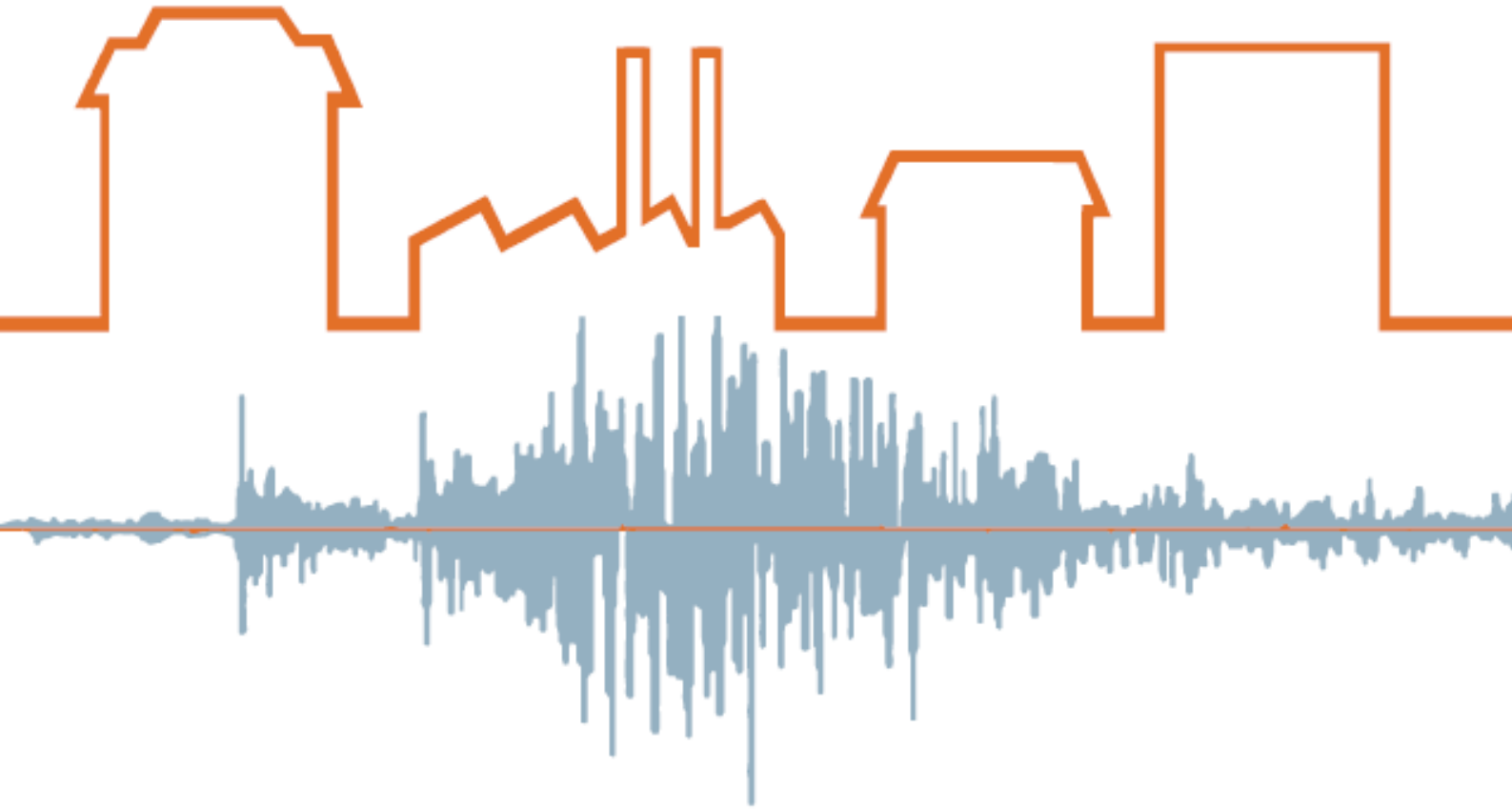
BUILDING RESTORATION METHOD STATEMENTS



Kimia

Method statements

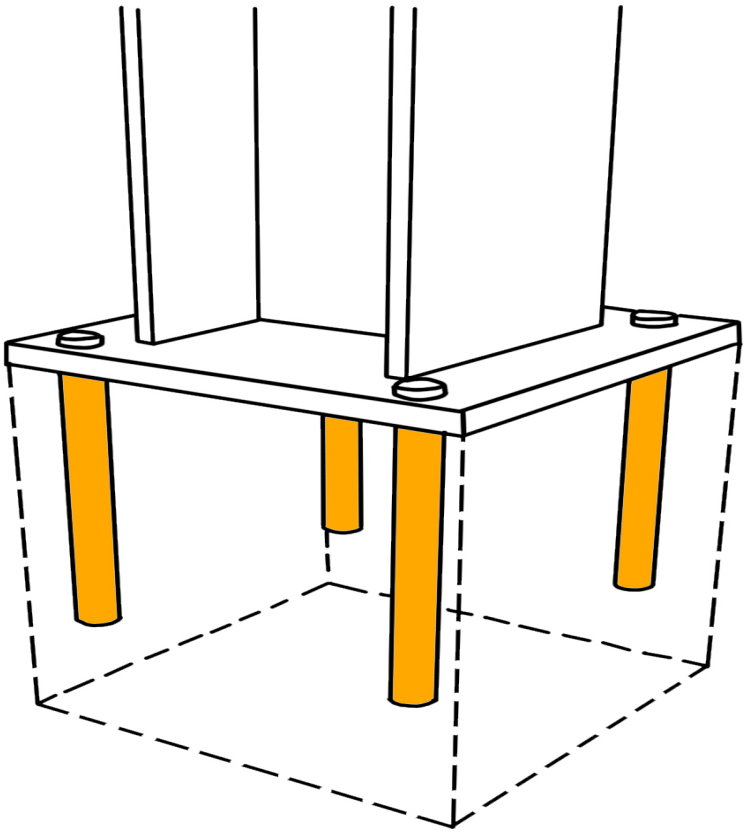
Please find a list of standard method statements for the most common interventions that can be undertaken using our products and systems.

Do not hesitate to contact us to ask for:

- Personalized method statements;
- Cost analysis;
- Personalized CAD details;
- Technical support in the dimensioning of structural interventions;
- Technical support in finding best alternatives solutions for projects already designed;
- Help in choosing the right solutions for both structural and non structural interventions;
- Product customizations;
- Tips for the correct application procedures;
- Training and mentoring on the job with Italian Applicators.

Our Technical Department is at your disposal for any technical request.

Anchors, structural connections, precision groutings and structural tying



Anchoring metallic structures and industrial machinery

Prepare the substrate by removing all deteriorated concrete to form a sufficiently-rough, solid substrate with no detached portions. Cast the mortar **Betonfix AL** onto clean substrates saturated with water leaving a dry surface (s.s.d.). Pour the mix in a continuous flow from one side only into the prepared area, making sure that all air is expelled.

Anchoring of steel bars and reinforcements with resins in cartridges

Drilling of the holes and cleaning with compressed air jets. The diameter of the hole must be 2-4 mm greater than the diameter of the iron to be anchored. Fill partially the drilling (1/3 of the length) injecting the two-component thixotropic chemical anchor **Kimitech F3** before inserting the bar.
For the use of the cartridge, remove the cap from the cartridge, slide the locking pins to the opening position, screw the mixer nozzle, and then insert the cartridge into the extruder gun. Squeeze the material out of the spout until it gets a uniform dark color (a few inches of extruded product is sufficient), then proceed to the operation.

Repairs of cracked concrete by injection or casting of fluid resins

Preparation of the substrate by removing all crumbling or detached areas and all traces of cement laitance and paint by sandblasting or brushing. Open cracks less than 0.5 mm wide and carefully clean with compressed air to remove all traces of dust.

- Repair *horizontal cracks* by casting **Kimitech EP-IN** resin directly into the cracks.
- For *vertical cracks*, drill a series of holes along the crack and carefully clean the area with compressed air to remove all traces of dust. Insert injector tubes into the holes and seal the elements to be repaired with thixotropic epoxy adhesive **Kimitech EP-TX** and, with the same resin, seal the crack and dust its surface with dry sand to improve the adhesion of any products applied later. Wait until the adhesive hardens and inject compressed air to make sure the circuit is perfectly free. Mix the two-component epoxy resin **Kimitech EP-IN**, and inject the product into the lowest tube using a suitable low-pressure pump until it seeps out of the next tube. Seal the first tube and then inject the resin into the next one up, until the crack is completely filled. When the resin has hardened, remove the injector tubes.

Injections and anchoring of steel bars and reinforcements with cement slurries

Prepare the substrate by removing all deteriorated materials and seal crack and joints. When anchoring steel bars or other reinforcements, drill holes with a diameter 20 mm bigger than the diameter of the bars. In case of structural consolidation of masonry walls through injections, drill holes of about 20-24 mm, following the pattern defined by the designer of the interventions. Clean the holes, wet them with water leaving a dry surface (s.s.d.).

- In case operations are held on the extrados of horizontal surface, cast the cement slurry **Betonfix 200** into the holes filling them for 2/3, afterwords proceed with the insertion of the bars (if foreseen) and fill the void.
- In case injection of **Betonfix 200** are held on a vertical surface or at the intradox of an horizontal surface, seal the holes with a thixotropic mortar after having inserted the reinforcing bar (if needed). In case of intervention on compact substrates, when sealing the external part of the drilling, fix 2 pipes (one will be used for the injection of the slurry, the other one will allow the air inside the drilling to exit).

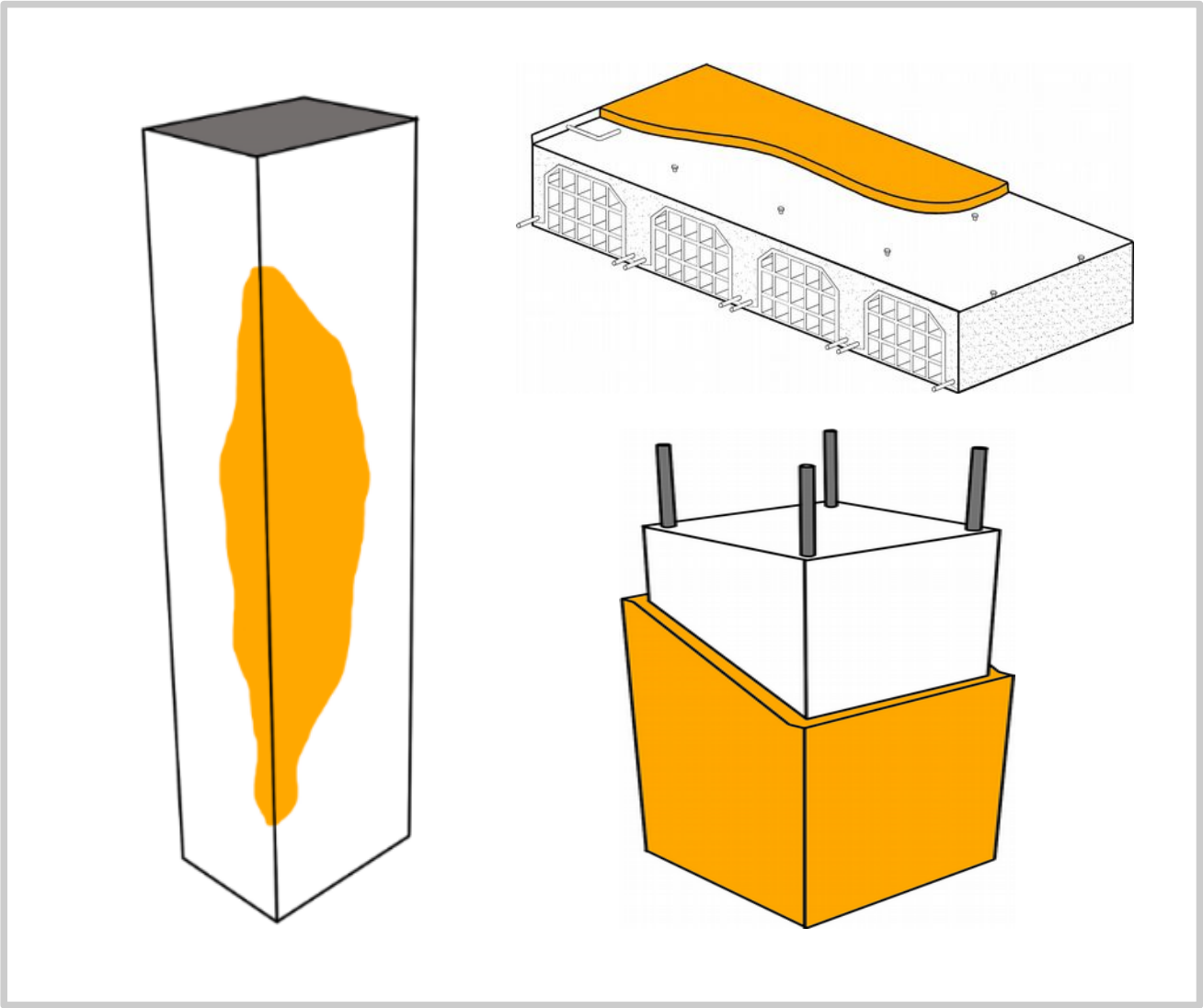
Bonding flat steel plates or other material to concrete elements

Apply the adhesive after adequate preparation of the concrete substrate by removing all crumbling or detached areas and all traces of cement laitance, stripping oils and paint by sandblasting or brushing. Carefully clean the area with compressed air to remove all traces of dust deposits. Remove all traces of rust, paint and oil from the surface of the steel by sandblasting to leave a bare metal finish (grade SA 2½). After mixing the two pre-dosed components of **Kimitech EP-TX**, spread the product on both the surfaces to be bonded, making sure it penetrates into particularly uneven areas. Press and hold the elements together until the adhesive has completely hardened (mechanical fastening can be foreseen to fix the plate untill the resin has not completely set).

Ground anchors

Boreholes are to be drilled with wash boring drilling method to the required lengths. Holes are to be flushed with water/air after drilling to a reasonable cleanliness. All strands are to be cut to length and tied together with tie wire. Free tendon length or strand free length shall be sheathed with a suitable plastic hose. A primary grout pipe is to be tied to the cable and should reach within 0.5m to the bottom of the hole. This grout pipe is withdrawn progressively during primary grouting of **Betonfix PL**. Pumping shall continue until the flushing water is displaced with grout of even consistency flowing out of the drill hole. Anchors shall not be loaded until 7 days after grouting.

Repairing and protection of concrete



Repair of R.C. structural elements

Preparation of substrates

Prepare all surfaces to be restored by completely removing all the deteriorated concrete with a hand or power chisel or with other suitable means, such as hydro-scarifying, to obtain a solid, sufficiently-rough substrate with no detached portions. If the deteriorated concrete has been removed with a hand or power chisel, clean all exposed steel reinforcement with a brush or by hydro-sandblasting to remove the rust and bring the steel reinforcement back to a bare metal finish. Hydro-sandblasting is not required if the surface has been prepared by hydro-scarifying. However, if the time between hydro-scarifying and treating the steel reinforcement is particularly long due to on-site logistics, hydro-sandblasting must be carried out. Replace any steel reinforcement which has been cut or damaged, or which is highly corroded, with new reinforcements. Clean all surfaces to be restored and saturate the substrate leaving a dry surface (s.s.d.) by hydro-cleaning.

Protection of steel reinforcement

Treat the steel reinforcement by brush-applying one coat of one-component anti-corrosion cementitious mortar **Betonfix KIMIFER**.

PS: In case Betonfix MONOLITE N or Betonfix MONOLITE R mortars are used, it is not necessary to protect the treat the steel reabrs with Betonfix KIMIFER.

Restoration operations

When Betonfix KIMIFER is still wet, restore the concrete using one of the following products:

- Pourable R4 products: **Betonfix CR or Betonfix HCR**
- Tixothropic R4 repair mortar: **Betonfix FB, Betonfix MONOLITE N, Betonfix MONOLITE R**
- Tixothropic R3 repair mortar: **Betonfix RCA, Betonfix TX**
- Tixothropic R2 repair mortar **Betonfix RR**

These cementitious mortars must be mixed with the amount of water or latex indicated in their relative Technical Data Sheet to form a well-blended, lump-free mix. Since water content or latex have an influence on the properties of the mortar, take special care to prevent it evaporating off too quickly while curing. In hot or windy weather, we recommend using the damp-curing technique or applying an anti-evaporation product to prevent rapid evaporation of the mixing water. The anti-evaporation product must be compatible with the successive skimming or protective layer, and must be removed if necessary.

- In case of *tixothropic products*, apply the mortar with a trowel within the application temperature range indicated in the Technical Data Sheet. If the thickness to be restored is more than the indicated values, apply the mortar in several coats and reinforce it by inserting electro-welded mesh to compensate for hygrometric shrinkage and guarantee sufficient contrast to the slight expansions of the mortar. The size (diameter of wire and mesh size) must be according to design specifications. Tamp the mortar. The waiting time depends on climatic conditions, and tamping should be carried out when a small imprint remains after touching the surface with a finger.
- In case of *pourable mortars*, cast them within the application temperature range indicated on the Technical Data Sheet. Pour the mix in a continuous flow from one side only into the prepared area, making sure that all air is expelled. If applied into formwork, coat the formwork with a stripping compound before casting to prevent it drawing off any of the mixing water. Reinforce the concrete with electro-welded steel mesh. The dimensions of the mesh (diameter of steel wire and size of mesh) must be according to design specifications, so as to compensate for hygrometric shrinkage and to guarantee sufficient contrast to the expansive action of the mortar. Embed the mesh at around the mid-point of the layer to be restored and connect it to the steel reinforcement.

Skimming

When the repair is done using Betonfix MONOLITE N, Betonfix MONOLITE R and Betonfix RR, there is usually no need to apply a final skimming. If a finer finish is required (in case of interventions undertaken with all the other tixothropic mortars), or if the quality of finish obtained - which depends on the type of formwork used – is not good (in case of castable grouts), skim the surfaces once the repai mortar has cured with **Betonfix RS** or **Betonfix R30**.

PS: Before skimming the surfaces, in case of castings done using formwork, remove all traces of stripping and/or anti-evaporation agent by hydro-sandblasting.

Protection

Final protection of the surfaces may be carried out using **Kimicover BLINDO**.

Skimming of concrete surfaces and renders

Prepare the substrate by removing all crumbling or detached areas to obtain a solid substrate. Remove all traces of dust or other elements which could prevent the product adhering correctly. If the substrate is painted, the paint must be even and must be well adhered to the substrate.

Apply **Betonfix RS** on clean substrates, which must be damp in case of absorbent materials (concrete and render), dry in case of old paintwork, with a smooth metal trowel in layers from 1 to 3 mm thick, then finish off the surface with the same trowel or a sponge float. Thicker layers, up to a maximum of 6 mm, must be applied in two layers.

Place alkaline-resistant glass fibre mesh **Kimitech 350** between the first and second layer.

Overlap the edges of each strip of glass fibre mesh by at least 10 cm. Net will be used any time the substrate is composed by various materials.

Protection against carbonation of R.C. substrates

Surfaces to be protected with **Kimicover BLINDO** must be perfectly solid. Repair any areas in concrete which are in poor condition with mortars of the Betonfix range of products, and wait at least 7 days before application of the product. Remove all traces of dirt, dust, grease, oil, paintwork, saline efflorescence, mould and moss which could affect the right adhesion of the painting to te substrate.

In case of old surfaces, the choice of the right cleaning depends on the type of dirt: cold water is usually sufficient. Cleaning the surface with hot water or steam is particularly recommended if oil or grease is present.

Sand-blasting may also be used. If the surface is not dirty, it may simbly be brushed down with a stiff brush and blown with compressed air to remove the dust. On surfaces where the type of curing cycle used is unsure, or if they are crumbly or have low absorbency, use Kimitech ACR for the preliminary treatment cycle. The primed surface must never be "shiny". Kimicover BLINDO may be applied using traditional application techniques: by brus, roller or spray. For effective, complete covering of the surface, apply at least two coats. Under normal humidity and temperature conditions, wait at least 24 hours between each coat, and in all cases, only when the previous coat is completely dry.

Protection against water entrance

Prepare the substrate by removing all crumbling or detached areas to obtain a solid substrate. Remove all traces of dust or other elements which could prevent the product adhering correctly. Apply the two-component elastic cementitious mortar **Kimicover DUO** on clean and dump substrates to form a layer at least 2 mm thick.

- If powder is mixed with 33% of latex, apply the product with a smooth metal trowel or by spray with a rendering machine, fitted with a spraying lance for skimming compound.
- If powder is mixed with 50% of latex, apply the product by brush or roller.

In areas where there is the risk of crack-formation due to settling, or on structures particularly subjected to dynamic stress, the product must be applied in two layers, with alkaline-resistant glass fibre mesh **Kimitech 350** placed between the first and second layers. Overlap the edges of each strip of glass fibre mesh by at least 5 cm.
After at least 7 days from protective waterproofing, the surfaces will be protected with **Kimicover BLINDO**, to be applied using traditional application techniques: by brus, roller or spray. For effective, complete covering of the surface, apply at least two coats. Under normal humidity and temperature conditions, wait at least 24 hours between each coat, and in all cases, apply the second coat only when the previous one is completely dry.

Protection against chemical aggressions

Completely remove loose particles, cement laitance, dust, paint, oil, form release compounds and other deleterious substances. In case of oils and grease:

- If the substrate is superficially impregnated, vigorously clean it with a 10% water and soda solution or detergents and then rinse thoroughly several times with clean water.
- If oils and grease have penetrated deeply into the substrate, the contaminated concrete must be removed by scarifying and levelled with appropriate Betonfix mortar or Kimitech ECF reinforced with a net.

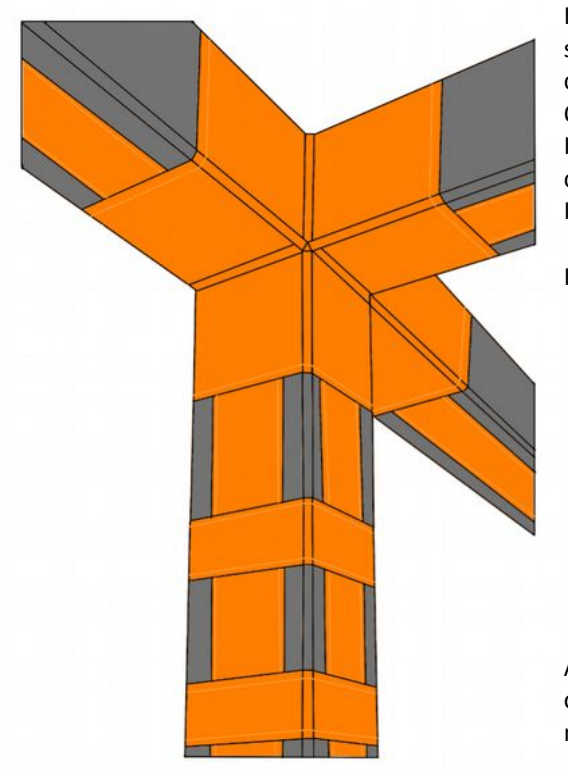
In case:

- surfaces contain loose particles → apply Kimicover FIX primer;
- there is water in counter pressure → block local seapage or general water spilling with Betonfix WW and afterwords apply the tri-component system Kimitech ECF reinforced with a net.

Kimitech K40 NF (epoxy resin) or **Kimicover 301 NF** (polyurethan resin) can be applied with brush, roller, or airless gun in at least 2 coats. The second coat must be applied within the time stated in the TDS of the products. In case of very absorbent substrates, not previously treated with Kimicover FIX or three-component epoxy-cementitious system Kimitech ECF, the first coat of Kimitech K40 NF may be diluted 5 to 10% with clean water, while teh first coat of Kimicover 301 NF can be diluted 5 to 15% with Solvente EPOX.

Structural interventions with non-traditional materials

FRP streghtenings with fabrics



If the substrate is sound and not damaged cortically, sandblast the surface to remove all traces of stripping compound, varnish, paint and cement laitance.
On very irregular surfaces, after cleaning and applying the primer Kimicover FIX, apply a regularization layer of a thicknes of at least 1-1,5 cm with structural mortars of Tectoria or Betonfix range mixed with Kimitech B2 latex.

In case of:

- *Structural cracks* → Seal them pouring or injecting cement-based or lime-based slurries.
- *Substrates polluted or demaged cortically* → remove damaged parts and reconstruct them following the pertinet cycle of interventions. Wait at least three weeks before lying of the FRP reinforcements. If reinforcement must be carried out immediately, repair with Kimitech TX311 (eventually applying it in more than one layer).
  On the last layer, on wet, it will be possible to directly lay the reinforcement.

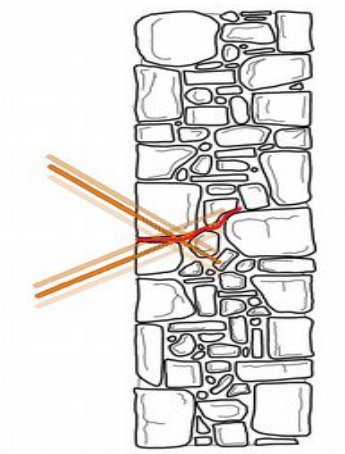
All sharp edges must be smoouthed with a demolition hammer o any other suiitable means. It is recommended that the bending radius be not less than 2 cm.

Appy with a brush, roller or airless pump **Kimicover FIX** primer.
When wet and in any case within 8 hours, apply with a notched trowel an avarage 1 mm thick layer of tixothropic resin **Kimitech EP-TX**.
On wet, place the reinforcing fabric made out of carbon fiber (**Kimitech CB**) or glass fiber (**Kimitech VR**) with grammage, type of weaving and width requested, ensuring no wrinkles are present. Pass over the roller *rullo per compositi* so the air bubbles are eliminated. Unless specified in a different way, stiprs must be overlapped at least 20 cm in case of wrapping of colums or connection among subsequent strips.

Depending on environmental conditions, impregnate the reiforcements applying by brush the fluid resin **Kimitech EP-IN** (with a longer workability time) or **Kimitech EP-IN/50** (faster). To have a better grip for subsequent smoothing products and finishings (if forseen), dust the surface of wet resin with quartz aggregates.

FRP streghtenings with pultruded plates

If the substrate is sound and not damaged cortically sandblast the surface to remove all traces of stripping compound, varnish, paint and cement laitance. On very irregular surfaces, after cleaning and applying the primer Kimicover FIX, apply a regularization layer of a thickness of at least 1-1,5 cm using structural mortars of Tectoria or Betonfix range mixed with Kimitech B2 latex. In case of *Structural cracks* or *Substrates polluted or demaged cortically*, proceed as suggested in the previous paragraph. All sharp edges must be smoouthed with a demolition hammer o any other suiitable means. It is recommended that the bending radius be not less than 2 cm.
Appy with a brush, roller or airless pump **Kimicover FIX** primer.
When wet and in any case within subsequent 8 hours, apply with a notched trowel an avarage 1 mm thick layer of tixothropic resin **Kimitech EP-TX**.
With a flat trowel, apply an even layer 1-1,5 mm thick of thixotropic epoxy adhesive Kimitech EP-TX also on the side of the **Kimitech PLATE** which is to be bonded to the substrate and place the lamina.



Structural connections by reinforced tacking with helical bars

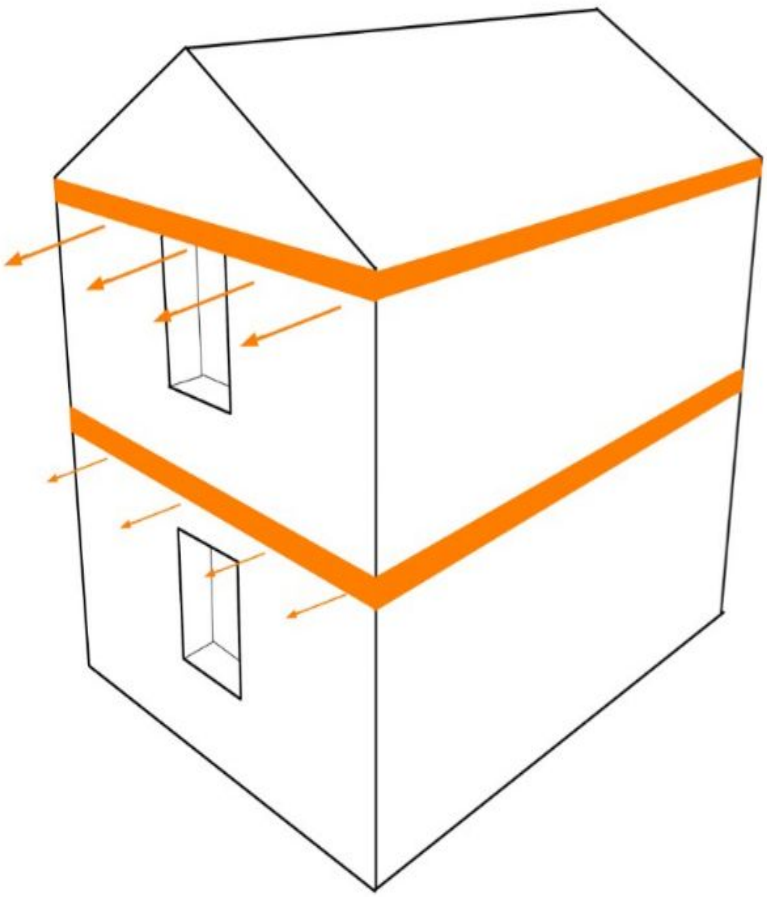
For "dry" connections in structural and non-structural reinforcement systems, proceed as follows:

- Make holes in the walls to cross and intercept cracks or portions of walls which need to be connected. The diameter of the holes will be 2 mm less than diameter of the **Kimisteel INOX X-BAR** to be used (e.g. for a bar f 10, a hole diameter of 8 mm will be made).
- Cut to size of helical bars and insert by means of a drill with a spindle for helical bars Kimisteel SDS DRILL or manual bar pushers Kimisteel MANUAL DRILL.
- Seal the outer edge of the hole, once screwed the bar, with proper Kimitech resins or Betonfix, Limepor, Tectoria mortars.

Reinforcements with steel fabrics and inorganic matrixes

Remove existing plasters or claddings. Brush the surface to remove all traces of stripping compound, varnish, paint and cement laitance. In case of structural cracks, seal them pouring or injecting cement-based or lime-based slurries.
Once removed existing plasters and regolarized the substrate, apply the reinforcement using the following procedure:

- Apply a coat of primer **Kimicover FIX** to the substrate;
- Trowel apply **Kimisteel LM** mortar;
- If foreseen by the project, roll the terminal part of the high-strength steel fibre fabric **Kimisteel INOX** or **Kimisteel GLV** and insert it in previously drilled holes in which the net will be grouted (in case a mechanical fastening has been specified, block the first end of the strip);
- Lay the strip on the fresh mortar;
- Roll the other terminal part of the strip, insert it in the holes previously drilled (in case a tension of the fabric has been specified, pre-tension the strip before blocking the other end);
- Apply another layer of **Kimisteel LM** so it covers the strengthening fabric evenly;
- Grout the terminal ends of the Kimisteel fabric by mean of adequate cement-based, lime-based or epoxy anchoring grout (if specified by the designer of the project).

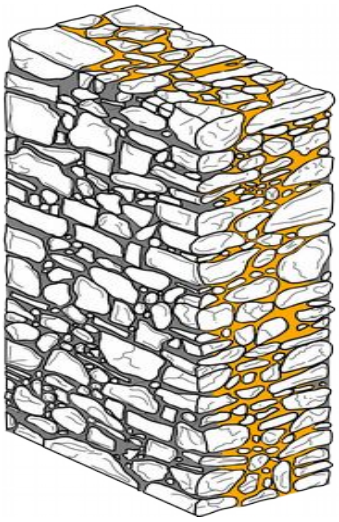


Reinforcements with carbon fabrics and inorganic matrixes

Remove existing plasters or claddings. Brush the surface to remove all traces of stripping compound, varnish, paint and cement laitance. In case of structural cracks, seal them pouring or injecting cement-based or lime-based slurries.
Once removed existing plasters and regolarized the substrate, apply the reinforcement using the following procedure: apply a coat of primer **Kimicover FIX** to the substrate; trowel apply **Kimisteel LM** mortar and lay **Kimitech ST 160 R** on the fresh mortar; apply another layer of **Kimisteel LM** so it covers the strengthening fabric evenly.

Consolidation of masonry with natural hydraulic lime-based products

Injections for the consolidation of core walls



Preparation of substrates

Cutting out deteriorated mortar from joints, where required, in brick, stone, tuff or mixed masonry, to obtain a sound, compact substrate with no crumbly or unstable areas and no saline efflorescence, dust or mildew, without compromising the integrity of the face of the wall. Hydro-clean the surface to remove all traces of material and substances which could compromise the adhesion of any products or systems applied later.

Drilling the injection holes

Drilling of 20-40 mm diameter holes to a depth of 2/3 of the thickness of the wall, preferably at a square pitch of 50x50 cm. If the wall is thicker than 60 cm, it is better to drill holes from both sides of the wall.

Fastening the tubes or injectors in place

Fastening tubes or injectors in place with appropriate mortars. On "exposed-finish" masonry, point the joints to grout and seal any cracks and uneven areas on the face of the wall from which the slurry could seep through. If a new layer of dehumidifying, transpirant or structural render needs to be applied, first apply a 5 mm thick scratch-coat to prevent the injected slurry from seeping through the face of the wall.

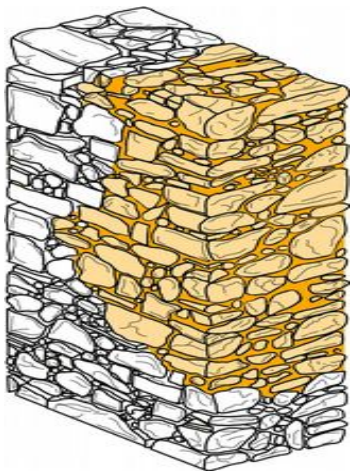
"Cleaning" the inside of the masonry

The day before injecting the slurry, we recommend saturating all the inside of the structure with water through the tubes or injectors previously fastened in place. Saturate the wall starting with the holes in the highest position. Make sure the structure has absorbed all the injected water before injecting the slurry.

Injecting the slurry

Inject the selected slurry (**Limepor 100**, **Limepor IZ8**, Betonfix 200 or Betonfix PL in case of non historical masonry) through the tubes or injectors previously fastened in place with a manual or electronic pump at a pressure of up to 1 bar at the nozzle. Inject the product starting from the bottom working upwards to help expel air in the structure and fill all the cavities. When the slurry seeps out of a tube or injector near the one being injected, stop injecting, close the injector used and continue the operation from the tube or injector from which the slurry seeped out. Follow this pattern until the slurry seeps out of the highest hole. When the consolidation procedure has been completed, remove all tubes and injectors and grout the holes with a suitable mortar from the above-mentioned ones.

Restoration of masonry by patching and cladding



Restoring masonry using the "patching" or "cladding" techniques is necessary when the face of the wall is particularly deteriorated, if elements such as stone, bricks or tuff are missing or if there are cracks or poor joints between portions of the masonry. After making the structure safe using suitable temporary supports, remove all the elements which are particularly loose and/or poorly bonded. "Break out" the areas of the wall where there are cracks or gaps, starting from the bottom working upwards, by removing deteriorated and/or cracked elements, all the unsuitable installation mortar and any other elements or objects which could compromise restoration of the masonry.

While carrying out this operation, put all the elements in good condition and which may be reused to restore and "patch up" the masonry together on one side. Also, while removing the deteriorated areas, leave rough edges to offer better grip between the areas of new masonry and existing masonry. Clean all support and jointing surfaces with a low-pressure hydro-cleaner, where possible, to help the mortar adhere to the substrate.

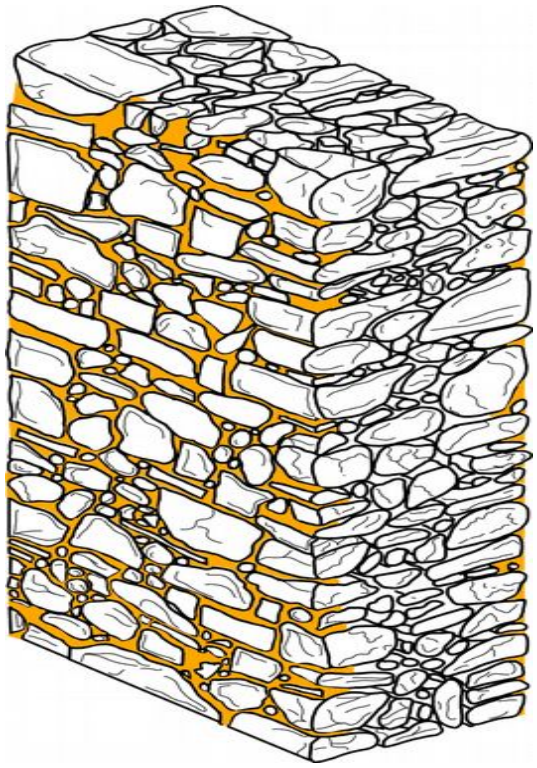
"Patch" or "clad" the face of the wall by creating an "installation bed" of mortar and then lay the elements on the mortar (either the original ones previously removed or new ones with the same shape and size of the existing elements to prevent physical or chemical incompatibility). Press the elements down slightly so they form a better grip with the existing ones. Remove excess mortar with a trowel.

Work will be done using a lime binder (**Limepor NHL 3,5**, **Limepor LGS** or **Limepor NHL-Z**) mixed with local aggregates or a ready-to-use mortar (**Tectoria M15**, **Tectoria M10**, **Tectoria PMP** o **Limepor MT**).

If required, after seasoning, spread a suitable transparent, transpirant, water-repellent treatment over the surface, such as **Kimistone IDROREP**, **Kimistone IBASIL** or **Kimistone ANTISMOG**.

Laying of brick, stone, tuff and mixed masonry

Apply the lime binder (**Limepor NHL 3,5**, **Limepor LGS** or **Limepor NHL-Z**) mixed with local aggregates or a ready-to-use mortar (**Tectoria M15**, **Tectoria M10**, **Tectoria PMP** o **Limepor MT**) by trowel after saturating the construction elements (bricks, stone and tuff) to prevent them drawing off water from the product and compromising its performance characteristics.
Eliminate any excess water with compressed air.
Form a "laying bed" and then lay the construction elements in place while applying a light pressure to make sure they are held in the right position.
Remove excess mortar from the laying bed and construction elements with a trowel.
On "exposed-finish" masonry, pass over the mortar joints between the construction elements with a damp sponge.
If required, after seasoning, spread a suitable transparent, transpirant, water-repellent treatment over the surface, such as **Kimistone IDROREP**, **Kimistone IBASIL** or **Kimistone ANTISMOG**.



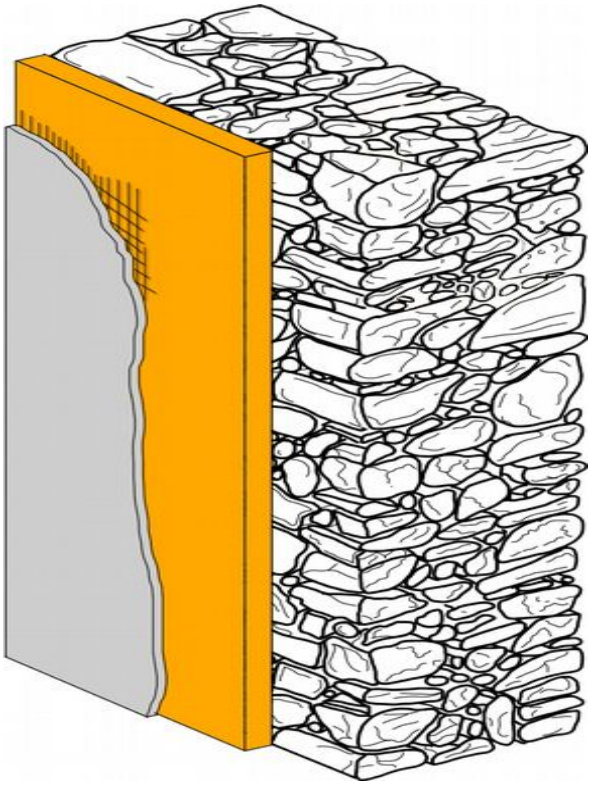
Pointing masonry joints on "exposed" masonry

Apply the lime binder (**Limepor NHL 3,5**, **Limepor LGS** or **Limepor NHL-Z**) mixed with local aggregates or a ready-to-use mortar (**Tectoria M15**, **Tectoria M10**, **Tectoria PMP** o **Limepor MT**) after adequate preparation of the substrate by manually or mechanically cutting out deteriorated mortar from joints, to obtain a sound, compact substrate with no crumbling or unstable areas and no traces of dust or mildew, without compromising the integrity of the face of the wall.
Clean the masonry by low-pressure hydro-cleaning to remove all traces of efflorescence and soluble salts from the surface. Saturate the substrate with water to prevent it drawing off water from the mortar and compromising its final performance characteristics. Eliminate any excess water with compressed air.
Apply one or more layers of mortar according to the depth and length of the rows to be filled, pressing down slightly to favour adhesion with the substrate. Remove any excess mortar immediately after application, including from the construction elements.
Pass over the mortar joints between the construction elements with a damp sponge.
If required, after seasoning, spread a suitable transparent, transpirant, water-repellent treatment over the surface, such as **Kimistone IDROREP**, **Kimistone IBASIL** or **Kimistone ANTISMOG**.

Natural hydraulic lime-based plasters

Re-adhesion of detached even frescoed plasters to substrates

Injecting of **Limepor IZ4**, lime slurry to restore the adhesion between masonry substrates and render, including frescoed walls.
The hydraulic binder must be suitable for use on site to make salt-resistant, volumetrically-stable, super-fluid injection slurry which is also easy to inject manually using a large-capacity syringe, such as those used in veterinary applications, or by gravity casting.
On structures with frescoed render and/or of historical or artistic interest, while grouting and "sealing" the cracks and gaps in the substrate, fasten small pieces of soft, rubber tube in place at a suitable pitch.
In this case, we recommend that the inside of the structure is not "wetted", in that it could cause irreparable damage to the frescoes.
Inject the product starting from the bottom working upwards to help expel air in the structure and fill all the cavities.
When the slurry seeps out of a tube or injector near the one being injected, stop injecting, close the injector used and continue the operation from the tube or injector from which the slurry seeped out. Follow this pattern until the slurry seeps out of the highest hole.
When the consolidation procedure has been completed, remove all tubes and injectors and grout the holes with a suitable mortar from the Limepor or Tectoria range.



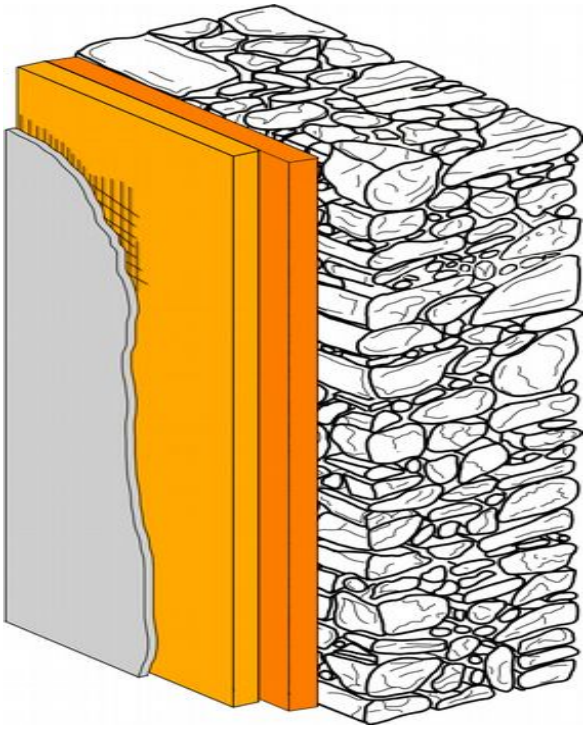
Application of traditional renders

Apply **Tectoria PMP** or **Limepor MT** render after adequate preparation of the substrate, on a clean, sound, compact substrate with no crumbling portions and no traces of dust, dirt, mildew or soluble salts.
Hydro-clean the surface to remove all traces of material and substances which could compromise the adhesion of any products or systems applied later.
Apply an initial 5 mm thick scratch-coat, to even out the absorbency of the substrate and improve adhesion of the render.
Wait until the scratch-coat layer starts to set, then apply a single layer up to 30 mm thick of render by trowel or with a continuous-feed rendering machine, starting from the bottom working upwards.
If the thickness required is higher than 30 mm, apply the render in several layers.
Apply each layer without tamping the previous layer.
After applying the render, wait a few minutes and level off the surface using an aluminium H-type or blade-type straight edge by passing over the surface horizontally and vertically until it is flat.
Remove the vertical guides, if they have been used, and fill the gaps with the same product.
Finish off the surface of the render with a damp sponge float.

Horizontal chemical barrier to block capillary rising damp

For structures with uneven core-wall masonry or with voids, all internal cavities must be filled by injecting adequate slurry (Limepor 100, Limepor IZ8). Drill a series of holes at a downward angle of around 20° to a depth of 2/3 the thickness of the wall. The holes should be around 15-30 mm diameter. Drill the holes around 15-20 cm above floor or ground level at a pitch of 10-25 cm. For walls with a thickness of less than 50-60 cm, or which are accessible from one side only, drill two staggered rows of holes and form the chemical barrier on one side only, while for walls thicker than 60 cm, we recommend making a barrier on both sides using the same procedure as described previously.
Clean out the holes with compressed air to remove all traces of dust and residues of material.
Fasten the propagators or injectors in place, according to the injection method chosen, using suitable masonry mortar, which must then be removed together with the propagators or injectors after injecting the chemical barrier. Inject **Kimicover IN** in each hole until the structure is completely saturated.

Dehumidifying macroporous plasters



Preparation of substrates
Remove the deteriorated render either manually or with mechanical means to a height of approximately 50 centimetres above the deteriorated area, and in all cases to a height of at least twice the thickness of the wall.
Remove all traces of loose or crumbly material and all traces of dust, mildew and any other element which could compromise adhesion of the dehumidifying cycle until the substrate is clean, sound and compact.
Then clean the wall with low-pressure water jets to remove any efflorescence or soluble salts present on the surface.
Saturate the substrate with water to prevent it drawing off water from the mortar and compromising its final performances. Excess water must evaporate off, so that the masonry is saturated and the surface is dry (s.s.d. condition). Compressed air may be used to speed up this process.

Application of the first scratch-coat layer
Apply a first scratch-coat layer of **Limepor RZ** (in case of multi-products cycles) or **Limepor MONO** (in case of single-product cycles) approximately 5 mm thick to completely cover the substrate to be rendered, to improve its adhesion, even out absorption of the substrate and slow down transfer of salts.
On mixed masonry or masonry out of plumb by more than 4-5 cm, which would lead to the layer of render having an irregular thickness, we recommend inserting Ø2 mm zinc-plated metallic mesh with a mesh size of 5x5 cm before applying the scratch-coat layer.
The mesh must be fixed in place to the wall with nails and/or plugs with a small gap between the wall so that it becomes embedded in the middle of the layer of render. Form levelling strips with the dehumidifying render or place vertical guides in position to define the correct planarity and thickness of the render.

Application of the macro-porous dehumidifying render
Wait one day, apply a coat of Limepor RZ (multi-product cycles) or Limepor MONO (single-component cycles) as an adhesion promoter on which, on wet, apply at least 20 mm thick lime dehumidifying render using **Tectoria DF** (multi-product cycles) or **Limepor MONO** (single-component cycles). If the thickness required is higher than 30 mm, the dehumidifying render must be applied in several layers. Each layer must be applied without tamping the previous layer. After applying the render, wait a few minutes and level the surface using an aluminium H-type or blade-type straight edge by passing over the surface horizontally and vertically until it is flat. Remove the vertical guides, if they have been used, and fill the gaps with render. Finish off the surface of the render with a plastic, wooden or sponge float a few hours after application, according to the surrounding temperature and conditions. Never press down on the surface of the render or porosity could be reduced and, therefore, impede evaporation of the moisture in the masonry.

Notes
Apply the render when the wall is not exposed to direct sunlight and/or wind. In such cases, such as during hot and/or particularly windy weather, take special care when curing the render, especially during the first 36-48 hours.
Spray water on the surface or employ other systems to prevent the mixing water evaporating off too quickly.
If a smoother finish than a normal tamped surface is required, apply a transpirant skimming mortar.
For constructions particularly exposed to rain, if the render does not require any dressing coat, it may be protected with a transparent, transpirant water-repellent product, such as **Kimistone IDROREP**, **Kimistone IBASIl** or **Kimistone ANTISMOG**.

Skimming coats

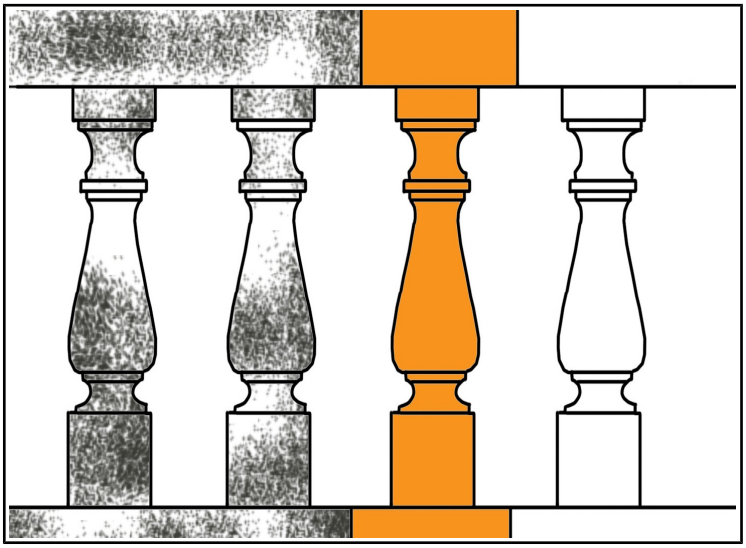
Apply the finishing mortar **Limepor FN** or **Limepor EDO** after adequate preparation of the substrate by removing all loose or detached areas, to obtain a clean, sound substrate with no traces of dust or crumbling portions.
We also recommend that the surface of new render is planed with a metal-tipped cutter to remove any surface laitance and make it easier for the skimming compound to adhere and prevent the formation of air bubbles.
Wet the substrate and apply the product in 1 mm thick layers on a damp substrate using a flat, metal trowel, pressing down slightly to promote adhesion and remove air bubbles entrapped in the porosity of the render.
Apply further layers of the product as soon as the previous finishing coat starts to set, until the required finish is obtained.
If a very smooth finishing is desired, the last coat should be given with **Limepor SK.**
Once hardened, smooth over **Limepor SK with a slightly** dampened, flat, metal trowel to obtain a mirror finish.

Treatments for stone materials

Elimination of biodeteriorating organisms

Disinfestation and cleaning of render and brick, stone or tuff masonry infested with biodeteriorating organisms, by applying a wide-spectrum, water-based, anti-mould and anti-mildew biocide solution with a brush, roller or spray (such as **Kimistone BIOCIDA**) before painting or applying water-repellent treatments on “exposed” masonry.

Cleaning of the surface



In case of old surfaces, the choice of the right cleaning depends on the type of dirt: cold water is sometimes sufficient. Cleaning the surface with hot water or steam is particularly recommended if oil or grease is present.

- In case of compact, carbonate stone, the alkaline cleaner **Kimistone C10.10** can be used (the product solubilises grease).
- For delicate stone materials, **Kimistone C957** can be adopted (the product slowly solubilises coherent atmospheric dirt and softens black crusts without altering the stone's original patina).
- In order to clean compact silicate stone, removing calcifications and encrustations, the strong acid cleaner **Soluzione P** can be used.

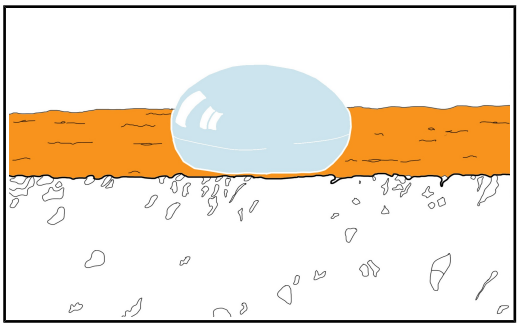
All cleaners may be applied (diluted or not) to dry surfaces with a brush or low pressure spray gun, being careful to soak the support thoroughly. Scrub vigorously until a foam forms then leave to take effect. Reaction time usually varies from 10 to 30 minutes. On completion, rinse thoroughly with a high-pressure washer, if suitable for the type of support. Otherwise run water over the surface until all residues have been removed. Always carry out a patch test before cleaning the whole surface.

Cortical consolidation

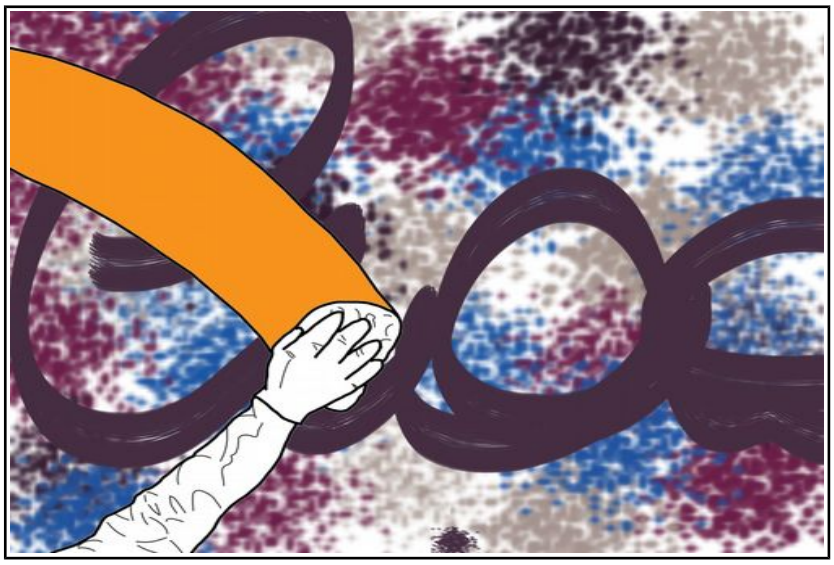
Supply and application of **Kimistone KSF** for cortical consolidation (or of **Kimistone K55** or **Kimistone K10** for cortical consolidation and hydrophobization) of various types of "weak" or "crumbling" substrate, including those of historical or artistic interest (porous stone, bricks, tuff, installation mortar, render, etc.), by impregnation.
Apply the product after adequate preparation of the substrate by low-pressure hydro-cleaning the surface, where possible, to remove all traces of grease, oil, paint and any other substance which could prevent the product penetrating into the substrate, to obtain a clean, sound, compact substrate with no loose portions and no traces of dust, dirt, mildew or soluble salts.
Apply several coats of the product on the dry substrate by spray with low-pressure, manual spray equipment, with a brush or by roller, according to the absorption and porosity of the substrate.

Hydrophobic impregnation

Kimistone IDROREP, **Kimistone IBASIL** or **Kimistone ANTISMOG** must be applied on dry surfaces (water obstacles penetration of the product). To apply the product evenly, it is advisable to use a manual shoulder-mounted sprayer for large surfaces and a roller or brush for smaller surfaces or for walls with many windows.
Once Kimistone IDROREP has been applied, the surface cannot be painted. Any painting must therefore be done beforehand using inorganic paints (silicate paint, for example). In any case, tests should be done to assess any possible changes in colour.



Anti-graffiti treatments



Apply the graffiti remover **Kimistone GRAFIX MOOVE S** to completely dry surfaces (as water will impede its action) with a brush or roller working from the bottom up, covering dirty and surrounding areas (to ensure that when the paint starts to dissolve and run, it will not damage any surrounding clean areas).
Leave to take effect for 20 to 30 minutes then scrub vigorously and rinse with a pressure washer as appropriate. Reaction time will be longer when more than one layer of graffiti needs to be removed. In these cases, as the dissolved paint starts to run, remove it with absorbent paper then add more product to the remaining paint. On completion when all paint has been dissolved, rinse with a pressure washer.
In order to protect stone materials and structures from the spray paint used in graffiti, preventing it from penetrating deep into the material, on clean, dry surfaces apply the sacrificial protector **Kimistone DEFENDER** using a lowpressure spray gun or natural fibre brush.
The number of coats required will depend on the absorption of the substrate: at least two coats are recommended, to be applied wet on wet while the previous coat is still fresh. Do not allow excess product to build up on the surface, and do not apply at high temperatures, in direct sunlight, during frost or strong wind. Graffiti made on surfaces treated with sacrificial protector will be easily removed with a warm water/steam jet washer (max. +80-90 °C).

Waterproofings

Waterproofing of balconies and terraces

Preliminary operations

Clean the substrate, in order to totally remove the inconsistent or flaking parts.
A proper cleaning is also useful to remove dust, grease, rust, paint and any other material which may affect the adhesion of coatings. After cleaning the surfaces, verify the dectivity and if necessary fix it in order to avoid water stagnation.
Verify the presence of adequate systems for the collection and disposal of water.
If the balcony is delimited by walls and not by railings, implement through holes on the walls. Remove or lift from the ground obstacles (splitters and other elements) or non-structural element.

- In the case of a bituminous membranes, evaluate whether to proceed with the removal of the membrane, or with localized renovation. The removal is the most convenient operation to be done when most of the existing membrane is deteriorated.
- In case of concrete surfaces, make sure that the substrate is structurally sound. The "pull off" tensile strength of the concrete must be > 1.5 MPa. It is then necessary to check the presence and depth of possible cortical degradation and proceed to a concrete renovation cycle. Eliminate any metal spacers and level deep and extended irregularities with a skim coat. In case of new concrete screeds, prime the surface with the epoxy resin **Kimicover FIX MV** with a roller or brush. This operation must be carried out between 8 and 24 hours before the beginning of the waterproofing.
- In case of already tiled surfaces, remove the first row of tiles of the walls to a height of about 20 cm, check the adhesion to the substrate and repair any holes or irregularities. Clean the surface with **Soluzione P** cleaner applied with a roller, brush or floor machine. Once applied let it work for a few mins and rinse the treated surface with water.

Joints

If a proper grid of static and dynamic joints has been designed and implemented, then it is possible to proceed with the restoration of the edges and the replacement of the preformed devices previously applied over the joints, in case they are deteriorated. If there are natural joints, due to the an incorrect sizing of cuts of the screed, if the joints have a straight or almost straight line, enlarge them.
If the cracks are widespread and irregular, the surface must be restored before the joints are recreated.
If the tiled surfaces have no joints and it is necessary to create them, cut the grout lines using an angle grinder, trying to make joints in areas that might tend to act as dynamic joints.
To waterproof the joints:

- Place the **Ethafoam** polyethylene support at the end of the joint as a foundation for the polyurethane sealant **Tecnoseal 88** or **Tecnoseal 130** in case of joints larger than 5 mm.
- Apply a self-adhesive membrane (such as our **Kimicover JOINT**) and a reinforcing net (**Kimitech 120**) to be saturated with mortar or the waterproofing resin chooesen to waterproof the surface.

The contact lines between the screed and the walls will be secured applying Kimicover JOINT on top of them, while collecting wells will be treated by applying a self-adhesive membrane, Kimicover JOINT P into the plumbing.

Waterproofing of the surfaces

- Apply by roller a first coat of the mortar (**Kimicover UNO**, **Kimicover DUO**, **Kimicover GUAINA**) or resin (**Kimicover 501**, **Kimicover LASTIC** or **Kimicover 601P**), on wet place the reinforcing fabric **Kimitech 350** (to be used with mortars) or **Kimitech TNT** (to be used with resins) and pour additional waterprrofing agent over the net to finish the waterproofing;
- After 24 - 48 hours, apply by roller an additional coat of waterproofing mortar or resin.

Finishing

- Monochromatic occasionally walkable varnishing → Completed the curing of the last coat of waterproofing (avarage 7 days), proceed with the monochromatic elastic covering realized with **Kimicover BLINDO** (Kimicover 501, LASTIC and 601P do not need any protection).
- Bonding of the tiles (this option is not available in case of waterproofing with Kimicover LASTIC or 501) → After at least 7 days from waterproofing, proceed with the bonding of the ceramic coating with glue of the line **Aderflex**. Expansion joints in the coating shall correspond to expansion joints in the substrate, Joints will be subsequently grouted with a suitable Tecnoseal sealant.

Blocking of water seepages

In case of underground structures subjected to negative pressures, create channels and collection and evacuation systems at points of arrival of water.
Carefully clean the cracks to be treated and enlarge them mechanically, removing any grease, flaky parts and any material which might affect good anchoring of the product.
Mix **Betonfix WW** a little at a time with clean water, wait until it starts to set (about 2 minutes, depending on the temperature) and press it against the crack or hole, maintaining pressure until it has completely set.
In the case of widespread seepage, apply the product as a powder and work it into the affected area, repeating until all leaks have been completely infilled. Work from top to bottom.

Waterproofing of basement walls and tanks

The existing coatings must be controlled, clean and mechanically sound and adherent.
In case of poor adhesion to the substrate, they must be removed.
Any holes or irregularities of the substrate must first be repaired with suitable Kimia products.
In the case of degraded substrated check the depth of degradation and repair. The concrete castings, properly seasoned, must be structurally sound (tensile pull off resistence > 1.5 MPa).
To remove dust, existing coatings, grease, rust, release agents, paint, cement laitance and any other substance or material which may affect the adhesion of subsequent coatings, clean the substrate thoroughly by sandblasting.
Saturate the substrate with water. Excess water must evaporate off, so that the substrate is saturated and the surface is dry (s.s.d. condition). Compressed air may be used to speed up this process.
The connections between walls and floor, joints, collection wells will be repaired and waterprooved applying **Kimicover JOINT** or **Kimicover JOINT P**.

- Mix **Betonfix 300** for about 5 minutes with water or **Kimitech ELASTOFIX**. Apply by brush, trowel or airless spray pump a first coat of the product. On wet place the reinforcing fabric **Kimitech 350** and pour additional waterproofing agent over the net to finish the waterproofing.
- After 24 - 48 hours, apply by roller an additional coat of Betonfix 300.

Waterproofing of drinking water tanks

The existing coatings must be controlled, clean and mechanically sound and adherent.
In case of poor adhesion to the substrate, they must be removed.
Any holes or irregularities of the substrate must first be repaired with suitable Kimia products.
In the case of degraded substrated check the depth of degradation and repair. The concrete castings, properly seasoned, must be structurally sound (tensile pull off resistence > 1.5 MPa).
To remove dust, existing coatings, grease, rust, release agents, paint, cement laitance and any other substance or material which may affect the adhesion of subsequent coatings, clean the substrate thoroughly by sandblasting.
Saturate the substrate with water. Excess water must evaporate off, so that the substrate is saturated and the surface is dry (s.s.d. condition). Compressed air may be used to speed up this process.
The connections between walls and floor, joints, collection wells will be repaired and waterprooved applying **Kimicover JOINT** or **Kimicover JOINT P**.

- Mix **Betonfix 300** for about 5 minutes with water or **Kimitech ELASTOFIX**. Apply by brush, trowel or airless spray pump a first coat of the product. On wet place the reinforcing fabric **Kimitech 350** and pour additional waterproofing agent over the net to finish the waterproofing.
- After 24 - 48 hours, apply by roller an additional coat of Betonfix 300.
- before applying the epoxy finishing certified for contact with drinking water, wait for the complete seasoning of the waterproofing (at least 7 days). In case of closed tank, ensure a proper air circulation with cooling fan.
- **Kimitech K40 AP** can be applied with brush, roller, or airless gun in at least 2 coats.
- The second coat must be applied within the time stated in the TDS of the products.

Resin floorings

Decorative coatings

On properly prepared substrates, apply the primer **Kimicover FIX MV** and lay the **Kimitech 350** net. After maximum 12 hours, apply a first coat of maximum 1 mm thickness of **Kimifloor ECO-BASE** mixed with Kimifill aggregates (in case of dump substrates, for this step use Kimitech ECF).
Subsequent coats shall be applied after the surface has been sandpapered, cleant and primed with **Kimitech K60**. Depending on aggregates added and technique of application of the product, different textures will be made.
The finishing of the system is achieved by applying 2 coats of the one-component polyurethane resin **Kimifloor ECO-FINITURA** (it can be pigmented for special chromatic effects) and a final coat of two-component water based polyurethane finishing **Kimifloor FINITURA ECO-PLUS**.

Self-levelling coatings

Self-levelling coatings must be applied on cement screeds properly seasoned and structurally sound (tensile pull-off resistence > 1.5 MPa), after a proper surface preparation (with a shot blast-cleaning machines or a scarifier in case of substrates polluted with oils, grease, etc). In case of degraded substrates check the depth of degradation and repair.
On perfectly dry surfaces, apply the primer **Kimicover FIX** by brush or roller.
After maximum 4 hours, apply one of the following products:

- **Betonfix FONDO**, is a cement-based self levelling mortar, suitable for residential uses;
- **Kimitech ECF**, 3-component epoxy-cementitious tixothropic product, used to level the substrate prior the application, after maximum 24 hours, of the self-levelling 3-component epoxy-cementitious product **Kimitech ECA**;
- **Kimitech HLA**, 2-component epoxy resin (available in different RALs), suitable for every type of use (industrial applications included) on substrates provided with water-vapour barrier. The product will be applied in 2 coats (second coat after maximum 24 hours from first one). For the first levelling coat, Kimitech HLA will be mixed with 100% aggregates **Kimifill** 0,1-0,3 to get a tixothorpic consistency.

Varnishing and protection of Betonfix FONDO and Kimitech ECA self-levelling coating will be done with polyurethane or epoxy varnishings. Kimitech HLA self-levelling coats do not need further finishings.

Polyurethane varnishings

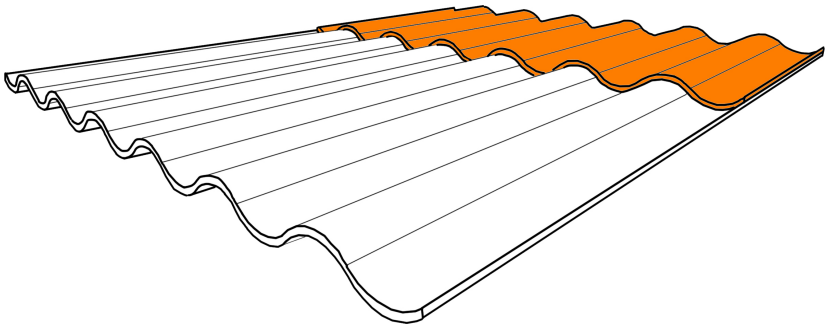
(This cycle can be applied only in case of substrates with water-vapour barrier)

Clean the substrate with a single-disc concrete grinder (Blastrac BGS-250 or similar) & using the acid cleaner "**Soluzione P**" in order to chemically roughen the medium, opening the porosities. Afterwords, clean the surface with water and remove the dirty water with a liquid-hoover.
On perfectly dry surfaces, apply **Kimicover 301 NF** (different RALs on request) by brush or roller.
To prepare the 2-component varnishing, mix resin and hardener with a low-speed stirring device, add **Solvente EPOX** (20% on the weight of Kimcover 301 NF for the first coat, 5% for subsequent coats), and continue mixing to gain an omogeneus amalgam.
In case an anti-slippery surface is needed, spread on the first coat of Kimicover 301 NF, when it is still wet, 0,1 Kg/sqm of Kimifill 1F or Kimifill 0,1-0,3 (choose among the 2 depending on the antislip class needed).
Subsequent coats must be applyed after at least 8h from previuos ones and within 24h. In case it is not possibile to apply the subsequent coat within 24h, it is compulsory to sandpapaer the surfaces, hoover them and then apply the finishing.

Epoxy varnishings

Clean the substrate with a single-disc concrete grinder (Blastrac BGS-250 or similar) & using the acid cleaner "**Soluzione P**" in order to chemically roughen the medium, opening the porosities. Afterwords, clean the surface with water and remove the dirty water with a liquid-hoover.
On perfectly dry surfaces, apply the primer **Kimicover FIX** by brush or roller.
After maximum 4 hours, apply at least two coats of epoxy varnishing **Kimitech K40 NF**. If higher mechanical resistences and easiness of cleanability is required, it is possible to apply a finishing coat of transparent polyhuretane resin **Kimifloor ECOFINITURA**, **Kimifloor ECOFINITURA PLUS** or **Kimicover 301 NF**.
In case an anti-slippery surface is needed, spread on the first coat of Kimicover 301 NF, when it is still wet, 0,1 Kg/sqm of Kimifill 1F or Kimifill 0,1-0,3 (choose among the 2 depending on the antislip class needed).
Subsequent coats must be applyed after at least 8h from previuos ones and within 24h. In case it is not possibile to apply the subsequent coat within 24h, it is compulsory to sandpapaer the surfaces, hoover them and then apply the finishing.

Asbestos treatments



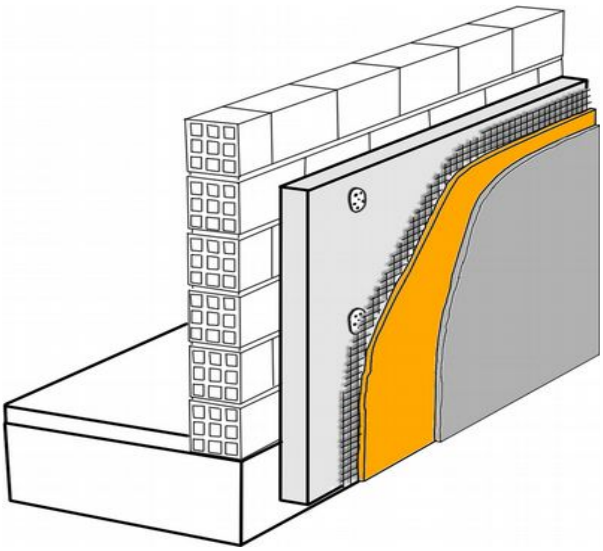
Encapsulation without removal

The installation of the products will be carried out with suitable equipment, by qualified personnel. Clean the substarte to remove dust, grease, old paints. Apply the two-component primer **Kimicover FIX** to compact the asbestos.
After 6-36 hours, apply by airless pump, brush or roller the acrilic resin **Kimicover BLINDO**.
Depending on the exposure of the surface (outdoor or indoor) the encapsulation resin will be applied in 1 or 2 coats (in this case, second coat will have a different color from the first one).

Removal

To encapsulate asbestos cement elements in order to eliminate the dispersion in the air of fibres during removal treatments, apply by airless pump the encapsulating resin **Kimitech K80**.

Thermal insulations



External thermal isolation composite systems

To glue insulating panels for external insulation systems, apply 3.5- 4.5 kg/m² (depending on the substrate's planarity) of **Betonfix RS** to the outer rims of the panel and to the fixing points in the central areas, ensuring that the product does not overspill onto the joints between the insulating panels during installation.
To finish the interventions, apply a coat of Betonfix RS so as to form a first layer of 1-2 mm thickness (2 - 2.5 kg/m²). After application and before the product sets, lay the 160 g/m² reinforcing mesh, being careful to fully embed it in the base layer. After the first layer has set, apply a second layer of Betonfix RS about 1-1.5 mm thick. At least 1.5-2 kg/m² must be used for this second coat.

Kimia

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