



External Wall Insulation Systems

Installation Guide



K Systems Ltd, September 2020

Site Survey & Preliminary Work

Before K Systems products & components are applied to any structure a pre-installation survey must be carried out to confirm the suitability of the substrate for the application of the system. This survey will also establish what, if any, repairs should be undertaken prior to applying the system.

K Systemes will arrange for fixing Pull out tests using test equipment Hydrajaws on the specific building to establish the correct Ewi fixing & type/s to be used, together with the required spacings / fixing centres for the project.



A specification with site specific details will be prepared that will show:

- The position/type of base trims to be used
- The position/type of movement joints to be used & centres.
- Termination details at party walls, roofs and other features
- Details around windows and doors, including the type of weather sealing to be used
- Position/type of cavity barriers or fire breaks, if any, to be used.
- Fixings type/fixing pattern to be used. ie; through pinning the meshcloth or other.

The existing surfaces should be sound, clean and free from loose material. All other trades should have their first fix works completed with all perimeters water tight sealed.

The terms 'line and level' used in conjunction with this specification refer only to dealing with minor localised variations in the surface, to which the system is applied.

The system cannot correct major variations in line and level over several storeys in height and over large areas of elevations, and in these cases will basically follow the line of the existing building unless these building irregularities are overcome by a treatment, prior to the installation of the external wall insulation system.

Any excessive irregularities, ie, over +/- 5mm, must be made good prior to the installation to ensure that the insulation boards are installed with a smooth, in-plane finished surface. The flatness of the surface must be checked; this may be achieved using a straight edge, striking building lines or alternatively laser levels spanning the facades. Horizontal projections, ledges etc, should be removed to provide a level surface to receive the system.

Where appropriate, the Registered Installation Contractor must inspect the existing wall and include for the application of K Systems Standard UF Base dubbing render to take up any variation in the flatness of the backing wall. For new build backgrounds such as RC Concrete or lightweight block, these backgrounds will require a key coat, prior to the application of KS Standard UF Base / dub out.

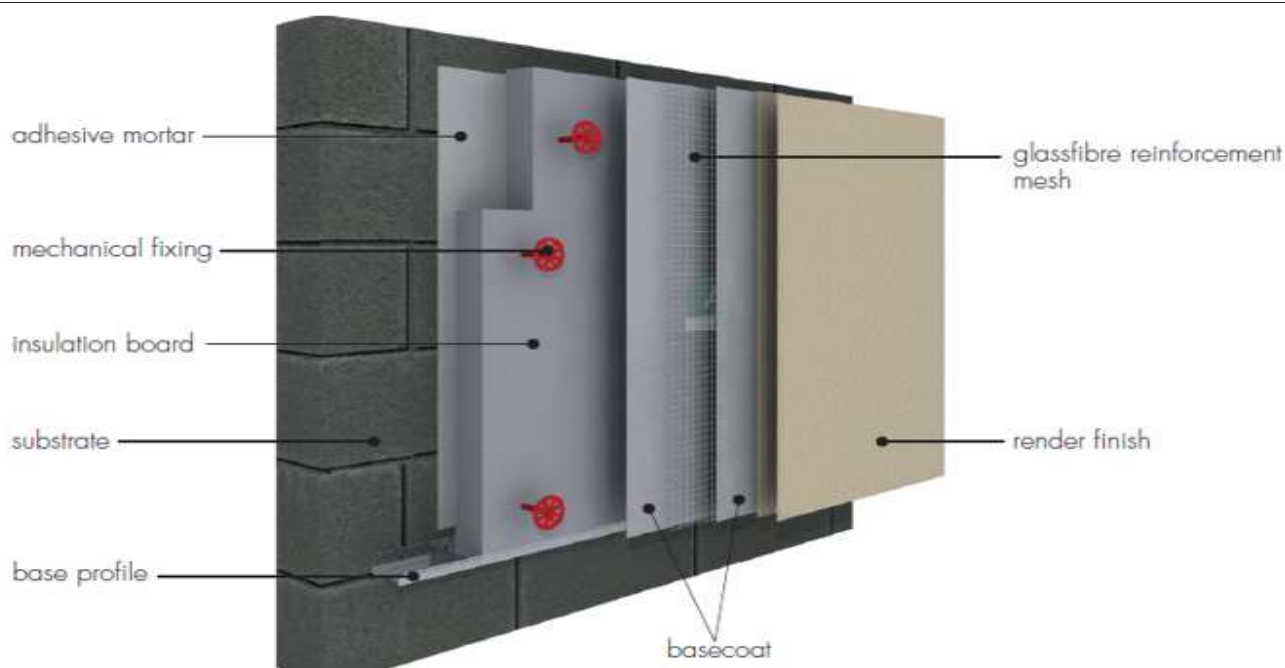
It is essential that any variations within the substrate do not have a detrimental effect on the system; attention must be given to ensure that all fixings have the minimum specified embedment in the substrate, ensuring the performance of the mechanical fixing and subsequent system performance.

As a secondary option to correct alignment issues found on substrate alignment, thicker & thinner insulation boards may be installed to correct such alignment issues exceeding +/- 15mm. If implemented, then longer mechanical fixings will then be required for such thicker installed board.

Where the existing wall is rendered it is essential that the render is hammer tested to verify that it is bonded well to the substrate. If any loose areas of render are located the render should be hacked off and reinstated.

The Registered Installation Contractor must ensure that all drainage plumbing, gas flues and other attached items such as satellite dishes are removed or modified to suit the application of the new cladding system. Alterations may also be required to the drainage gullies/oil pipes depending on the existing details at ground level. New contractors will required in house training, leading to site support visits during the project duration.

Typical build up for a Ewi / Thin Coat K Systeme



Deliveries/Storage

The materials will be delivered to site by different hauliers. The heavy materials will be palletised and will require mechanical offloading unless a moffat/tail lift delivery has been specifically requested at the time order order. The materials should be stored in suitable metal containers, with the exception of the insulation and renders.

Fixings are delivered in boxes labelled with the type/length of fixing.

The fixing type delivered should be checked against the specification.



K Systems product Algae Clean will be required for pre-treatment works where exist surface algae is found.



Compriband Seal Tape is required to all perimeter abutments i.e; window & door openings, soffit line, window cills, vents etc. In the Ewi package details.



Thickness of Insulants to achieve
U Value 0.30 w/m2K



Base trims & beads delivered to the project, should be stored in a bead rack or similar with horizontal support.



K Systems basecoat renders / are called K Systems HP 14 / KS Standard Dash Receiver & KS Brick Rend effect render are all supplied in 25 kg bags and are palletised with 40 bags (1.0 T). Pallets are shrink wrapped to give weather protection. Once the shrink wrapping is removed care should be taken to avoid the bags getting wet as the bags have only limited waterproofing.

The product name is on the side of the bag together with date manufactured. Shelf life is 1 Year when stored in the correct conditions.



Mineral Fibre Insulation is supplied in board sizes 1.2m x 600mm /.72 sq m area. Boards are palletised and shrink wrapped. No. of boards per pallet varies depending on the board thickness. Available in board thickness 30 mm / 250mm in 10mm increments.



Enhanced Polystyrene Insulation – supplied pre-cut to 1.2m x 0.6m size. Boards are shrink wrapped. No of boards per pack varies depending on the board thickness.
Available in board thickness 20mm / 250mm in 10mm increments.



K5 phenolic foam Insulation – supplied by Kingspan pre-cut to 1.2m 0.6m size. Boards are shrink wrapped. No of boards per pallet varies depending on the product thickness.



Available in board thickness 20mm / 120mm in 10mm increments.

Plinth Boards XPS, required only below DPC level.



Dash Aggregates - supplied in 25 kg bags and are palletised. Pallets are shrunk wrapped to give weather protection.



Primer and Silicone TC (acrylic) top coats - supplied by K Systems in oval drums and are palletised with 30 drums. Pallets are shrunk wrapped to give weather protection.

TC Primer buckets weigh 15 kg & will cover 65 sq m area pending background porosity.

Silicone TC15 / acrylic top coats buckets weight 25 kg & will cover 10 sq area of wall.



Primer & Sil TC 15 should be colour co-ordinated for the project. Applied samples are always recommended for the client to choose from, prior to an order.



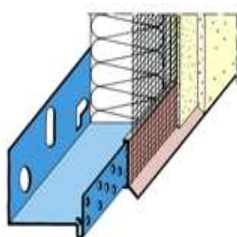
Fix the base trim to the existing wall using hammer fix fixings at 300mm/c s

Drill hole into the wall – diameter may be 6mm or 8mm – check specification

The level of the base trim will usually be at the DPC level however this may vary. Refer to project specification.

Ensure that the base trim is fixed level
Use Packing shims to align the base trim if necessary.
Existing render Bellcast detail, should be removed in retrofit projects if protruding too far, which will affected the surface alignment of the elevation.

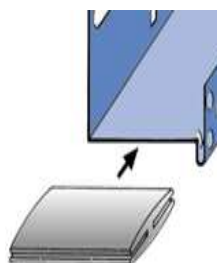
If there is a gap exceeding 10mm between the wall and the base trim seal with expanding foam.




If the required finish is a silicone or acrylic top coat then the base trim should be fitted with a PVC clip on drip bead, usually 8mm for thin coat systems finished with Silicone TC 15.



With this type of base trim it can help to keep the base trims level if the sections of the base trim are joined together with the PVC connector. This is not mandatory, but it is expected that the base trim is fitted level without steps.



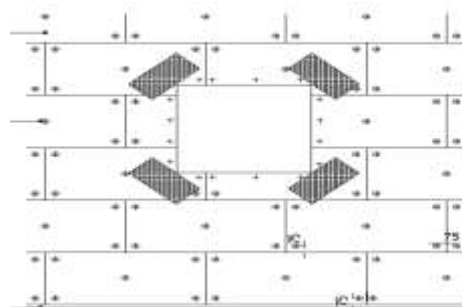
<p>Carefully mitre all internal & external corners to form neat edges and use the PVC connector clips to ensure level & alignment is maintained to all corners.</p>	
<p>Alternatively if a thick coat render finish such a dash aggregate, scratch texture coat or brick effect render is to be used then a more heavy duty base trim as shown may be specified.</p> <p>NB If this type of base trim is being used then the PVC nosing should bridge 100mm all adjoining base trim butt joints.</p>	
<p>Install full system stop beads to terminate the system around the sides of the existing gas boxes and other similar features. Full System Stop beads should be 10mm wider than the board thickness for Sil TC thin coat systems.</p>	
<p>Install aluminium Z spacer supports to either side of gas riser pipes to support louvered powder coated cover plates.</p> <p>NB the Z spacers may require plastic shimming off the wall to maintain the correct alignment wall alignment. If the back flange is not flush to the wall, then the gap should be filled with expanding foam.</p>	

Fixing of the Insulation

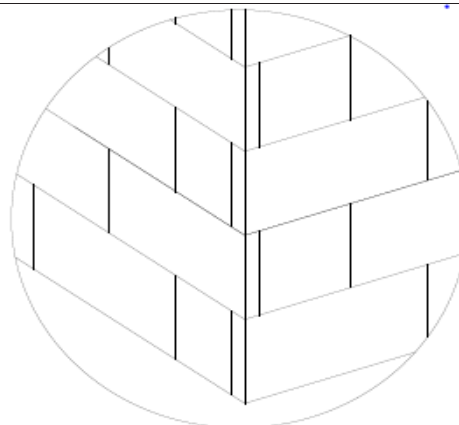
Note the following images show the instalation of Phenolic insulation – on this project an enhanced expanded polystyrene insulation material is specified however the principals of the installation will remain the same for all insulation types.

EPS Expanding Polystyrene Fixing Pattern Only.

This is the board fixing pattern universal for all insulation types & the mechanical pattern for all EPS which may be increased pending the substrate density / suitability.



Insulation boards are interlocked at all external & internal corners & installed using a stretcher bond method. The smallest board off cut should be no less than 200mm wide x 600mm high.



All Insulation boards should be staggered
In a L Shape around window & door stress areas.
Drill holes through the insulation board ensuring that the holes are drilled to the required depth in the existing wall. If the wall has existing render or dubbing out render has been applied to improve the alignment. Then the Ewi fixing length and the depth of embedment may have to be increased. The minimum embedment specified is into the main solid wall ignoring the render.

Insulation boards to be installed using a minimum of five fixings per board (five dice pattern), unless stated otherwise on the project drawings.



Phenolic Insulation is first fixed using One Ewi fixing prior to secondary fixings inserted through the meshcloth following first 3mm pass of K Systems HP 14.



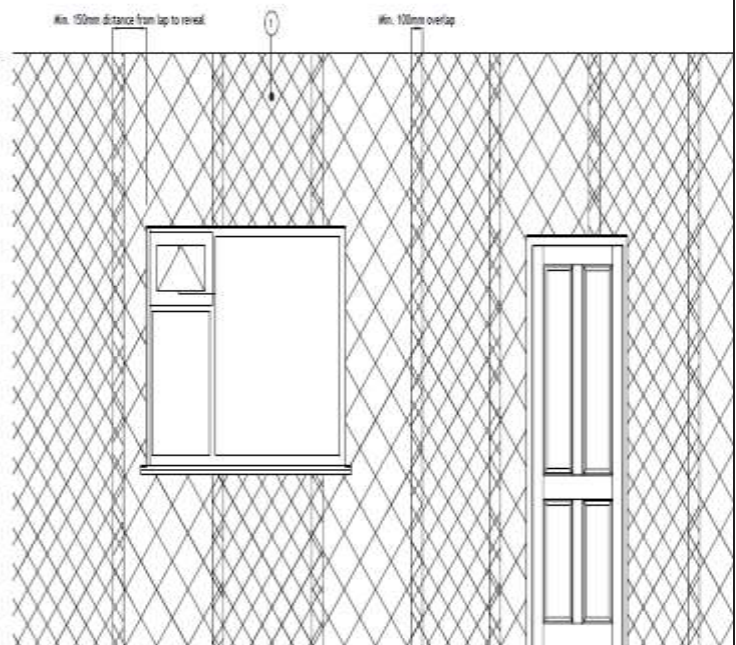
Phenolic & Mineral Fibre Insulation Only

Ewi fixings / mushroom heads inserted through the meshcloth should be counter-sunk into the meshcloth 3mm with 150mm sq patches of meshcloth adhesively fixed using K Systems HP 14 Basecoat.



Meshcloth Fixing Pattern.

Meshcloth is adhesively fixed onto the surface of first 3mm pass using K Systems HP 14. Meshcloth overlaps should be staggered 150mm from all stress areas.



Multi-storey Applications

Additional steel Fire Fixings will have to be installed at a rate of 1 fixing per sq m required only to first floor areas & floors above. These fixings must be installed through the glassfibre meshcloth after the application of the first pass application of KS HP 14 base coat.



The boards must all be tight jointed to avoid thermal bridging. Void areas 3- 6mm wide if found at board joints must be filled using expanding foam to enhance the thermal performance of the project. The minimum size of board off cut is no less than 200mm.

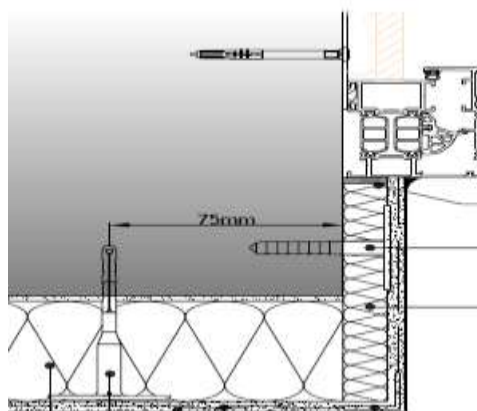


In new build project the insulation board thickness will form the window & door reveals footprint to receiver basecoat render. In retrofit project where the window frames will not be moved, thinner Insulation boards will be adhesively fixed & returned into the frame abutment with compriband seal tape. See package details.



If it is not possible to fit insulation to the reveals, then consideration must be given to cutting back the reveals. If cutting back of the reveals is required, then the Registered Installation Contractor must either include for this work in their tender or they must highlight its exclusion.

If cutting back of the reveals is not allowed by the client/client's engineer, then it must be accepted that a cold bridge will exist at the reveals that may cause some surface condensation.

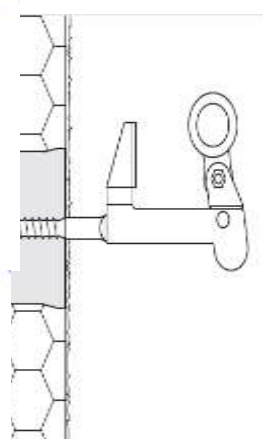


Ensure that the insulation boards are cut without straight joints at the corner of door and window openings.

“L” shaped board cuts should be used.



Timber pattresses are required to anchor surface mounted Satellite dishes, exterior light fittings or similar. Use treated timber grounds. Such area should be cut out using a handheld Pad Saw when boarding is completed.



Temporary rainwater pipes should be re-instated just after boards are installed as good practice management. Keeping Insulation boards moisture free from rain water shower. This will allow the applied render colour to cure evenly with no colour variations on surface.

All timber pattress will receive render over such areas should receive K Systems product R 7 applied neat prior to render application. Use 70mm wood screws as indication points of where these pattresses / centres are located prior to basecoat render KS / HP 14.



Ensure that the window cills have enough projection (minimum 40mm) from finished render surface as good practice detailing & avoid render surface staining. Retrofit over cill & verge capping should be installed into position prior to boarding.

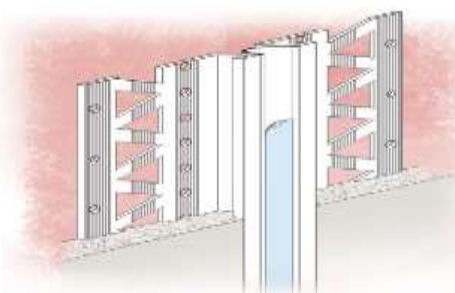
The overcills can be either PVC or powder coated Aluminium. Care needs to be taken to identify the method of window frame drainage as the fitting of overcills can impede the drainage. If the overcills will affect the drainage path then it may be necessary for the window frames to be drilled to create new face of frame drainage holes.

Alu Press Metal capping will be required where the top of insulation board extend beyond soffit or gable wall verges, as system protection & good detailing. Verge Trims should extend 50 / 60mm from all finished render surfaces, to avoid staining.



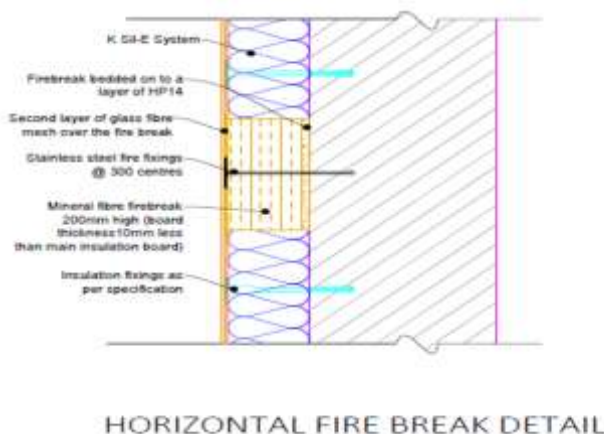
Movement Beads

If the finish is to be a silicone or acrylic thin top coat then PVC movement joints must be fixed directly to the surface of the insulation using “firtree” fixings before applying the render. The spacing of the movement joints must be a maximum of 10m. The project drawings will show the required location of the movement joints.

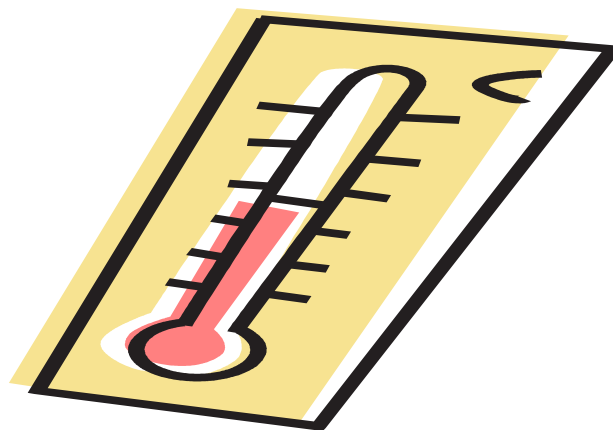


Fire Breaks

If the project involves a multi-storey building then there may be a requirement for a Fire break to be fitted at each vertical party wall line & horizontal floor level, using Non-Combustible Board / Mineral Fibre. This requirement will be identified in the project specification and the project details, normally located @ Second floor & subsequent floors above in commercial projects.



Application of the render



Before commencing the application of the basecoat render check the weather forecast.

If the temperature is not 4°C and rising in the morning do not commence work.

If heavy rain is expected the consideration may need to be given to secondary protection and ensure that all rainwater gutters will safely discharge water away from the face of the wall.

If very hot sunny weather is expected then it is best to work on shaded elevations or protect the work after application using hessian.

Read the datasheets for all of the products to be used and wear all necessary Personal Protective Equipment. Request Ewi details package of detail based on Thin or Thicker Coat render systems.



Add 5 -6 litres of clean water for each 25kg bag of K Systems HP 14. render.

Mix using an electric paddle mixer for at least five minutes to ensure that the polymers are well mixed in. Allow the product to rest for 2-4 minutes then re mix for 2 minutes to achieve an application friendly & working window time with the HP 14 product.



Start by bedding the corner wing mesh to the reveal & elevation corners of openings using HP 14 Base coat render.



The external corner beads and the mesh of the base trims should also be bedded in. Localised patches of glass fibre mesh should also be bedded over any timber pattresses, pre-coated with R 7.



The rest of the insulation can then be coated with the **First Coat** of KS HP 14 basecoat. This first coat should be 3mm thick.



The glass fibre mesh can then be bedded into the first coat of base coat render using a trowel to push the mesh into the render.



Sheets of the mesh should always be overlapped with a minimum overlap of 100mm. No laps should be placed within 150mm of any reveal or corner.



Trim the bottom edge of the glass fibre neatly to marry up with the nosing of the base trim.



<p>On certain projects the client may require a second layer of meshcloth be incorporated to ground floor level, enhancing the impact resistance of the system.</p>	
<p>Diagonal stress patches of mesh (approx. 250mm x 350mm) shall be installed to all corners of any reveals as per the standard KS details.</p>	
<p>Apply the Second Pass of KS HP 14 base coat 2-3mm thick. Rule to line & level removing high points & filling out low points. Allow to semi set & finish the surface with a plastering float or sponge float.</p>	
<p>Base coat fully applied at finished depth of 6mm with meshcloth encapsulated and floated up smooth with no surface voids.</p>	

If a Silicone TC 15 (thin coat) finish is specified, then the surface of the base coat should be sponged up before the render has fully cured.



The sponging of the render will leave a lightly textured flat surface with the chips of limestone showing in the surface.



Ensure that the finished surface is flat, as any significant blemishes will not be covered by the thin top coats. The basecoat HP 14 should be given sufficient curing time, moisture free, prior to TC Primer & Sil TC 15 top coat finished



If a thick coat finish such a dash or scratch render is to be applied then the surface of the HP 14 Base coat should be left with a scratch as shown in the photograph, to improve the adherence of the Dash receiver coat using KS product Standard Dash Receiver 6 -8mm applied to receive dry dash aggregate.



The base coat render must be allowed to dry/cure for up to 2-3 days prior to the application of any further finishes. If the elevation treatment requires a transition between finishes, stop beads should be fitted to define the transition point. These beads may be left in place or removed depending on the client's requirements.

At this point low modulus sealant can be applied to the window/door frames before the application of the final finishes. Alternatively, the sealing can be left until the finishes have been completed.



On properties with external rainwater pipes it is beneficial to fit temporary flexible sock pipes or rigid pipes that will guide rainwater away from the face of the building.



Before applying the Silicone TC top coats with sleeve & roller the base coat must be fully cured prior to TC Primer application. All TC Primer colours are co-ordinated with Silicone TC 15 finish colour, decided by the client or designer.



The TC Primer coat should then be allowed to dry for up to 24 hours before the next coat, using Sil TC 15 is applied.



Check the weather forecast to ensure that temperatures will be suitable for application (5°C and rising). The K Systems Silicone TC 15 top coats must be stirred thoroughly before use using a slow speed mixer/ drill & paddle. A small amount of water can be mixed with the product to achieve the best working consistency. Keeping the same ratio of water for all buckets of Sil TC 15 universal for all buckets.



All perimeters should be protected ie; window & door frames, cills, vents, finished surface footpaths etc.

Apply the product to the thickness of the largest grain size using a stainless-steel float; allow to take up slightly. The surface is then rubbed up in a circular motion using a thin plastic float to create the finished uniform surface texture.

Complete continuous surfaces without interruption, working to a wet edge at all times.

Drying times may be prolonged by lower temperatures and/or high humidity.

The finished Sil TC 15 render must be protected from rain showers while in the early stages of curing.






Other Finishing Options

If a thick coat finish is specified such as dash render, scratch texture coat or KS Brick Rend / brick effect render then the movement joints should be fixed over the top of the base coat to ensure that the finish is broken. Corner beads may also be used around window and door openings with the dash finish.

Feature bands being formed around a window opening using the scratch texture coat.



<p>Finished quoin detail – note the quoins need masking off during the application of the acrylic render finish</p>	
<p>Dash aggregate being applied onto Dash Receiver.</p> <p>While the render is still plastic, throw the selected aggregate onto the surface to give a uniform dense coverage.</p> <p>Immediately tamp the selected dashing aggregate into the butter coat with a wood float or plasterer trowel, ensuring a good bond is obtained.</p>	
<p>K Systems Brick effect render application.</p> <p>The working day areas of application will be dictated by the skill of the operatives, weather conditions and architectural requirements.</p> <p>Where possible, application on individual wall surfaces should be completed in one operation.</p> <p>Where this is not practical, day work joints to be agreed with the architect.</p> <p>(A) Mortar Layer</p> <p>Add approximately 4 - 5 litres of clean water to each 25kg sack of material; mix thoroughly for a minimum of 5mins</p> <p>The mixed materials are then applied to the prepared background, 6 - 8mm thick, using hawk and trowel or render application machine. Rule off to a flat finish.</p>	

Do not over-trowel, polish surface, or apply water during set.

(B) Face Layer

After the mortar layer has started to stiffen, the face layer is applied. It must not be applied if the mortar layer has been allowed to dry /or set with a surface skin.

The mix is applied on to the mortar layer following its initial stiffening, using hawk and trowel, or projection render machine.

It is applied to an average thickness of 3-5mm.

C) Texturing

To achieve a textured surface finish, use the appropriate tool - stiff brush, comb, sponge, spatula or other implement as required, but do not over-trowel, polish surface or apply water during set. The skill of the operator will determine the finish

(D) Cutting and Marking Out

After the face layer has been shaded and textured, and following initial stiffening of the applied materials, the face layer is cut through and the mortar layer cut into, using an appropriate cutting tool.

This reproduces recessed mortar coursing of the brickwork or stonework; spirit levels, templates and straight edges should be used for guiding this operation.

Experience will dictate the best time for the operation to take place; too soon and the spirit levels and other guides will mark and spoil the surface, the cutter will rag and tear the material; too late and it becomes difficult and then impossible to cut. At the correct time a clean cut is easily achieved.

Brushing

Following further stiffening of the materials and using a soft bristled brush, lightly brush and remove any face materials left by the cutting out.



The product must be protected from rain, mist or cold (less than 5°C on a falling thermometer) conditions in order to prevent an excessively prolonged drying period.

In common with traditional sand/cement renders, the products must not be applied to frost-bound surfaces.

In sunny weather, work should commence on the shady side of the building and be continued round following the sun to prevent the render drying out too rapidly.

Wall surface temperatures above 40°C will accelerate the chemical setting of the process and if the set is too rapid complete hydration may not be achieved.

The use of polythene sheeting is recommended during curing and should hang clear of the face of the wall but be arranged in such a way that it does not form a tunnel through which wind could increase the rate of water evaporation from the products.

Care must be taken to protect the products from rapid drying due to exposure to direct sun or drying wind to ensure complete hydration of the cement.

In common with traditional renders the products may be subject to lime bloom. The occurrence of this may be reduced by providing adequate protection and avoiding application in winter or in adverse weather conditions. The effect is less noticeable on lighter colours.

Quality of Finish

The NHBC Document 'A Consistent Approach to Finishes' should be used to judge the minimum standard of the finished work. This document highlights that the surface of the render should be viewed under natural daylight from 10 metres away. At this distance the render on the walls should be reasonably consistent in texture, finish and colour. However, there may be some minor colour variation due to differences in the suction of the background and the orientation of the wall.

In terms of flatness of the render this should be within a tolerance of +/- 8mm over 5m. To undertake a flatness check, a 5m long string line should be placed on packers and the distance from the string to the surface recorded. For instance, if 20mm packers are used then the string should be no closer than 12mm and no further away than 28mm from the surface.

The flatness of the window and door reveals should also be checked and should have a tolerance of <4mm deviation under a 1m straight edge.

K Systems Ewi trained Contractors should implement quality control checks on their work to ensure conformance to the above quality standards.

The Registered Installation Contractor should formally sign off the work before offering the work up as complete to the main contractor.