KA-Bond SBR
Technical Data Sheet

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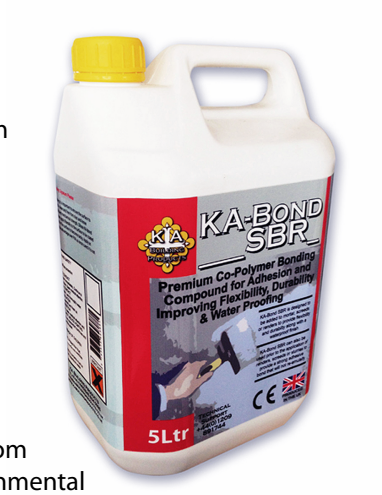

KA-Bond SBR
Description
KA-Bond SBR is a water-based non-ionically stabilized hydrolysis-resistant dispersion of a carboxylated styrene-butadiene copolymer. The dispersion contains an antioxidant, antifoam and is freeze stable.
Applications
KA-Bond SBR is used for modification of hydraulic binders in common applications including repair mortar, rendering, bonding, in mineral sealing slurries and bitumen emulsions and as cement based adhesive. KA-Bond SBR is well compatible with most of the hydraulic binders. Even at higher temperatures (> 25°C) the addition of KA-Bond SBR prevents a premature stiffening of the mortar. The air content of the mortar modified by KA-Bond SBR is in the medium range.
Storage and Handling
KA-Bond SBR must be stored in closed containers between + 5° and + 35°C and protected from frost and direct sunlight. Detailed information is available on request. Information on environmental and hazard data may be taken from the material safety data sheet. KA-Bond SBR is not classified as dangerous according to EC Directive 88/379/EEC and requires no special labelling.

KA-Bond SBR IN PRIMER SYSTEMS
Regarding KA-Bond SBR when used with cement as part of a primer system or as a bonding agent.
The application of a primer/bond coat is recommended to obtain reliable adhesion of a subsequently applied render, repair mix or floor topping. In addition, site trials have shown that SBR can be very effective in improving the adhesion of plaster to difficult substrates.
Uses Suggested uses of KA-Bond SBR in primer systems:
Corrosion protection of steel Waterproofing General purpose building adhesives.
Bonding agent
Selection of materials The Portland cement should be fresh but cool, and cement containing air set lumps should not be used.

Preparation of surfaces
Before using a KA-Bond SBR based primer it is important to ensure that the surface to which it is to be applied is clean and free from dust and loose material, and has sufficient mechanical strength.
Preparation e.g. wire brushing
It is recommended that concrete or masonry surfaces are well dampened an hour or so before priming (unless already damp, e.g. basement walls) and should be damp but surface dry when the primer coat is applied.
Dampen surface
Coverage rate This will depend upon the SBR/cement ratio and the background. Typical coverage rate on rough concrete is 0.3 to 0.4 litres of SBR per m2 per coat.
When used as a coating, as opposed to a bonding agent, the thickness of each coat should not exceed 0.5mm to minimise the risk of cracking.

Mixing
Add the cement gradually to the SBR, stirring continuously. A slow speed electric drill fitted with a paddle is suitable.
Pot life The mix has a pot life of 2 hours at 20ºC.

Application
When used as a bonding agent below mortars, renders, screeds and toppings the priming mix must be vigorously brushed into the prepared background and the mortar, etc. applied while the priming coat is still wet or tacky, usually this should be within 20 minutes depending on conditions.
Cleaning of equipment All tools should be cleaned immediately after use with water because hardened primers have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit, used with coarse wire wool, help to remove partially hardened mixes.

Primer
Applications Consolidation of sandy and dusty substrates (cementitious floorings, underlayments etc.) Substrate preparation for renovation and coatings Priming of porous substrates, gypsum, limestone Substrate barrier for following layers such as self-levelling underlayments Work on site The substrate should be sound, free of dust and dry. Depending on the suction of the substrate it is enough to apply the primer one or two times with a dilution of 1:5 up to 1:8. The diluted dispersion can be applied by broom, brush or roller.
Recommendations KA-Bond SBR universal working temperature >+2°C [35F] flexible, high water vapour permeability
Cementitious primer, bonding aid
Formulation The optimal composition of a cementitious primer with KA SBR, depends very much on the intended application. Good adhesion properties are already achieved by adding diluted KA SBR to the used mortar. As a general rule a dilution factor of 1:1 to 1:3 can be used.
Guide formulation:
OPC (e.g. CEM I) - 1 vol.: sand (1-2 mm) - 1 vol.: KA-Bond SBR - 1 vol.
Work on site
The substrate has to be sound and stable. Surface contaminations, e.g. oil, rubber and flaking paint, should first be removed. Before applying the bonding agent, the surface should be thoroughly wetted with clean water for several hours. The surface should be free of glistening water, when the primer is applied. The following mortar layer should be laid, while the primer still is "tacky", but not yet completely dried. Recommendation - KA-Bond SBR
Rendering
This information sheet is concerned with the use of KA-Bond SBR in rendering.
Adding KA-Bond SBR to a render mix gives the following advantages:

- A reduction in water permeability
- Increased crack resistance
- Greater protection against carbonation
- Improved durability
- KA-Bond SBR has a long and successful track record in the construction industry.

Selection of materials to obtain maximum performance from mixes modified with KA-Bond SBR
It is important that attention is paid to the choice of the other materials used. Sand should be well washed and sharp. Cement: Portland, High Alumina and sulphate resisting cements are compatible with KA-Bond SBR. Masonry cement may lead to excessive air entrainment in KA-Bond SBR mixes. The cement should be fresh, cool and free of lumps.
If lime is used in the mix, it should not exceed 25% of the cement by volume.
Air entraining agents should not be used.
Preparation of surfaces
Before using a KA-Bond SBR modified mortar or concrete it is important to ensure that the surface to which it is to be applied is clean and free from dust and loose material and that the structure has sufficient mechanical strength.
Walls should be wire-brushed and any old paint etc. removed. All contaminants such as oil, grease, or any surface laitance must be removed to ensure adequate development of bond when the render is applied.
Primers
A primer coat is recommended to obtain maximum adhesion of the render.
The optimum proportions of cement, sand and KA-Bond SBR depend upon the background, application and properties required.
Coverage rates as a rough guide, 1 litre of SBR will cover 1m2 at a 15mm thickness.
Mixing procedure for renders containing KA-Bond SBR is similar to that used for conventional compositions, with gauging water being partly replaced by the SBR and mixing minimised to limit air entrainment.
Mixing should preferably be carried out in a forced action mixer. The usual procedure is to premix sand and cement in the mixer, add the SBR, mix for 1 to 2 minutes, and then slowly add water to the required consistency.
NB. Over addition of water causes rapid thinning of SBR modified mortars owing to the plasticising effect of the SBR.
Pot Life The mix has a pot life of approximately 1 hour at 20ºC and batch size should be calculated accordingly.

Application
Apply render onto wet or tacky primer. The first coat should be limited to a thickness of approximately 7mm.
Scratch the surface and leave to set before applying the second coat of similar thickness to the first.
For added protection, allow first coat of render to dry overnight and then apply a second coat of primer. While this is still wet or tacky, apply the second coat of render.
The final coat should be trowelled/floated to a smooth finish as the work proceeds.
In severe drying conditions a render should be kept damp for 2 days to allow the cement to cure.
Cleaning of equipment All tools should be cleaned immediately after use with water because hardened SBR modified renders have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit used with coarse wire wool help to remove partially hardened mortar.

Rendering
Example 1 Standard rendering over moderately strong backgrounds, e.g. typical brickwork. O.P.C. 1-part Moist sand 4.5 parts KA-Bond SBR 0.2 parts (i.e. 10 litres of SBR per 50kg of cement) Water as required
Example 2 Waterproof rendering above ground, over strong backgrounds, e.g. dense concrete and also for carbonation protection. O.P.C. 1-part Moist sand 3 parts KA-Bond SBR 0.28 parts (i.e. 14 litres of SBR per 50kg of cement) Water as required
All parts are by volume of un-compacted material.

IMPROVING THE PERFORMANCE OF EXTERNAL RENDERING WITH KA-Bond SBR
KA-Bond SBR and cement work harmoniously together to form a powerful double binding system which has many uses in the Construction Industry. It enables plastering contractors to give their clients tough, durable and well bonded interior and exterior render coats.
Primer mix design
The optimum proportions of cement and KA-Bond SBR depend upon the background, application and properties required. The following is a typical example:
O.P.C. 1 to 2 parts SBR 1 part
All parts are by volume.
The level of cement may be varied to obtain the required consistency.
MORTAR REPAIR SYSTEMS / RECONSTRUCTION OF CONCRETE
Applications - Substrate preparation
- Primer slurries / Bonding aid (1)
- Cement-based corrosion protection (2)
- Repair mortars
(1) In order to ensure a good adhesion of PCC (Polymer Cement Concrete), repair mortars and floor screeds to the substrate, a bonding aid is absolutely necessary. KA-modified cement slurries have a good track record for this application.
(2) KA-modified cement slurries are increasingly used for the corrosion protection of reinforcing steel during the repair of concrete, because they give excellent corrosion protection to the steel and also bond well to the concrete.
Substrate preparation
Application
• consolidation of sandy or dusty surfaces (plaster or cement flooring)
• preparation of substrate for repair and coating
• preparation of porous substrates, gypsum substrates, chalk and mineral colour coatings
• sealing of substrates prior to application of a following layer, for example self-levelling floors

Method of use
The substrate should be sound, free from dust and as dry as possible. Depending on the absorbing capacity of the substrate a one or two-layer coating of Lattices diluted in a ratio of 1:5 up to 1:8 with water is sufficient. The diluted polymer dispersion is applied by broom, brush or roller.
- application at working temperatures < 2°C
- forms a flexible, water vapour permeable coating with good wet adhesion

PRIMER SLURRIES / BONDING AID
Composition The composition of the KA-modified cement slurries depends on the particular application. Good bonding characteristics are achieved by slurries made from the mortar which is modified by the addition of diluted Lattices. Normally the KA- dispersion diluted with water in a ratio 1:1 up to 1:3 is used as gauging liquid. On the building site primer slurries are usually made according to the following formulation.
Formulation of the primer slurry
Cement 1 pbv: Sand 1-2 pbv: KA-SBR 0.5-1 pbv
pbv = parts based on volume
Application The substrate has to be prepared in accordance with good practice and has to be wetted or coated with a diluted SBR primer! The primer slurry is applied by brushing onto the slightly damp substrate. The following layer of mortar is applied onto the primer slurry while it is still wet.

Cement-based corrosion protection
Advantages against conventional coatings for corrosion protection

- low cost
- application on damp surfaces possible
- easy to apply • environmentally friendly
- excellent adhesion of the repair mortar without the need for coating with sand
- high elasticity

Composition
Similar to making primer slurries for adhesion, filler and KA-dispersions are mixed together to form a homogeneous slurry.
Guide formulation Portland cement 32,5 R 130 pbw* KA-SBR 100 pbw (pot life max. 4 h)
* pbw = parts based on weight
Application
The cement-based corrosion protection slurry is made just before use using suitable mixing equipment. The surface of the steel to be coated must be free from rust and dirt. The corrosion protection slurry is applied in a minimum of 2 coats by brushing to a total thickness of 700-1000 µm.
Repair mortars Improved properties by addition of Lattices

- improved workability at reduced water demand
- improved and homogeneous coverage of the aggregates
- increase of water retention capacity
- higher early strength development
- improved adhesion of mortars
- increase of flexibility and reduction of the E-modulus
- improvement of the ratio flexural-compressive strength by increasing flexural strength
- reduction of the permeability to gases and liquids
- reduced shrinkage • increase of abrasion resistance
- improved resistance against aggressive media
- excellent resistance against freeze/thaw-cycles and de-icing salts

Typical properties Repair mortars modified by Lattices have the following characteristics:

- reduced water/cement ratio
- up to 100% increased flexural strength
- fast development of mechanical strength, even at lower temperatures
- adhesion strength up to 4 N/mm^2
- freeze/thaw-salt resistance > 50 cycles
- approx. 50% reduction in shrinkage
- up to 50% reduction in modulus of elasticity (E-modulus < 17000 N/mm^2)
- resistant against saponification, no loss in mechanical strength after storing in calcium
- hydroxide solution

KA-Bond SBR CONCRETE REPAIRS
This information is concerned with the use of KA-Bond SBR in patch repairs of reinforced concrete.
The information given here is suitable for small repair projects. KA-Bond SBR is also suitable for use on larger projects, but these should be considered individually by specialist concrete repair companies.
Uses Use of KA-Bond SBR in the concrete repair system gives the following advantages:

- Improved adhesion to background Corrosion protection of the steel
- Improved crack resistance Reduced thermal stresses because the coefficient of thermal expansion is similar to that of unmodified concrete
- Protection of background concrete from carbonation
- Improved durability
- KA-Bond SBR has a long and successful track record of use in the construction industry

Diagnosis It is important to establish the reasons for concrete failure prior to remedial action. If the problem has been caused by, for example, chlorides, porous concrete or inadequate cover to steel, areas which appear undamaged may deteriorate at a later date.

Primer New mortar
Selection of materials to obtain maximum performance from mixes modified with KA-Bond SBR it is important that attention is paid to the choice of other materials used.
Sand should be well washed and sharp. The grade of sand will depend upon the thickness of each layer to be applied. Cement Portland, High Alumina and sulphate resisting cements are compatible with KA-Bond SBR. Masonry cement may lead to excessive air entrainment in KA-Bond SBR mixes. Portland cement should be fresh but cool.
Cement containing air set lumps should not be used.
Air entraining agents should not be used.
Other additives should only be used after seeking further advice from KA Ltd.

Preparation of surfaces
Removal of unsound concrete
Clean back mechanically to good sound concrete, preferably behind any exposed steel reinforcement. The concrete should be cut back so that the mortar can be applied to a thickness of at least 5mm at the edges of the repair to avoid feather edging. Provide at least 10 mm of cover to the reinforcement.
Preparation
• Depending on the size of the repair, abrasive blasting or wire brushing of steel is then necessary. • The steel should be washed with clean water and allowed to dry. Chemical cleaners and rust treatments should not be used.
Note: If corrosion of steel appears excessive, an engineer's opinion should be sought.

Priming Steel
• Brush primer coat on to the steel and allow to dry. This coat should be applied within 24 hours of preparation of the old concrete and steel.
Brush
• 16 - 36 hours after application of first primer coat to the steel dampen surface of background concrete and allow to surface dry.
• Brush second coat of primer on to steel and background.

Apply mortar
• • Whilst second coat of primer is still wet or tacky, apply the repair mortar, making sure that it is well packed behind exposed steel. NB. The second coat of primer will only remain tacky for about 20 minutes depending upon ambient conditions.
• Where conditions require more than one layer of mortar, scratch surface of first layer and leave to just set before applying the second coat of similar thickness to the first.
• For added protection, allow first layer of mortar to dry overnight and then apply a coat of primer. While this is still wet or tacky, apply the second coat of mortar.

Smoothing Off
• The final coat should be trowelled/floated to a smooth finish as the work proceeds.
• In severe drying conditions a repair should be kept damp for 2 days to allow the cement to cure.
• A surface coating may then be applied over the whole area when the moisture content of the mortar is sufficiently low.
Notes: 1. If the final cover to the steel will be less than 10 mm, another type of mortar may be considered, e.g. epoxy. 2. Epoxy primers may be more suitable where a long open time is needed, e.g. for shuttering. However, the steel will need a much higher standard of cleaning, or a layer of SBR primer may be applied before using the epoxy primer.
Cleaning of equipment All tools should be cleaned immediately after use with water because hardened synthetic SBR modified repair mixes have excellent adhesion and are therefore difficult to remove. Solvents such as white spirit used with coarse wire wool help to remove partially hardened mortar.
Other applications Information sheets are available which describe the use of KA-Bond SBR in priming, rendering and flooring applications.

KA-Bond SBR CONCRETE REPAIRS
Mix designs Primer Mix The mix design for the primer coats can be found in the separate sheet on primer systems.
Mortar Mix The following mortar mix is suitable for most repairs to concrete with a compressive strength greater than 25N/mm 2 and where cover to the steel is above 15mm.
O.P.C. 1-part Moist sand 2.5 parts SBR 0.2 parts (i.e. 10 litres of SBR per 50-kg bag of cement) Water as required
All parts are by volume of uncompacted material.
Note: The SBR level should be increased to 0.3 parts in the following cases:
if the background concrete contains chlorides
ii) if the final cover to steel will be 10 - 15mm
iii) in conditions of severe exposure.
Coverage rate In the above mix a 50-kg bag of cement with 125-kg of sand will yield approximately 0.08m3 of mix.
Mixing procedures for repair mortars containing KA-Bond SBR are similar to those used for conventional compositions, with gauging water being partly replaced by the SBR and mixing minimised to limit air entrainment.
Mixing should be carried out in a forced action mixer. The usual procedure is to pre-mix sand and cement in the mixer, pour in the SBR, mix for 1 - 2 minutes, and then slowly add water to the required consistency.
NB. Over-addition of water causes rapid thinning of SBR modified mortars owing to the plasticising effect of the SBR.
Pot life The mix has a pot life of approximately 30 minutes and batch size should be calculated accordingly.

The softness of the base polymer and the polymer type greatly influences the properties of the flexible cementitious membrane. The physical properties of some suitable KA grades are given below:
In most cases harder polymers give lower elongation. At the same softness SBR often yield slightly higher tensile strengths whereas acrylic based polymers tend to give slightly higher elongations.