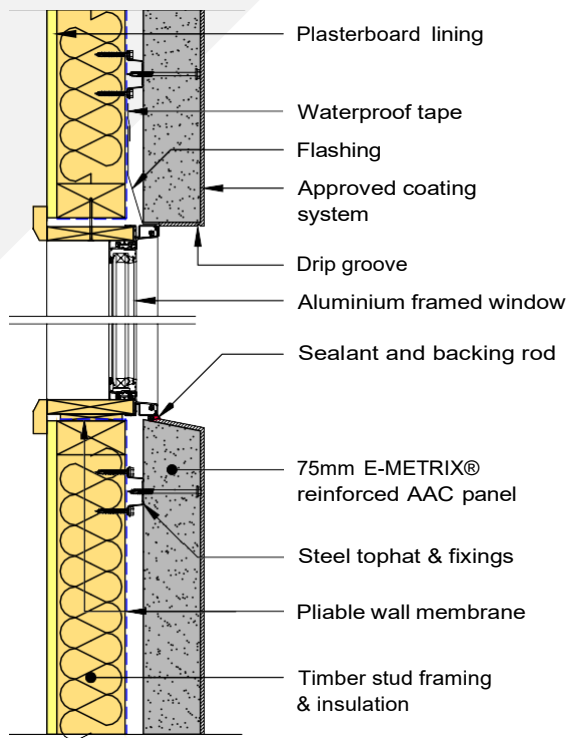


Figure 18 – Window head and sill detail

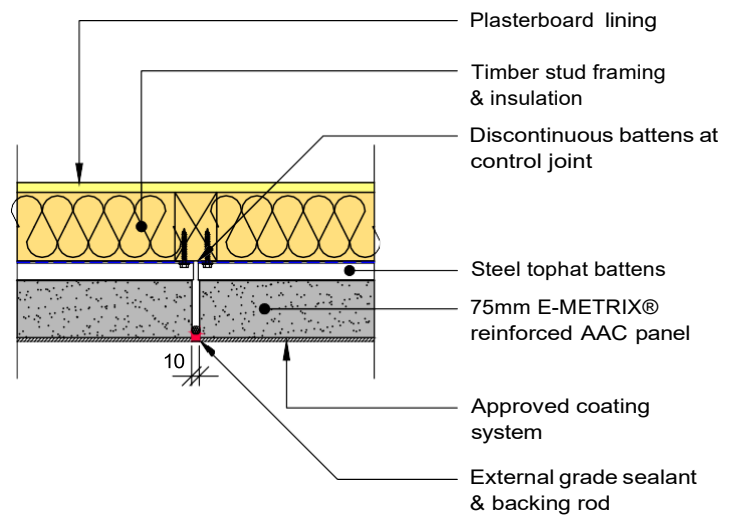


Figure 17 – Vertical control joint detail

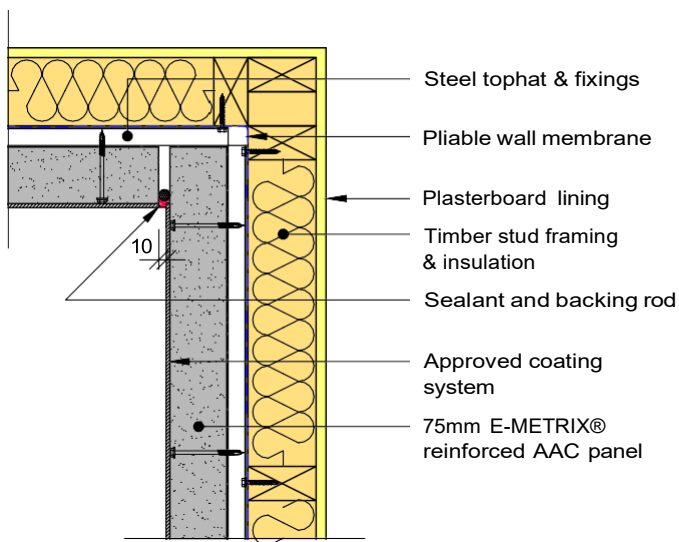


Figure 19 – Internal corner control joint detail

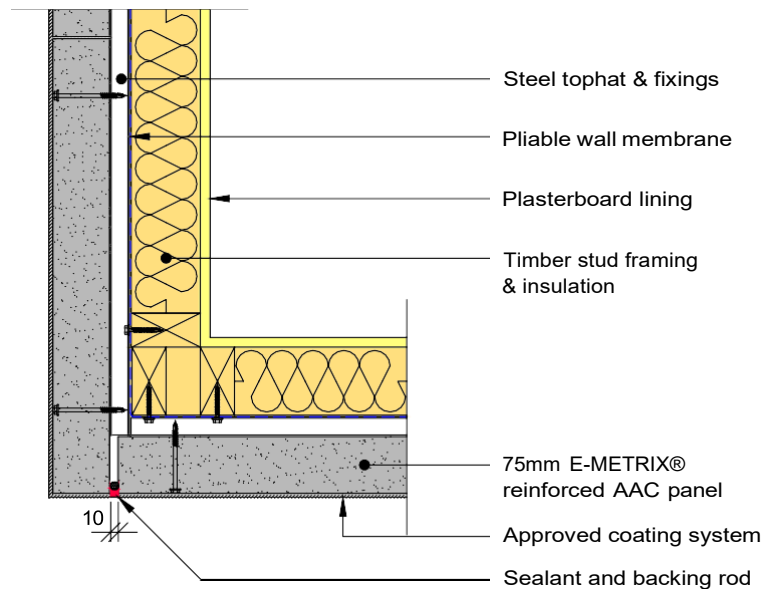


Figure 20 – External corner control joint detail

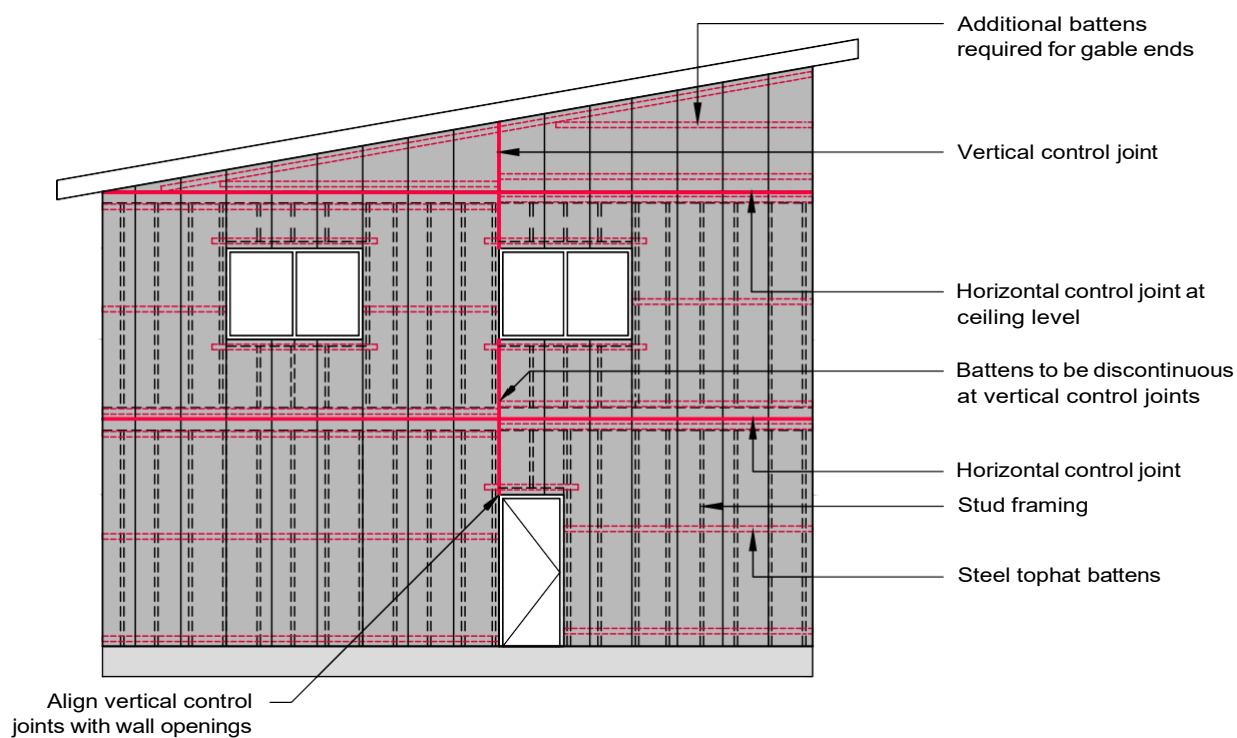


Figure 21 – Typical wall set out elevation

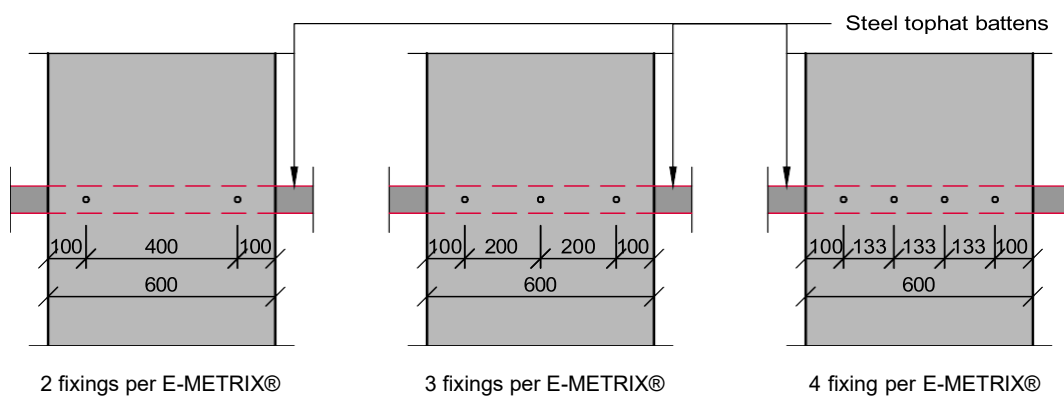


Figure 22 – Fixing spacing detail