Nitomortar® PE

constructive solutions

High strength jointing and multi-purpose repair compounds

Uses

For fast and emergency reinstatement of concrete, bedding, jointing and reprofiling of concrete, masonry and brickwork. Nitomortar PE is ideally suited for the repair and reprofiling of precast concrete units, damaged arrises and treads. It can be used to infill hollows and holes in concrete floors, bedding and fixing kerbstones, manhole sets, frames, brick slips, ceramic tiles, slabs and coping stones. Nitomortar PE Concrete should be used to repair larger voids. The products are especially useful where fast strength gain is important. When properly compacted, they are highly impermeable.

Advantages

- Fast development of strength minimises disruption - stronger than concrete within 2 hours
- No primer required - excellent bond to a wide variety of substrates
- High chemical and oil resistance
- Extremely versatile - can be poured, trowelled or modified with aggregate without significantly affecting setting times or strengths
- Extremely low wastage due to ability to mix part packs to consistencies required
- Will cure under damp or wet conditions and can be used down to 0°C
- Pre-weighed components ensure consistency

Description

Nitomortar PE products are based on a polyester resin system. There are two grades:

Nitomortar PE - for general purpose use;

Nitomortar PE Concrete - a special grade allowing users to add suitable aggregate, thereby substantially reducing the cost of infilling larger voids.

Winter versions of both products are available which are faster setting at low ambient temperatures. Both grades of Nitomortar PE are supplied as two-component products with pre-weighed quantities of liquid resin and powdered hardener, ready for on-site mixing and use. The hardener system enables the mix to be varied from a pourable consistency to a trowellable mortar without significantly affecting the setting times or strengths achieved. This makes the product extremely reliable in use.

Design criteria

The following guidelines should be used:

	Nitomortar PE	Nitomortar PE Concrete
Maximum thickness	: 12 mm	40 mm
Minimum thickness	: 5 mm	5 mm*
Maximum plan area	: 0.25 m^2	0.50 m^2
Maximum linear run	: 1 m	1 m

Greater thicknesses should be built up in layers and larger areas should be applied in a ‘chequerboard’ fashion. Consult the local Fosroc office for further information.

***Note:** When using aggregate larger than a sand grading, the minimum thickness will be increased. Consult the local Fosroc office for further information.

Properties

General

Bond strength: Nitomortar PE forms a strong bond to most structural materials provided the surfaces are suitably prepared. The resulting bond between Nitomortar PE and concrete will be stronger than the tensile strength of the concrete itself.

Shrinkage: The polyester resin used in Nitomortar PE is formulated to reduce shrinkage to a minimum. Linear shrinkage will be approximately 0.8%. No further shrinkage will occur after the material has cured.

Durability: Cured Nitomortar PE performs under temperatures as high as 60°C and down to sub-zero conditions.

Chemical resistance: Fully cured Nitomortar PE is unaffected by water, petrol, oil and most corrosive chemicals. It is not recommended for use in contact with ketones, phenols, strong alkalis and oxidising agents. Because chemical resistance can be affected by external variable factors (e.g. temperature), the local Fosroc office should be consulted for specific applications.

Underwater use: Nitomortar PE will cure under water. The local Fosroc office should be consulted when considering this type of application.

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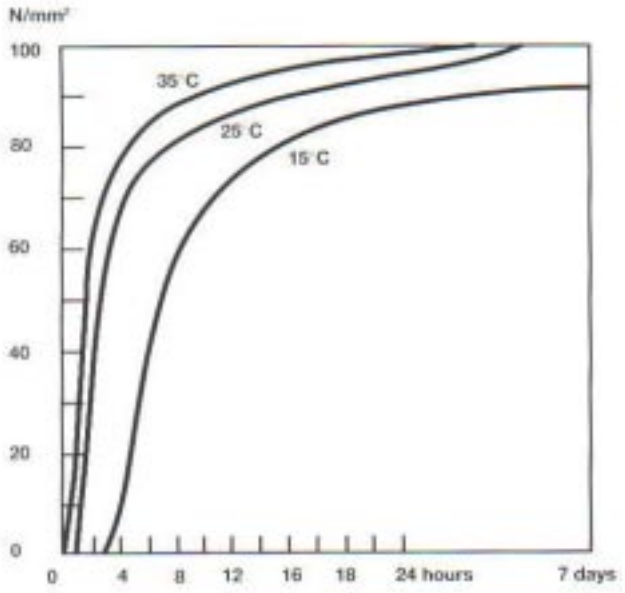
Working time

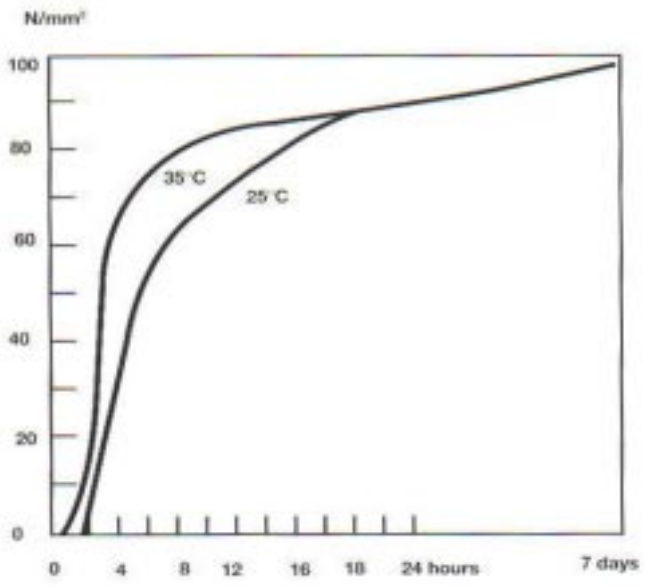
Temperature		Nitomortar PE	Nitomortar PE Concrete
Standard grade:		**Minutes**	**Minutes**
5°C	:	120 - 150	90 -120
15°C	:	45 - 60	45 - 60
25°C	:	15 - 20	25 - 30
Tropical grade:		**Minutes**	**Minutes**
25°C	:	70 - 90	80 - 100
35°C	:	45 - 60	45 - 60

Compressive strength gain: All grades of Nitomortar PE will develop strengths equivalent to mature concrete within a 2 to 6 hour period at temperatures above 15°C. Typical compressive strength development is shown below:

Nitomortar PE



Nitomortar PE Concrete



Property at 20°C		Nitomortar PE flowable consistency	Nitomortar PE Concrete
Compressive strength at 7 days (BS 6319, Pt 2)	:	100 N/mm²	100 N/mm²
Flexural strength (BS 6319, Pt 3)	:	28 N/mm²	25 N/mm²
Tensile strength (BS 6319, Pt 7)	:	14 N/mm²	12 N/mm²
Young's Modulus of Elasticity	:	16 kN/mm²	23 kN/mm²
Thermal conductivity	:	1.0 Watt/m/°C	
Coefficient of thermal expansion	:	30 x 10^{-6} per °C	

Note : Strengths quoted for Nitomortar PE Concrete may vary dependent on the type of aggregate selected.

Mix design – Nitomortar PE

	Hardener: resin ratio (volume)	(weight)	Density kg/m³	Yield litres/kg
Trowellable:	3.2:1	4.2:1	1920	0.52
Flowable:	2.5:1	3.5:1	1840	0.54
Fluid:	1.6:1	2.0:1	1680	0.60

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Mix design – Nitomortar PE Concrete

For each full pack of Nitomortar PE Concrete use one of the alternative aggregate type described in the table below:

Dried aggregate		Quantity	Yield (litres)
Grade C sand	:	17 litres (30 kg)	20
Grade M sand	:	14 litres (25 kg)	17.5
Grade F sand	:	11.5 litres (21 kg)	15
Grade M sand	:	6.5 litres (12 kg)	
10 mm aggregate	:	12 litres (21 kg)	22.5
Grade M sand	:	5.5 litres (10 kg)	
10 mm aggregate	:	5.5 litres (9.5 kg)	27.5
20 mm aggregate	:	11 litres (19 kg)	

Specification

Jointing and multi-purpose polyester repair mortar

The high strength jointing and repair mortar shall be Nitomortar PE Mortar, a two-component polyester resin. The mortar shall be capable of use at a wide range of consistencies without significantly affecting setting times or strengths. When applied at a flowable consistency, the cured product shall exhibit a compressive strength of 100 N/mm^2, a flexural strength of 28 N/mm^2 and a tensile strength of 14 N/mm^2 at 7 days. Young's Modulus of Elasticity shall be 16 kN/mm^2.

Multi-purpose polyester repair concrete

The high strength repair concrete shall be Nitomortar PE Concrete, a two-component polyester resin capable of site modification with suitable aggregates. The repair concrete shall be capable of use at a range of consistencies without significantly affecting setting times or strengths. The cured product shall exhibit a compressive strength of 100 N/mm^2, a flexural strength of 25 N/mm^2 and a tensile strength of 12 N/mm^2 at 7 days. Young's Modulus of Elasticity shall be 23 kN/mm^2.

Instructions for use

Preparation

Saw cut or cut back the extremities of the repair locations to a depth of at least 5 mm to avoid feather-edging and to provide a square edge. Break out the complete repair area to a minimum depth of 5 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 of 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

Exposed steel reinforcement should be treated with one full coat of Nitoprime Zincrich. This should be allowed 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

No priming is necessary when using Nitomortar PE products.

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Mixing

Pour the required quantity of liquid resin into a clean plastic mixing bucket and add the powdered hardener slowly, stirring thoroughly and continuously. Continue mixing for 3 minutes until a uniform consistency is achieved.

For Nitomortar PE Concrete, measure out the correct volume of surface dry aggregate (coarse/fine) appropriate to the proposed application. Add this to the previously mixed resin (see above) until a uniform consistency is achieved. Mechanical mixing is recommended for Nitomortar PE Concrete and a forced-action mixer (e.g. Mixal or Cretangle-type) should be used.

Do not mix more material than can be used within the pot-life of the product.

Application

Apply the mixed Nitomortar PE to the prepared substrate by steel trowel, pressing firmly into place to ensure positive adhesion and full compaction. In the case of repairs to very dense or non-absorbent substrates, the first layer of Nitomortar PE should be made slightly 'resin-rich' to ensure that the surface to be bonded is properly 'wetted-out'.

Thoroughly compact the mortar around any exposed reinforcement. Refer to the 'Design criteria' chart above for maximum thicknesses in a single application. Thicker sections should be built up in layers. If sagging occurs during application, the Nitomortar PE should be completely removed and reapplied at a reduced thickness.

When larger areas are being rendered (generally over 0.25 m^2 for Nitomortar PE Mortar and 0.50 m^2 for Nitomortar PE Concrete) a chequerboard application technique is recommended.

For certain applications, particularly where access is restricted, the mixed Nitomortar PE can be poured into place. The local Fosroc office should be consulted before proceeding.

When used for bedding purposes or for fixing brick slips, ceramic tiles, slabs, coping stones, etc, provision might be necessary for temporary support.

Note: the minimum applied thickness of Nitomortar PE and Nitomortar PE Concrete is 5 mm.

Build-up

Additional build-up can be achieved by application of multiple layers. Exposed steel reinforcing bars should be firmly secured to avoid movement during the application process as this will affect mortar compaction, build and bond.

Where thicker sections are required, the surface of the intermediate applications should be scratch-keyed to provide a suitable surface for subsequent layers. The application of additional layers should follow between 8 and 24 hours after the first application.

Finishing

Nitomortar PE is finished by the use of a steel trowel which may be wiped from time to time with a cloth moistened with Fosroc Solvent 102. The completed surface should not be overworked.

Low temperature working

Nitomortar PE can be applied in cold conditions down to 0°C. The material should not be applied when the substrate and/or air temperature is below freezing or where the substrate is contaminated with frost or ice. In cold conditions, the winter grade may be more appropriate. Consult the local Fosroc office for further information.

High temperature working

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practice:

(i) Store unmixed material in a cool (preferably temperature controlled) environment, avoiding exposure to direct sunlight.

(ii) Keep equipment cool, arranging shade protection if necessary. It is especially important to keep cool those surfaces of the equipment which will come into direct contact with the material itself.

(iii) Try to eliminate application during the hottest times of the day and in direct sunlight.

(iv) Make sufficient material, plant and labour available to ensure that application is a continuous process.

(v) Water (below 20°C) should be used for mixing the grout prior to placement.

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Curing

Curing protection is not necessary for Nitomortar PE products.

Cleaning

Nitomortar PE and Nitoprime Zincrich should be removed from tools, brushes, equipments and mixers with Fosroc Solvent 102 immediately after use.

Limitations

- Nitomortar PE products should not be used when the temperature is below 0°C or if the substrate is contaminated with frost or ice.
- The products should not be applied to damp or wet surfaces where there is total reliance on bond nor 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.

Technical support

Fosroc offers a comprehensive technical support service to specifiers, end users and contractors. It is also able to offer on-site technical assistance, an AutoCAD facility and dedicated specification assistance in locations all over the world.

Estimating

Supply

Nitomortar PE Mortar	**:**	5 litre packs
Nitomortar PE Concrete	**:**	5 litre packs

Coverage and yield

Nitomortar PE Mortar	**:**	5.0 litres/ pack
Nitomortar PE Concrete	**:**	15 to 27.5 litres/5 litre pack (dependent on aggregate addition)

Note : Coverage figures for Nitoprime Zincrich are theoretical - due to wastage factors and the variety and nature of possible substrates, practical coverage figures will be reduced.

Storage

Nitomortar PE Mortar and Nitomortar PE Concrete have a shelf life of 9 months at 20°C if kept in a dry store in the original, unopened bags or packs.

If stored at high temperatures and/or high humidity conditions the shelf life will be significantly reduced.

Precautions

Health and safety

Nitomortar PE products and Fosroc Solvents 102 and 105 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 protection. 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, 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.

Fire

Nitomortar PE products and Fosroc Solvents 102 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

Nitomortar PE resin	**:**	29°C
Fosroc Solvent 102	**:**	33°C

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Additional Information

Fosroc manufactures a wide range of complementary products which include :

- waterproofing membranes & waterstops
- joint sealants & filler boards
- cementitious & epoxy grouts
- specialised flooring materials

Fosroc additionally offers a comprehensive package of products specifically designed for the repair and refurbishment of damaged concrete. Fosroc's 'Systematic Approach' to concrete repair features the following :

- hand-placed repair mortars
- spray grade repair mortars
- fluid micro-concretes
- chemically resistant epoxy mortars
- anti-carbonation/anti-chloride protective coatings
- chemical and abrasion resistant coatings

For further information on any of the above, please consult your local Fosroc office - as below.

Important note :

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products whether or not in accordance with any advice, specification, recommendation or information given by it.

Fosroc Chemicals (India) Pvt. Ltd.
Head Office
111/3, Hafeeza Chamber II Floor,
K H Road, PBNo. 2744, Bangalore 560027
www.fosroc.com

telephone	fax	e-mail
++91 80-22240018/120	++91 80-22233474	india@fosroc.com

Regional Offices

Bangalore
Shankar House, IV Floor
1 & 18, RMV Extension
Bangalore 560 080
Ph:080-2361 3161/2361 2004
Fax : 080-2361 7454
email: Bangalore@fosroc.com

Mumbai
208/209, Persepolis
Sector 17, Vashi
Navi Mumbai 400 703
Ph:022-2789 6412/14
Fax: 022 - 2789 6413
email:Mumbai@fosroc.com

Delhi
First floor,1/2 East Patel Nagar
Opp: Vivek Cinema, Main Patel Rd
New Delhi 110 008
Ph:011-25884903/4
Fax: 011- 25884422
email:Delhi@fosroc.com

Kolkata
130/B Jodhpur Park
Ground Floor
Kolkata 700 068
Ph: 033 2472 5482
Fax: 033-2472 9921
email:Kolkata@fosroc.com

●Ahmedabad : (079) 26762799 ●Ankleshwar :(02646) 220704/224687 ● Bhubaneshwar : (0674) 2546415 ● Chennai (044) 24899949/24853383
●Chandigarh : (0172) 2639360 ● Cochin : (0484) 2356668 ●Coimbatore : (0422) 2472966 ●Goa : (0832) 2542465 ●Guwahati (0361) 2548793
●Hyderabad : (040) 27662324/27662425 ● Hubli (0836) 3402597 ●Indore : (0731) 504339/5061477 ● Jaipur : (0141) 2235349 ● Jamshedpur: (0657) 2223848 ● Lucknow :(0522) 2239044 ● Nagercoil (04652) 2224849 ● Mangalore: (0824) 22272234 ● Visakhapatnam : (0891) 2564850

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