Nitobond SBR

FOSROC constructive solutions

Polymer bonding aid and mortar additive

Uses

For improving and bonding concrete repair mortars, floor toppings and screeds, waterproof renders and cementitious slurries. Cementitious mortars are alkaline in nature and will protect embedded steel reinforcement. Mortars produced with **Nitobond SBR** may be used for horizontal, vertical and overhead repair work. **Nitobond SBR** may be used to form a bonding agent for slip bricks, ceramic tiles, etc.

Advantages

- Single component liquid can be easily gauged as required
- Improves cohesion and workability
- Improves mortars to provide waterproof repairs, renders and toppings which are highly resistant to freeze/thaw cycling
- Improved tensile and flexural properties allow thin applications
- Excellent bond to concrete, masonry, stonework, plaster and blockboard
- Contains no chloride admixtures

Standards compliance

Nitobond SBR complies with the requirements of the United Kingdom Water Fittings Byelaws Scheme Tests of Effect on Water Quality. Mortars made with **Nitobond SBR** have been tested and approved with the Hong kong Housing Authority Specification TM 1 to TM8 (1990) for Class 40 site mixed materials.

Description

Nitobond SBR is a modified styrene butadiene rubber emulsion which is supplied as a ready to use white liquid. It is designed to improve the qualities of site-batched cementitious mortars and slurries. Being resistant to hydrolysis, it is ideal for internal and external applications in conjuction with cement.

Technical Support

Fosroc offers a comprehensive range of high performance, high quality concrete repair and construction products . In addition, Fosroc offers a technical support service to specifiers, end-users and contractors, as well as on-site technical assistance in locations all over the world.

Design criteria

The application parameters for mortars modified by the use of **Nitobond SBR** will differ depending on the actual mix design used. Generally, however. **Nitobond SBR** mortars can be applied in sections up to 40 mm thickness in horizontal locations and up to 15 mm in vertical locations the thickness achievable in overhead locations without the use of formwork is largely dependent on the profile of the substrate. Vertical an overhead sections greater than those stated above may be built up in layers but may sometimes be possible in a single application dependent on the actual size and configuration of the repair area, and the volume of any exposed reinforcing steel. **Nitobond SBR** mortars should not be applied at less than 6 mm thickness. Thicknesses up to 40 mm in a single application can be achieved by the use of formwork. Consult the local Fosroc office for further information.

Properties

The results listed below were achieved by assessing the mechanical properties of a 3:1 sand:cement mortar containing **Nitobond SBR** in the proportions 10 litres per 50 kg cement against a 3:1 sand:cement control mortar. The test methods used were in full accordance with BS 6319 at 28 days - air cured.

Test method	Typical result	Control
Compressive strength (BS 6319, Pt 2:1983):	62 N/mm^2	46 N/mm^2
Tensile strength (ASTMC-190-85):	3.3 N/mm^2	2.7 N/mm^2
Flexural strength (BS6319,Pt3: 1983):	9 N/mm^2	7.9 N/mm^2
Slant shear bond (BS6319,Pt4: 1984):	53 N/mm^2	11 N/mm^2
Chemical resistance:	Cementitious materials have limited chemical resistance. The addition of **Nitobond SBR** to cement mortars reduces permeability and therefore helps reduce the rate of attack by aggressive chemicals, acid gases and water.	

Nitobond SBR

Specification clauses

Polymer bonding aid and mortar additive

The polymer bonding aid and site-batched mortar shall be modified by the use of **Nitobond SBR,** a single component styrene butadiene rubber emulsion.

Application instructions

Preparation

Saw cut or cut back the extremities of the repair locations to a depth of at least 10 mm to avoid feather-edging and to provide a square edge. Break out the complete repair area to a minimum depth of 6 mm up to the sawn edge.

Clean the surface and remove any dust, unsound or contaminated material, plaster, oil, paint, grease, corrosion deposits or algae. Where breaking out is not required, roughen the surface and remove any laitance by light scabbling or grit-blasting.

Oil and grease deposits should be removed by steam cleaning, detergent scrubbing or the use of a proprietary degreaser. The effectiveness of decontamination should then be assessed by a pull-off test.

Expose fully any corroded steel in the repair area and remove all loose scale and corrosion deposits. Steel should be cleaned to a bright condition paying particular attention to the back exposed steel bars. Grit-blasting is recommended for this process.

Where corrosion has occurred due to the presence of chlorides, the steel should be high-pressure washed with clean water immediately after grit-blasting to remove corrosion products from pits and imperfections within its surface.

Reinforcing steel priming

Apply one full coat of Nitoprime Zincrich to any exposed steel reinforcement and allow to dry before continuing. If any doubt exists about having achieved an unbroken coating, a second application should be made and, again, allowed to dry before continuing.

Substrate priming

The substrate should be thoroughly soaked with clean water and any excess removed prior to commencement. A slurry primer should be prepared consisting of 1 volume **Nitobond SBR** to 1 volume clean water to 3 volumes fresh cement. To obtain a smooth consistency, the cement should be blended slowly into the premixed liquids. The slurry primer should be stirred frequently during use to offset settlement.

The slurry primer should be scrubbed well into the surface of the concrete. Avoid applying to thickly and avoid 'puddling'. The repair mortar, topping or render must be applied on to the wet slurry primer. If the slurry primer dries before application of the mortar, it must be removed and the area reprimed before continuing.

In exceptional circumstances, e.g. where a substrate/repair barrier is required or where the substrate is likely to remain permanently damp, Nitobond EP bonding aid should be used. Contact the local Fosroc office for further information.

Mixing

Care should be taken to ensure that **Nitobond SBR** mortars are thoroughly mixed. A forced-action mixer is essential. Mixing in a suitably sized drum using an approved spiral paddle in slow speed (400/500 rpm) heavy-duty drill is acceptable for occasional use.

A wide range of mix designs is achievable using **Nitobond SBR.** Typical designs are detailed below:

1. Patching and repair mortar (HKHA Class 40 mix):
50 kgs Ordinary Portland Cement
125 kgs grade Zone 2 sharp sand
9 litres **Nitobond SBR**
14 litres (approximately) clean water
Recommended thickness: 6 mm to 40 mm.
(mix design is based upon oven dried sand. Adjustments should be made to the water demand, relative to the moisture content)

2. Heavy-duty floor screed:
50 kgs Ordinary Portland Cement
75 kgs 3 to 6 mm granite chips
75 kgs grade C/M sharp sand
10 litres **Nitobond SBR**
6 litres (approximately) clean water.
The screed should be of semi-dry cohesive consistency.
Recommended thickness: 10 mm to 40 mm.

3. Render:
50 kgs Ordinary Portland Cement
150 kgs grade C/M sharp sand
10 litres **Nitobond SBR**
6 litres (approximately) clean water
The render should be of a semi-dry cohesive consistency.
Recommended thickness : 6 mm to 9 mm.

4. Bonding mortar for slip bricks, tiles, etc:
50 kgs Ordinary Portland Cement
125 kgs grade C/M sharp sand
10 litres **Nitobond SBR**
7 litres (approximately) clean water
Water is adjusted to give a firm mortar. For fine joints, use grade M/F sand. Support where necessary until the mortar is set. Recommended thickness: 6 mm to 40 mm.

Note that these mix designs are based on the use of dry sand and aggregate. Adjustments must be made to the water demand relative to the moisture content of the sand and aggregate used. It should also be noted that, due to the frequent inconsistencies of site-stored materials and variable conditions, actual results may differ from those published above.

Weigh the cement, sand and, where required, aggregate into the mixer and dry blend together for one minute. With the machine in operation, add the pre-mixed **Nitobond SBR** and clean water. Continue mixing for 3 minutes to ensure complete dispersal into the sand and cement. Make any small adjustment to the quantity of clean water but do not significantly exceed the literage shown above. Additional water should be kept to a minimum. Continue mixing up to a maximum of 5 minutes until a smooth and fully homogeneous consistency is achieved with the required workability and application properties. It is critical that allowance is made for the moisture content of the sand and aggregate, particularly where they are stored on site.

Application

For application to all surfaces, **Nitobond SBR** mortars, toppings and renders must be well-compacted on to the primed substrate by trowel. It is frequently beneficial to work a thin layer of the mortar into the slurry primer and then build the mortar on to this layer. Exposed steel reinforcement should be completely encapsulated by the mortar.

Nitobond SBR mortars can be applied at a minimum thickness of 6 mm and up to 40 mm thickness, dependent on the location and configuration of the repair zone. The thickness achievable in overhead locations without the use of formwork is largely dependent on the profile of the substrate. Refer to the recommended thicknesses shown in the 'Mix design' section above. If the recommended thickness is exceeded and sagging occurs, the affected section must be completely removed and reapplied in accordance with the procedure described above. The use of formwork may facilitate achieving the required build. If formwork is used, it should have properly sealed faces to ensure that no water is absorbed from the repair material.

Where thicker sections up to a total thickness of 40 mm are to be built up by hand or trowel application, the surface of the intermediate layers should be scratch-keyed and cured with **Nitobond AR.** Application of the slurry primer and a further application of **Nitobond SBR** mortar may proceed as soon as this layer has set.

Finishing

Nitobond SBR mortars can be finished with a steel, plastic or wood float, or by a damp sponge technique, to achieve the desired surface texture. The completed surface should not be overworked.

Low temperature working

In cold conditions down to 5°C, the use of warm water (up to 30°C) is advisable to accelerate strength development. Normal precautions for winter working with cementitious materials should then be adopted.

High temperature working

At ambient temperatures above 35°C, the material should be stored in the shade and cool water used for mixing.

Curing

Nitobond SBR mortars, toppings and renders are cement based. In common with all cementitious materials, they must be cured immediately after finishing in accordance with good concrete practice. The use of Nitobond AR or Concure 90 Clear, sprayed on to the surface of the finished mortar in a continuous film, is recommended. In harsh drying conditions, supplementary curing with polythene sheeting must be used.

Overcoating with protective decorative finishes

Nitobond SBR mortar repairs are extremely durable and will provide exellent protection to the embedded steel reinforcement within the repaired locations. The surrounding parts of the structure will generally benefit from the application of a barrier/decorative coating to limit the advance of chlorides and carbon dioxide, thus bringing them up to the same protective standard as the repaire itself. Forsoc recommend the use of the Dekguard range of protective, anti-carbonation coatings. These products provide a decorative and uniform appearance as well as protecting areas of the structure which might otherwise be at risk from the environment. Dekguard products may be applied over the repair area without prior removal of the Nitobond AR curing membrane. Concure 90 Clear curing membrane must be removed prior to the application of Dekguard products. This is best achieved by light grit or sand-blasting.

Nitobond SBR

Cleaning

Nitobond SBR and Nitobond AR should be removed from tools, equipment and mixers with clean water immediately after use. Cured material can only be removed mechanically.

Equipment used with Nitoprime Zincrich and Nitobond EP should be cleaned with Forsoc Solvent 102. Equipment used with Concure 90 Clear should be cleaned with Fosroc Solvent 103.

Limitation

Nitobond SBR mortars, toppings and renders should not be applied when the temperature is below 5°C and falling. Neither should they be exposed to moving water during application. Exposure to heavy rainfall prior to the final set may result in surface scour. If any doubts arise concerning temperature or substrate conditions, consult the local Fosroc office.

Estimating

Supply

Nitobond SBR:	25 and 210 litre drums
Nitoprime Zincrich:	1 litre cans
Nitobond EP:	4.5 kg packs
Nitobond AR:	5 litre drums
Concure 90 Clear:	25 and 200 litre drums
Fosroc Solvent 102:	5 litre cans
Forsoc Solvent 103:	25 litre drums

Coverage and yield

Nitobond SBR:	Refer to mix designs
Nitobond SBR (as slurry primer):	Approximately 2 to 3 m^2/litre
Nitoprime Zincrich:	7.4 m^2/litre
Nitobond EP:	10 to 11.5 m^2/pack
Nitobond AR:	6 to 8 m^2/litre
Concure 90 Clear:	4 to 5 m^2/litre

Notes: the actual usage per drum of **Nitobond SBR** will depend on the mix design used. The coverage figures for liquid products including the **Nitobond SBR** slurry primer are theoretical - due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

Storage

Shelf life

All products have a shelf life of 12 months if kept in a dry store in the original, unopened bags or packs.

Storage conditions

Store in dry conditions in the original, unopened bags or packs. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced. **Nitobond SBR** and Nitobond AR should be protected from frost.

Precautions

Health and safety

Cementitious mortars and slurries modified with **Nitobond SBR** contain cement powders which, when mixed or become damp, release alkalis which can be harmful to the skin. During use, avoid inhalation of dust and contact with skin and eyes. Wear suitable protective clothing, gloves, eye protection and respiratory protective equipment. The use of barrier creams provide additional skin protection. In case of contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately - do not induce vomiting.

Nitoprime Zincrich, Nitobond products, Concure 90 Clear and Fosroc Solvents 102 and 103 should not come in contact with the skin and eyes, or be swallowed, Ensure adequate ventilation and avoid inhalation of vapours. Some people are sensitive to resins, hardeners and solvents.
Wear suitable protective clothing, gloves and eye protec - tion. If working in confined areas, suitable respiratory protective equipment must be used. The use of barrier creams provide additional skin protection. In case of contact with skin, rinse with plenty of clean water, then cleanse with soap and water. In case of skin contact with Nitoprime Zincrich, Nitobond EP and Concure 90 Clear, remove immediately with resin removing cream followed by washing with soap and water. Do not use solvent. In case of contact with eyes, rinse immediately with plenty of clean water and seek medical advice. If swallowed, seek medical attention immediately - do not induce vomiting.

Nitobond SBR

Fire

Nitobond SBR, Nitobond AR and Nitobond EP are non-flammable.

Nitoprime Zincrich, Concure 90 Clear and Fosroc Solvents 102 and 103 are flammable. Keep away from sources of ignition. No smoking. In the event of fire, extinguish with CO_2 or foam. Do not use a water jet.

Flash points

Nitoprime Zincrich:	16°C
Concure 90 Clear:	40°C
Fosroc Solvent 102:	33°C
Fosroc Solvent 103:	40°C

For further information, refer to the Product Material Safety Data Sheet.

Additional information

Nitobond SBR was formerly known as Cebond LX.

Fosroc manufactures a wide range of products specifically designed for the repair and refurbishment of damaged reinforced concrete. This includes hand-placed and spray grade repair mortars, fluid micro-concretes, chemical resistant epoxy mortars and a comprehensive package of protective coatings. In addition, a wide range of complementary products is available. This includes joint sealants, waterproofing membranes, grouting, anchoring and specialised flooring materials.

Fosroc have also produced several educational training videos which provide more detail about the mechanisms which cause corrosion within reinforced concrete structures and the solutions which are available to arrest or retard these destructive mechanisms. Further information is available from the publication: 'Concrete Repair And Protection - The Systematic Approach', available in seven.

Nitobond SBR

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Important note

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