Method Statement for BC Extruded polystyrene boards

Introduction

The following guide contains instructions that are essential to good external thermal insulation practice.

General requirements

- For appropriate system design, BCI Shall be advised with all project details, site conditions and special requirements (if any) during the early stages of negotiations.
- A pre-installation survey of the property shall be carried out and recorded to confirm suitability of substrate for installation of the boards including modifications/repairs needed.
- At some cases many flashings must be installed prior to proceeding with BC XPS Board installation such as windows, louvers, doors or other finishes intersections.
- Installation procedure and different sections details must be approved by the consultant and main contractor prior to commencing with application.
- Adjacent construction materials and/or fixtures that are likely to be soiled by the application process must be appropriately protected.
- Scaffolding and other necessary equipment must be in place prior to installation.
- Access to electrical power and clean water should be facilitated by the main contractor.

- Ambient air temperature should not be above +40°C, and remain so for 24 hours

thereafter.

- Do not install boards during inclement weather unless appropriate protection is in place.
- All materials should be protected from weather and other damages during storage and application.
- Insulation materials should be stored on a firm, clean, dry and level base, which is off the ground. Insulation materials should be protected from exposure to direct sunlight by storing opened packs under cover in dry condition or by covering with polythene sheets.
- any material that is not mentioned in this guide is to be used within the insulation syste

Application procedure

Substrate preparation

The substrate should have the following requirements:

- Tested and approved as a suitable foundation for the system.
- Accepted substrate irregularity should at least meet the following criteria (according to DIN18202):
- Remove projecting mortar burrs and fill render/plaster cavities.
- Masonry, concrete or sound existing coatings must be clean, dry, adherent, sound/solid stable and free from all substances that may prevent good adhesion.
- Temperature during the application and drying phase should not fall below +5°C for the material, substrate and surrounding air. Maximum application temperature is +40°C. The material should not be applied in direct sunlight or sun heated substrates, during strong wind, fog or rain, high relative humidity or imminent rain or frost, etc.
- Concrete /Render/Plaster should be allowed to cure properly. New surface should be at least 4 weeks old prior to installation.

A. Insulation material

1. Applying XPS insulation to concrete/ masonry substrates

In all cases, movement joints in the masonry or concrete substrate must be respected and followed. XPS boards must not bridge movement joints in substrate, and a joint profile must be applied to accommodate movement intended by the joint.

2. Preparing the adhesive mortar

Adhesive
Mortar) should be soaked in water forapprox. 5 minutes, after that mix it using an electrical drill mixer to ensure thorough and homogenous mixing of all components. Depending on weather conditions the mortar can be used for 2 - 4 hours after mixing.

Never mix the slightly hardened or stiff material with water. Such material is not usable.

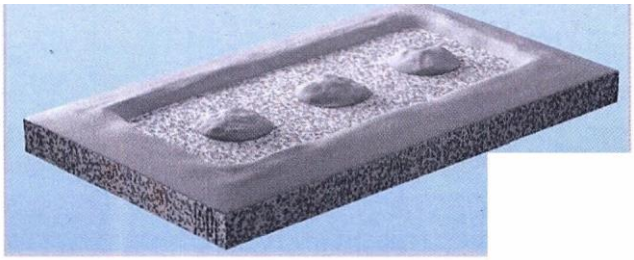
3. Applying adhesive layer to the back of the EPS insulation board

The Insulation boards are bonded to the wall by applying the prepared adhesive mortar to the boards using the point bead method, (See Fig 04).

A circumferential ribbon of adhesive (2 cm x 2 cm) is applied to the insulation boards. Also three evenly distributed patches of adhesive are then applied to the boards, so that an adhesive surface of at least 40% is achieved.

According to the design criteria, XPS boards need to be mechanically fixed, either by the drilling method or by the shooting method.

For mechanical fastening using drilling method, allow for at least 1 day before installing the dowels.



For better results allow for 3 days.

For mechanical fastening using shooting method, allow for at least 7 days before installing the dowels.

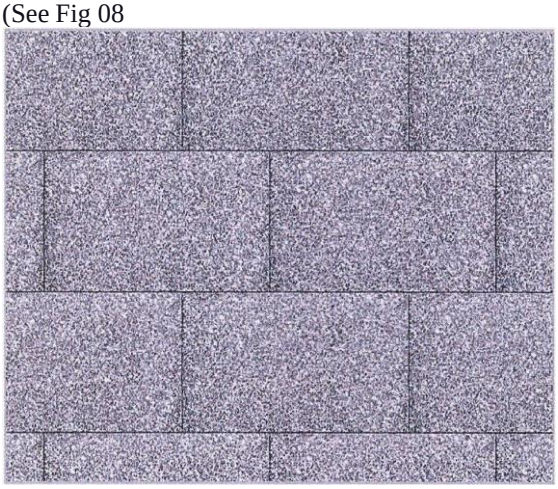
4. Installing the XPS insulation boards

Prior to installing the insulation board it is important to consider all base terminations of thesystem and ensure that base-rail is used in these locations.

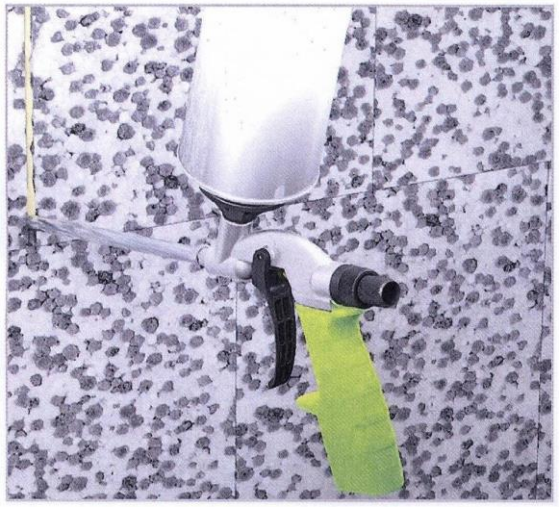
The first insulation board must be placed firmly on the base-rail in the front side (See Ag 05); quantity of adhesive is decided according to the actual conditions. Slide and push the insulation board into place on the wall using caution not to dent or damage the board. Insert insulation board edges all the way into base-rail. Applyfirm, even pressure to the entire insulation boardonce it is in place (See Ag 06 & 07).

Fig 7

Fix boards tightly at joints to produce a flush, continuously even surface with no visible gaps. Scrape excess adhesive off the edges ofthe boards. Continue installing the XPS boards horizontally while vertically staggering the boards and overlapping the substrate joints (except structural joints).
The main aim to vertically staggering the XPS boards is to avoid vertical cracks from occurring (See Fig 08



To avoid thermal bridging ensure a tight adhesive free joint connection between adjacent insulation boards. Filling foamcan be used for filling gaps up to 5mm. After hardening, sand the surface of the joint to make it level with the adjacent boards. Larger gaps shall be filled with strips of insulation (xPS boards).

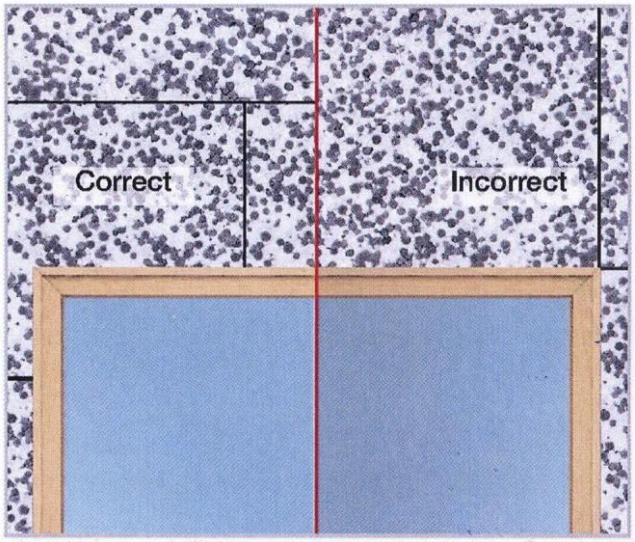


Temperature during the application and drying phase should not fall below +5°C for the Material, substrate and surrounding air. The material should not be applied in directsunlight or sun heated substrates, duringstrong wind, fog or rain, high relative humidity. After application, XPS boards should beprotected from direct sunlight and inclementweather. Yellowed and damaged parts shouldbe replaced, or if they are small
Areas, sand them down and fill with PU Foam.

Any high spots or irregularities should be removed by lightly sanding with a rasp to ensure the application of an even thickness of base coat. After sufficient stabilization of the installed boards (normally 2 days), the insulated wall is ready for the application of thebase coat.
Avoid contact of boards with aromatic solvents.

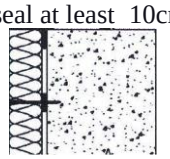
5. Openings in the substrate

At facade openings, e.g. windows, doors, the XPS board ends should not coincide with the edges of openings. Offset insulation board joints 30cm or more from the comers of openings around doors, window or othersimilar openings. Plan the work so that the insulation board around the corner is cut froma single piece (See Fig 10).

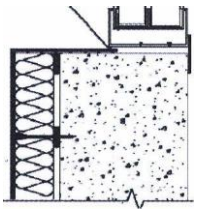


The following are- general instructions on how to work around openings.

If the frame of the window or door flushes with the substrate surface, the reinforcing mesh should overlap the XPS board and should continue to the window seal at least 10cm (See Rg 11)



If the frame of the window or door is recessed from the finish level of the substrate, the reinforcing mesh should overlap the XPS boards and should continue to the window frame at least 10cm (See Fig 12)

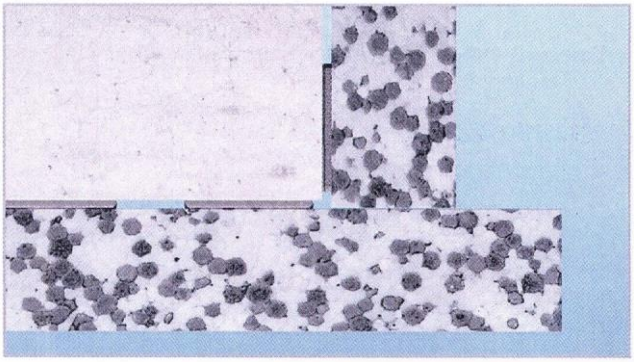


Windows, louvers, doors or other finishes intersection must be installed prior to proceeding with ETICS insulation.

6. Building corners and edges

At all outside corners always interlock or stagger the insulation board. Level the jointed XPS boards by sanding.

Remove all loose XPS particles from the wall surface.



B. Mechanical fixation

Details of mechanical fixing (including their arrangements in the insulation board) are specified in the project specific design requirements based on pullout test results, substrate type and wind loading data. Installation of mechanical fasteners shall commence no earlier than 24 hours after the insulation XPS boards have been adhesively fixed.

In most cases a minimum of 4 mechanicalfixings per m2 for XPS shall be installed unless otherwise specified in the project specific design.

.

The fixing method is decided after inspecting and testing the substrate. In all cases, the dowel testing should show results of load bearing 0.15 kN as an average according to DIN

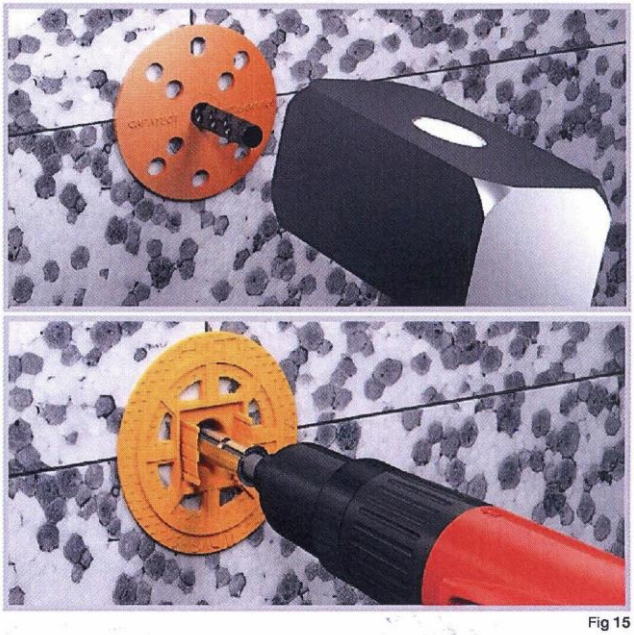


Fig 15

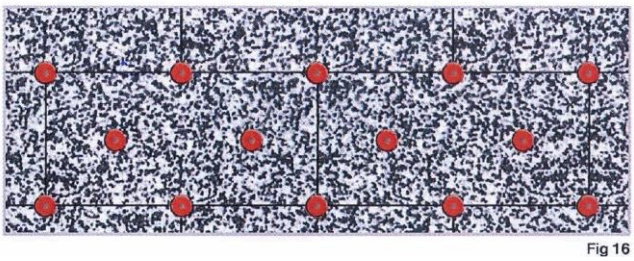


Fig 16

C. Base coat application

Prior to the application of the base coat, makesure that:

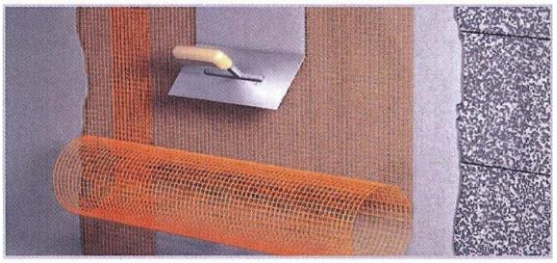
- Adhesive mortar has cured and the mechanical fixing dowels are all in place.

- Check the XPS leveling. If there is irregularity or leveling problems, identify theareas that need to be fixed using a straight edge and grind down the elevated spots. Do not attempt to compensate the level difference by building up base coat thickness.

- Identify the location of any aesthetic grooves or reveals and make sure they are cutand prepared before base coat application.

D. Reinforcing layer application

Apply the reinforcing coat material in a uniform thickness of 3 - 4mm over the EPS boards. Immediately embed the Reinforcing Mesh in the fresh coat by force trowelling the mesh (See Fig 17). Trowel over the mesh fromthe center outwards to its edge, removing anyexcess base coat materialto ensureconsistent embedding into base coat.



Reinforcing mesh is supplied in 1.1 m x 55m and the best practice is to lay it in one run (See Fig 18). If required cutting the mesh is possibleto get workable size, but keeping in mind to reduce the overlap areas to the minimum. The mesh can be applied horizontally or vertically according to the facade conditions, but for the same elevation it should be laid in the same direction. Overlap reinforcing mesh 10cm or more at the meeting ends.

After uniformly embedding the mesh, apply a 1 .5 - 2mm coat of base coat mortar to create a smooth even finish that is ready to accept the final coat. Ensure that the mesh pattern is not visible.

Ensure that both the reinforcing mesh and the base coat overlap the entire flange of Profile used in the installation. This effectively closes off the insulation board edge, forming an aesthetically pleasing termination that also protects the system from moisture penetration. Final base coat must be allowedto dry/ cure (3 days) prior to the application of the primer/finish coat.

E. Base coat mortar

Base coat mortars used n can vary depending on project specification and customer requirements. The following are the main options r within the Middle East region:

.

F. Special mesh laying practices

1. Meshing corners

In the case of 90° angle the outer corners must have rigid corner profile to furtherreinforce the edge Line and provide a straight and cleancorner. Overlap thecorner mesh 10cm or more with the adjacent reinforcingmesh.

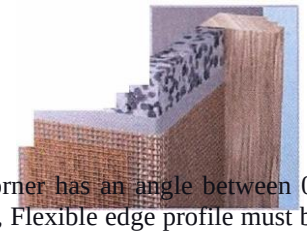


Fig 19

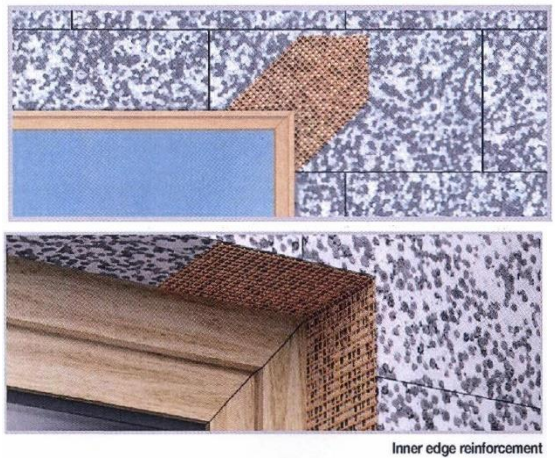
In case that the outer corner has an angle between 0° and 180°, other than 90°, Flexible edge profile must be used to provide a clean and well reinforced edge.

For the inner corner, use Flexible edge profile to reinforce inner corners. Overlap the mesh used in the corner 10cm or more to the adjacent reinforcing mesh.

2. Openings - Edge protection

At the corners of openings, a special reinforcing practice is essential to avoid cracks. The arrow type reinforcement is one method to protect the corner (See Fig 20). In this case a small piece is cut into the arrow shape with width 30cm or more and height of 30cm or more, and attached to the corner. It is then embedded into the base coat and overlapped with the standard reinforcing mesh. .

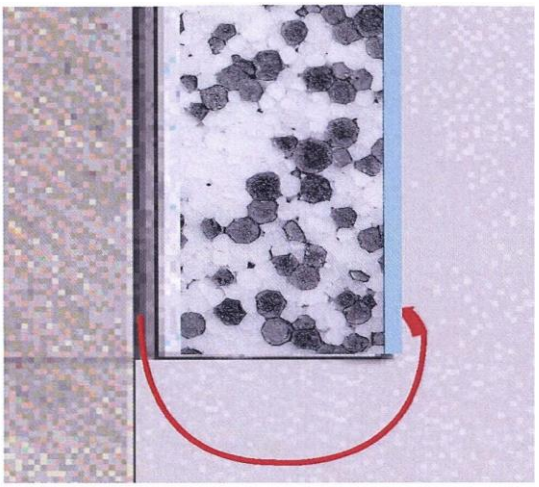
Another method is the butterfly reinforcement, where a rectangular piece of mesh is attached diagonally at the corner of the openings. It is then embedded to the base Coat and overlapped with the standard reinforcingmesh. The dimensions of the mesh should be


Inner edge reinforcement

20cm x 30cm or more.

3. Back wrapping mesh

Back wrapping is a termination method that is used according to the project requirements.Although it is not recommended as replacement for base rail, it can be used for starting the system while ensuring the EPS boards are manually leveled. It is mostly used as a vertical termination



to the system; Parapet walls are an example ofareas where back wrapping is used. At this time, all terminations to be back wrappedshould have free-hanging detail mesh in place. Tocontinue the back wrapping procedure, trowel thespecified base coat onto the exposed insulationboard edge and face in an area wide enough toembed the width of back wrapped mesh. Embedthe mesh into the fresh base coat by forcetrowelling.

4. Heavy duty mesh

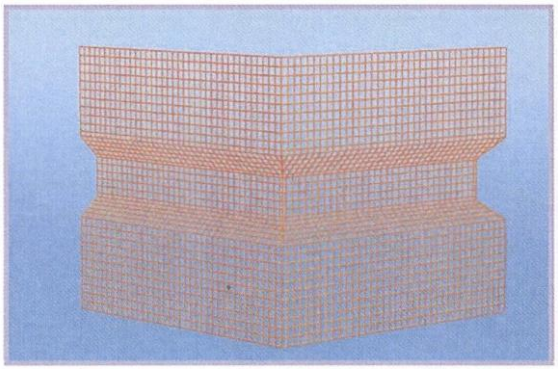
In areas requiring heavy duty impact protection, in Heavy duty mesh is used to give the required reinforcement. The standard height ofheavy duty mesh is 1 m.

The heavy duty mesh is fixed .prior to installingthe standard reinforcement mesh and the base coat. The mesh is fixed to the XPS boards and a layer of the base coat is applied and then, using atrowel, scrapped to keep the mesh fabric visible. This method avoids visiblesteps between one layer and two layerreinforcement. Edges an ends of heavy duty mesh must tightly abut one another. Do not overlap heavy duty mesh.

The standard mesh is then directly applied with base coat on top of the heavy duty mesh.

5. Meshing aesthetic grooves

Aesthetic grooves mesh comes pre-formed to the agreed groove shape. The mesh is embedded in the base coat in the same way as the standard mesh using force trowelling. The groove mesh must overlap 10 cm or more with the adjacent meshes).



special jointing

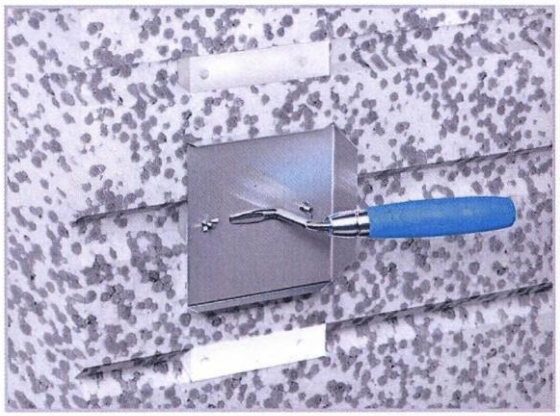


Fig 23

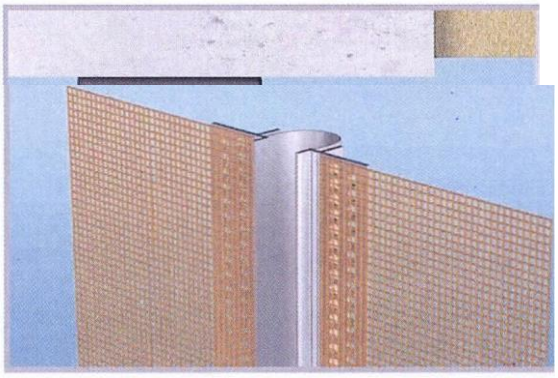
Fig 24

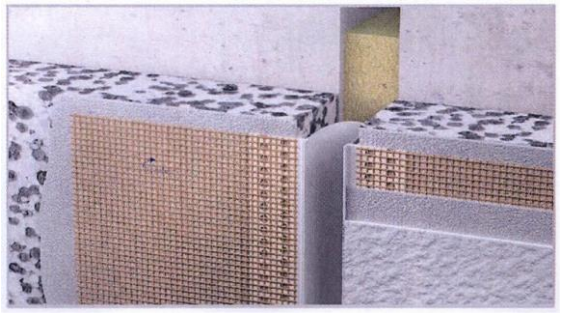
G. Types of joints

1. Expansion joints

Expansion joints in substrate must be followedand accommodated for the vertical expansion joints a

Profile is used; Expansion joint profile for even surfaces) and for corners and edges is a weather resistance profile that has insulating properties to stop thermal bridging within the system. It also provides an excellent vapor barrier.
Reinforcing material is applied on both sides of the joint and the fabric-strip is embedded into the mortar. Fabric should overlap by 10cmwith reinforcing surface.





2. Separation joints

It is recommended to create a horizontal joint if the elevation extends beyond 25m height. This joint intends to divide loads applied on the system especially the wind load. The joint is repeated every 25m height if the elevation extends further.
Joint material and jointing system can varybetween buildings, and as well can have different designs. Please refer to Al Nasir Trading Technical department for detailed design and possibilities of Paladin separation joints.

3. End joint

The End joints are anywhere which ends and a new finish starts on an elevation. This detail is treated with Joint sealing tape to create a weather and moisture proof joint.

Finishing renders

Finishing renders provide an excellent and appealing finishes while maintaining the functionally required for external renders for:

- Impact Resistance
- Weather Resistance
- Color stability
- Vapor barrier

Primers shall be applied and allowed to dryfor approximately 12 hours prior to theapplication of the finishing coat. Renderprimers prevent penetration of impurities fromthe adhesive into the render, protects andreinforces the substrate, and increases thebond strength between the render and thesubstrate. It is important that weather conditions aresuitable for the application and curing finishing coats. Finishing coatsshould not be applied when the air or walltemperature is above 45°C for the duration ofthe curing time. In wet weather the finishedwalls should be protected to prevent wash-off.It also advisable that protective coversremains in place as required to maximize thedrying process.
In sunny weather, work should commence on the shady side of the building and to be continued, following the sun to prevent rendering drying out too rapidly.

To minimize color shade variations and to avoid dry line jointing, continuous surface should be completed without a break. If breaks cannot be avoided they should be made where services or architectural features exists,such as reveals or lines of doors and windows. On completion of the insulation, externalfittings, rainwater goods etc. are fixed through the system into the substrate