concrete repair

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CONCRESIVE® 1414

Epoxy bonding agent for concrete repairs, bonding concrete to concrete, steel and granolithic toppings

Description

CONCRESIVE 1414 is a permanent epoxy adhesive for internal or external bonding of renderings, granolithic toppings, and concrete to concrete. It tolerates a degree of moisture before and during curing and is insoluble when cured. The ultimate bond strength is greater than the tensile strength of concrete. CONCRESIVE 1414 does not shrink and provides an even and stress-free bond.

Primary uses

CONCRESIVE 1414 may be applied to clean, sound and durable surfaces, i.e. steel, glazed tiles and bricks, ceramic and quarry tiles, terrazzo tiles and floors. Also to smooth and worn granolithic pavings, old and worn concrete, engineering and semi-engineering bricks.

Advantages

- High strength
- Non shrink
- Moisture tolerant
- Durable
- Resistant to chemical attack
- Supplied in pre-weighed units

Packaging

CONCRESIVE 1414 is available in 3kg units containing the base resin and reactor component.

Typical properties*

*Properties listed are only for guidance and are not a guarantee of performance.

Mixed density @ 25°C:	1485kg/m³	
Pot life:	25°C	2½ hours
	40°C	1 hours
Tack free time:	25°C	9½ hours
	40°C	5½ hours
Full cure:	7 days	

Standards

ASTM C881 Type 2 Grade 2, Class B & C.

Application procedure

Preparation:

All surfaces must be thoroughly cleaned and prepared. All loose particles, laitance, dust, curing compounds, floor hardeners, oil, grease, fat, bitumen and paint must be removed if good bond strength is to be achieved. Gloss surfaces must be abraded.

If oil, grease, fat, etc. are present, they should be removed before starting any other form of preparation. All laitance weak or friable concrete should be removed by chipping, grit blasting, or scabbling until a sound base is obtained.

All laitance should be removed by mechanical scarification, grit blasting, or by acid etching. Visible signs of mould growth, lichen, or algae, should be removed and treated with a fungicidal wash.

New concrete should have cured until the shrinkage and moisture movement is low. Surfaces heavily impregnated with mould oil should be degreased and grit blasted or mechanically scarified to remove the contaminated surface. All curing compounds should have disintegrated or be removed and application carried out only onto a clean, dust free surface.

Mixing:

Carefully transfer the entire contents of the smaller container of CONCRESIVE 1414 REACTOR COMPONENT to the larger CONCRESIVE 1414 BASE COMPONENT tin and thoroughly mix, using a stout palette knife or a slow running drill with a paint mixing paddle until uniformity is achieved. This normally takes about three minutes. Do not attempt to mix only part of the contents. Do not attempt to thin CONCRESIVE 1414.

Guide to application:

CONCRESIVE 1414 should be applied evenly across the whole surface with a clean, short haired paint brush or a laying-on trowel.

After application, the CONCRESIVE 1414 must be left to stand before overcoating. The time delay will depend on surface and prevailing conditions but will typically be 60 minutes at 25°C or 45 minutes at 40°C.

The CONCRESIVE 1414 should be protected during this time to prevent contamination. This is particularly necessary on horizontal surfaces.

Renderings and screeds:

Once the render or screed has been applied over the CONCRESIVE 1414 recognised methods of working may be adopted.

It is essential that granolithic paving and sand cement renders and screeds are cured. This can be achieved by curing with a fine spray of clean water and polythene sheeting. More effective is to spray the surface with a curing membrane from the MASTERKURE range. Failure to observe these precautions may cause the render or screed to crack and craze.

Expansion joints formed in the substrate should be carried through the rendering or screed and may be filled with MASTERFLEX 700, a 2 part polysulphide joint sealant.

Temperature

Since low temperatures retard the setting and curing of CONCRESIVE 1414, avoid working in cold weather if possible. Although CONCRESIVE 1414 will cure slowly at low temperatures, a temperature of 7°C to 10°C can be considered to be the lowest at which work on vertical rendering may proceed satisfactorily without shuttering.

Equipment care

Use CLEANING SOLVENT NO. 2 to clean tools when CONCRESIVE 1414 is still wet or tacky. Once CONCRESIVE 1414 has set hard, it can only be removed by chipping or burning.

Coverage

2-2.7m²/kg dependent on substrate profile.

Storage

Store under cover out of direct sunlight and protect from extremes of temperature. In tropical climates the product must be stored in an air conditioned environment.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage and disposal advice consult Degussa's Technical Services Department.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes mouth, skin and foodstuffs (which can also be tainted with vapour until product fully cured or dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek immediate medical attention. For further information refer to the material safety data sheet.

Note

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local Degussa representative.

Degussa reserves the right to have the true cause of any difficulty determined by accepted test methods.

Quality

All products produced by Degussa certified manufacturing facilities, are produced to conform to systems designed to meet internationally recognised quality standards.

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CONCRESIVE® 2020

A high build epoxy resin mortar, specifically designed for vertical and overhead applications

Description

CONCRESIVE 2020 is a three-component solvent free epoxy resin mortar. The specially selected fillers and resins form an easily finished impervious mortar with high build characteristics combined with optimum chemical and mechanical resistance.

Primary uses

Overhead work and vertical surfaces where normal epoxy resin compounds are unsuitable. Wherever effective repair of spalled concrete is required to provide all round protection to reinforcing steel, vertical renders for linings, etc. General repairs, renovation and rendering to:

- Soffits.
- Undersides of floors, beams, etc.
- Honeycombed or spalled concrete.

Wherever a high build impervious mortar with excellent chemical resistance and maximum mechanical properties is required, such as sewerage works, bridge repairs, manhole linings, pipes, etc. CONCRESIVE 2020 is non-toxic and can be used in potable water installations.

Advantages

- Light weight.
- Suitable for high build application.
- Suitable for vertical and overhead surfaces,
- Good adhesion and cure under damp conditions.
- Excellent chemical resistance.
- Non toxic.
- Extended pot life and working time.
- Low exotherm.

Packaging

CONCRESIVE 2020 is supplied in 5 kg units.

Typical properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Service temperature limits:	-20°C to 65°C.
Application temp. limits:	8°C to 45°C
Density (BS 6319 Part 1):	1540kg/m³
Pot life at 25°C:	120 mins
at 40°C:	90 mins
Tack free at 25°C:	5½ hours
at 40°C:	2¼ hours
Full cure 25°C:	3 to 5 days
Compressive strength at 25°C (BS 6319 Part 2) (ASTM C-579) (7 Day Cure):	35N/mm²
Chemical resistance:	Excellent

Standards

ASTM C-881. Type III, Grade 3, Class B & C.

Application procedure

The surface to be treated should be dry and free from dirt, dust concrete curing compounds, residual mould oil or other contaminate that could impair adhesion. Cement laitance should be removed by wire brushing or grit sand blasting before priming with CONCRESIVE 1020.

Thoroughly mix base and reactor components of the primer for 3 to 4 minutes and apply evenly to the substrate using a stiff brush. The contents of the container must be used within 45 minutes of mixing at 25°C.

Priming should be carried out in advance of application of the mortar. It is essential to apply the mortar on top of the primer whilst the latter is still tacky. If the first priming coat should gel, apply a second priming coat before applying the mortar.

1 litre of CONCRESIVE 1020 Primer will be sufficient to treat approximately 6 to 8m² (dependant on porosity and texture of surface).

The thoroughly mixed mortar should be used without delay and applied using a steel trowel. Press well into the primed surface and compact to ensure positive and permanent adhesion. Use a steel trowel to finish and bring resin to the surface. For large areas layers should not exceed 50mm in thickness. However, for smaller repairs thickness up to 75mm can be applied. Minimum thickness is 3mm. Further priming is necessary between layers and the backing layer should be cross hatched before cure takes place to provide a mechanical key.

Coverage

A 5 kg pack will cover approximately 0.65m² at a thickness of 5mm (dependent on surface texture).

Storage

Store under cover out of direct sunlight and protect from extremes of temperature. In tropical climates the product must be stored in an air-conditioned environment.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs (which may also be tainted with vapour until product is fully cured). Treat splashes to eyes and skin immediately. If accidentally ingested, seek immediate medical attention. Reseal containers after use. For further information refer to the Material Safety Data Sheet.

Note

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CONCRESIVE® 2200

High strength, non-flow, epoxy bedding and repair mortar

Description

CONCRESIVE 2200, is a non slumping epoxy bedding compound and adhesive. It is a two pack, fine aggregate filled, fast curing material, ideal for a variety of bedding, gap filling and concrete repair applications.

CONCRESIVE 2200 is a stiff but easily workable compound that can be applied by either trowel, spatula or knife. It cures to give high mechanical properties typical of epoxy compounds. It is resistant to oils, greases, petroleum, salts, many acids and alkalis and most commonly met corrosive media. It does not shrink on curing, and is designed to be used when cured from below freezing point to 60°C. Its impact resistance, and mechanical strength is greater than that of concrete.

Primary uses

For surface repairs of fine cracks and spalls.
For gap filling, grouting, bedding fixtures etc.
For repairs to arrisses without the use of form work. Wherever a thixotropic epoxy mortar is required.

Typical applications

- Bedding bridge beams or steel bridge bearings.
- Repairing surface defects or to honeycombing concrete in horizontal, vertical or overhead situations.
- Fixing slip bricks to concrete.
- Securing bolts into walls.
- Dowel bars anchoring.
- As a gap filling adhesive.
- Filling bolt pockets.
- Bedding tiles.
- Repairing concrete posts in-situ.
- Fixing of surface ports for crack injection.

Advantages

- High strength.
- Non-slump.
- Strong adhesion.
- Impact resistant
- Chemical resistant.
- Non shrink.
- Epoxy based.
- Trowels to a smooth finish.
- Easy to use.
- Supplied in pre-weighed units.
- No bonding agent or primer required.

Packaging

CONCRESIVE 2200 is available in 3kg units.

Composition

Two-component epoxy-based mortar filled with selected fine aggregate.

Typical properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Colour:	Cement grey
Mixed density:	1700 Kg/m³ at 25°C
Flashpoint:	N/A
Compressive strength to ASTM D695:	60 N/mm² at 7 days
Bond strength:	Greater than that of the concrete.
Pot life:	at 25°C : 1 hour 45 minutes at 40°C : 45 minutes
Tack free time:	at 25°C : 7 hours at 40°C : 2 hours 15 minutes
Full cure:	at 25°C : 5 days at 40°C : 3 days

Standards

ASTM C881 : Type 1, Grade 3 Classes B & C.

Chemical resistance

CONCRESIVE 2200 has excellent resistance to the following: most aqueous systems, sewage, urine, fresh water, sea water, diluted and concentrated alkalis, diluted acids, sulphur gases, mineral, vegetable and animal oils and fats, ammonia and formaldehyde.

Application procedure

Preparation:

All loose particles, laitance, dust and grease etc., must be removed prior to application of CONCRESIVE 2200.

Mixing:

The 3kg pack has been designed to be readily mixed by trowel. Where more than one pack is to be mixed at a time, a Mixal portable mixer (HD5 model) is suitable.

Application:

Knife or trowel CONCRESIVE 2200 to the required level using the minimum of solvent on the trowel to aid workability. The surface may be finished smooth by use of a paint brush dipped in CLEANING SOLVENT NO. 2. Where a very deep recess is to be filled, it may be necessary to build up in layers. Repairs may be camouflaged if required by covering surface with cement powder before full cure is affected.

Working temperature :

CONCRESIVE 2200 will cure at temperatures as low as 0°C, although at low temperatures cure is retarded.

Coverage

3kg is sufficient to cover 1.1 m² at 1.5mm thickness.

Equipment care

Clean with CLEANING SOLVENT NO. 2 immediately after use.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes mouth, skin and foodstuffs (which can also be tainted with vapour until product fully cured or dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek immediate medical attention. Keep away from children and animals. Reseal containers after use. For further information refer to the material safety data sheet.

Storage

Store under cover out of direct sunlight and protect from extremes of temperature. In tropical climates the product must be stored in an air conditioned environment.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult Degussa's Technical Services Department.

Note

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EMACO® BONDING AGENT P

Acrylic bonding agent & curing aid

Description

EMACO BONDING AGENT P is a single component white emulsion of milky appearance, based upon modified acrylic resins. It is formulated for use as a bonding agent for cementitious mortars and specifically EMACO R101. The product is ready to use, has exceptional grab characteristics and develops a tenacious bond of the new mortar to the host concrete.

EMACO BONDING AGENT P may be used in external or internal applications, but for permanently wet or submerged service conditions the use of RHEOMIX 141 in a cement bonding slurry is suggested as preferable.

Primary use

EMACO BONDING AGENT P is formulated for use as the primer for EMACO R101 repair mortar and is especially recommended for vertical and overhead applications. It is also recommended as a curing aid, to reduce the incidence of early age cracking in patch repairs. It is only effective if applied immediately finishing is complete and when the repaired area is protected from drying winds.

Packaging

EMACO BONDING AGENT P is supplied in 4 , 10, and 200 litres containers.

Typical properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Tensile bond strength at 7 days	>1.8N/mm²
Curing efficiency *	>55%

**The curing efficiency of EMACO BONDING AGENT P was measured to the UK's DOT Clause 2709 modified to include mortar pre-drying period.*

Directions for use

EMACO BONDING AGENT P is supplied ready for use and only under some circumstances can be diluted with water .

As with all bonding mediums, the quality of surface preparation has a direct influence on the effectiveness and durability of the repair. Saw cut the perimeter of areas to be treated to a minimum depth of 15mm to avoid feather edging of the repair mortar. Loose, contaminated, or damaged concrete should be removed and the full circumference of any corroded reinforcing steel exposed to reveal a

gap of 20mm behind steel. Remove all corrosion products from the steel by mechanical wire brushing before applying a single coat of CONCRESIVE ZR - Zinc Rich Primer. Prior to application of the EMACO BONDING AGENT P, the substrate should be soaked with copious amounts of clean water for a minimum period of 1 hour. Remove standing surface water from flatwork.

EMACO BONDING AGENT P is applied by brush using a “stippling” action rather than a "painting” action and ensuring the surface is completely covered. The repair mortar should be applied whilst the primer is still wet or tacky, reapplying as necessary to achieve this. Care should be taken not to over apply as excessive primer may cause high build applications to slip.

EMACO BONDING AGENT P may be spray applied as a curing aid to cementitious repairs.

Equipment care

Brushes and other equipment may be washed immediately after use with water

Storage

Shelf life is one year at 20°C if stored under cover, out of direct sunlight and protect from extremes of temperature.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult Degussa's Technical Services Department.

Coverage

As a bonding agent	5-8 m²/litre dependent on substrate
As a curing aid	4-5 m²/litre

Note

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Quality

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04/2006 Degussa-IR

EMACO® R101

Single component, shrinkage compensated polymer modified cementitious repair mortar

Description

EMACO R101 is a single component, polymer modified, cementitious repair mortar. It consists of a pre-packed grey powder in sealed bags containing cement, filler and polymer.

When mixed with the specified amount of water a grey trowellable mortar results that is ideally suited for interior or exterior high build application on vertical or overhead work.

Material can be applied up to 50mm thick in one pass without formwork; greater thicknesses can be achieved depending upon the geometry of the repair or by the use of temporary formwork. EMACO R101 is specially formulated to produce a shrinkage compensating mortar giving a smooth finish with excellent adhesion and exceptional water resistance.

Primary uses

- Repair of damaged, decayed, weak or debonded concrete.
- Replacement of concrete that has spalled, chipped or cracked.
- Replacement of concrete suffering from attack as a result of carbonation or ingress of chloride ions.
- Repair of vertical and overhead surfaces.
- Filling of honeycombs in new or old construction.
- Reprofiling of concrete or masonry.

Advantages

- Pre-packed, easy to use material, requiring only the simple addition of water.
- Precision made, consistent results.
- Shrinkage compensating.
- High build, non-slump.
- Durable, low permeability and weatherproof.
- Excellent compressive strength.
- Primer gives high bond strength to prepared surfaces.
- Resistant to aggressive media.

Packaging

EMACO R101 is supplied in 25kg bags.

Typical properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Appearance:		Granular grey powder
Density:		1750kg/m³
Compressive strength (BS 1881 Pt. 4):		>11 N/mm² at 1 day >35 N/mm² at 28 days
Water absorption (BS 1881 Pt. 122):		<1.7%
Water penetration (DIN 1048-70m head of pressure):		Nil at 10mm thickness
Initial surface absorption (I.S.A.T.) (BS 1881 Pt. 5):	10 min 30 min 60 min	< 0.01ml/m²/s < 0.01ml/m²/s < 0.01ml/m²/s
Pot life at 20°C:		> 30 mins
Minimum application temperature:		5°C
Recommended application thickness, dependent upon substrate:	min. max. over-head	10mm per layer approx. 50mm per layer approx. 25 - 40mm per layer

Standards

EMACO R101 has been specially formulated to meet the requirements of the following test methods:
ASTM C387: 77A Type 1.1.2.2 and 1.1.3
DIN 1045 Class B35
DIN 1048

Application procedures

Preparation:

It is essential that the surface of the concrete to be repaired is sound, clean and uncontaminated.

The decayed or damaged areas should be identified and clearly marked. The perimeter of the area should be saw - cut (or cut neatly keeping the sides of the area as square as possible). Feather-edging must be avoided, and a full 10mm minimum thickness at the edges of the repair must be maintained.
Breaking out should be undertaken using high pressure water jetting or pointed mechanical chisels. The use of scabbling equipment that can fracture aggregate but leave it in place should not be permitted.
Bush hammering / scabbling crushes the aggregate causing a weak surface to bond too. The force applied must not be such that damage to sound adjoining material may occur.

If unsound concrete or corroded reinforcement is found to extend beyond the pre-marked area, extend the cutting as necessary treating the edges as above. If the reinforcement is corroded ensure that the back of the steel is exposed. The prepared surface should be lightly textured but firm. Test the surface for soundness, remove all loose debris, dust and free water. An air lance (using oil free compressed air) or an industrial vacuum, aids thorough cleaning.

Reinforcement should have all traces of rust removed by the use of power tools, abrasive blasting or water jetting. Reinforcing steel should be exposed and cleaned around its full circumference. Clean the steel to a bright metal condition. (SA 2½ of Swedish Standard SIS 05-900: 1967 or BS 4232 Ref. 24 Second Quality. Alternative methods of cleaning reinforcement will be at the Engineer's discretion).

Priming:

Reinforcing steel:

Immediately after completion of cleaning, brush apply in a continuous film, a coat of CONCRESIVE ZR to the dry steel. A second coat may be applied after 5 hours at 20°C. See separate datasheet for further information.

The priming system to be used on the concrete substrate will depend on the cause of the damage.

Chloride induced corrosion:

If there are residual chlorides left in the host concrete it is recommended that CONCRESIVE 1414, an epoxy resin is brush applied as a bonding agent. CONCRESIVE 1414 has a tack free time of 7 hours at 30°C and the EMACO R101 should be applied within this time. If the CONCRESIVE 1414 dries, then it should be overcoated before application proceeds.

Allow 45 minutes standing time between the application of the CONCRESIVE 1414 and the subsequent application of EMACO R101.

Non-chloride induced corrosion:

The concrete should be thoroughly dampened with clean, fresh water, however, the surface should be free of standing water. Brush apply EMACO BONDING AGENT in a thin, continuous film. Avoid ponding.

For the EMACO R101 to achieve optimum bond, in the fresh and cured states, it should be applied to BONDING AGENT that is tacky.

Mortar preparation:

Mixing:

Slowly add the EMACO R101 powder to clean gauging water, working well to produce a smooth mortar. The consistency of the mix can be adjusted by the addition of more powder or water as necessary.

When mechanical mixing, best results are obtained using a forced action mixer. Again, add the powder to the water and mix for 3 minutes.

Mixing water should be added to EMACO R101 at the rate of 4.10 to 4.75 litres of water per 25kg of EMACO R101 powder. The addition rate of water is dependent on the workability required. Higher temperatures would generally require more water.

Placing and finishing:

Whilst the primer (CONCRESIVE 1414 or EMACO Bonding Agent) - is still tacky apply the EMACO R101 carefully and fully compact it. Application can be by trowel or by a rubber gloved hand to force the plastic mortar into place. The method chosen will be dictated by the size and situation of the repair.

EMACO R101 can be applied at thicknesses in excess of 50mm at one pass on vertical surfaces and up to 40mm when used in overhead work. Application thickness is dependent on repair size and geometry. Higher build applications can be achieved using temporary formwork.

Where necessary to achieve a desired thickness, the previous layer of EMACO R101 mortar should be lightly cross hatched and allowed to take up its initial set prior to the application of the final finishing layer. Trowel the surface to give a smooth finish matching the surrounding concrete.

Always give the applied EMACO R101 a final firm finish with a steel, wood or plastic float prior to the start of the curing regime.

Curing:

EMACO R101 should be cured in accordance with good concrete practice by application of a suitable curing membrane or by covering the work with properly secured plastic sheeting. Protection against rapid drying from wind, sun or excessive heat is necessary.

Curing should begin as soon as the final finish is achieved.

Chloride contaminated environments:

In cases of severe contamination, direct contact with water borne salts and saline solutions, highway structures where de-icing salts are in use and spray can reach the repair, cure with one of the MASTERKURE range of products.

If it is desired to change the appearance of the structure and to hide the "patchwork" appearance of multiple repairs, a pigmented

protective coating such as MASTERSEAL 300H applied on to a primer coat of MASTERKURE 181 should be used. MASTERKURE 181 a curing membrane that does not break down, acts as a primer for subsequent applications of certain protective coatings.

Note: In addition to shrinkage compensation, this product has been designed to develop tensile strength sufficient to withstand the internal stress generated by volume change to reduce the incidence of drying shrinkage cracking.

Coverage

Priming steel:	CONCRESIVE ZR	165m of 16mm diameter bar / litre
Priming concrete:	CONCRESIVE 1414	2-2.7m²/kg
Priming concrete:	EMACO BONDING AGENT	5 to 8 m² / litre

Yield

Approx. 17.5 litres/25kg bag at average water addition.

Watchpoints

- All existing expansion joints should be carried through the repair from the substrate.
- It is recommended that exposed concrete is protected with a protective coating from the Degussa range as an integral part of the overall concrete repair and protection operation.

Equipment care

Tools should be washed with water immediately after use.

Storage

Store out of direct sunlight, clear of the ground on pallets protected from rainfall. Avoid excessive compaction. Shelf life is one year minimum when stored as above.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult Degussa's Technical Services Department.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs. Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Use in well ventilated areas and avoid inhalation. For further information refer to the material safety data sheet.

Note

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Quality

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EMACO® R307

Single component polymer modified fairing coat. Cosmetic mortar for concrete surfaces

Description

EMACO R307 is a single component acrylic polymer modified repair mortar for use as a "fairing coat" or cosmetic mortar. When mixed with water, as directed, a fine grey trowellable mortar results which can readily be applied to fill in pores, blowholes and blemishes on a concrete surface.

EMACO R307 can be used as a 'skim' coat prior to the application of protective coatings.

EMACO R307 is specially formulated to produce a shrinkage compensating mortar with no cracking when applied in a thin section. Adhesion to concrete and flexibility are excellent.

Primary uses

- As a fairing or skim coat to cover and make good blemishes in concrete surfaces such as slight honeycombing, blowholes, defects caused by 'sand runs', patch repairs, shutter movement and grout loss.
- Preparatory treatment to concrete to receive a thin film protective coating.
- To produce a uniform surface over repaired areas.

Advantages

- Precision made, consistent results.
- Requires only the addition of mixing water.
- Shrinkage compensating.
- Excellent adhesion to concrete.
- Flexible.
- Smooth, easily produced finish.
- Low permeability
- Excellent resistance to freeze / thaw action and carbonation
- Reduces ingress of water borne salts, such as chlorides and atmospheric / chemical attack.
- Subsequent paint coats can be applied with greater economy.

Packaging

EMACO R307 is supplied in 20 kg bags.

Typical properties*

Colour	Light grey
Plastic density	1700kg/m³
Compressive strength at 28 days	20N/mm²

Application

EMACO R307 should be applied to the complete area with the minimum of trowelling. Leave for a short period before final trowelling. Finishing may be aided by flicking a small amount of water onto the surface, using a paint brush before final trowelling.

When used as a "scrape coat" EMACO R307 can be applied with a brush or roller and then the excess scraped off with the edge of a steel float. In this way blow holes and minor blemishes in an otherwise fair faced concrete can be hidden.

Curing:

Good curing practice is essential even though EMACO R307 is specially formulated to prevent shrinkage and cracking. Particular care is required in hot and windy conditions.

Cure with a single coat of MASTERKURE 180 which is compatible with most subsequent protective coatings, or by covering the work with a properly secured plastic sheeting.

Preparation:

It is essential that the surfaces to be bonded are sound, clean and uncontaminated. All loose powdering material must be removed.

Concrete surfaces should be thoroughly soaked prior to application of EMACO R307, to ensure a saturated, but surface dry condition.

Void filling:

Deeper voids should be filled prior to the application of a cosmetic coating by reducing the amount of water added when mixing to produce a trowellable putty like mortar.

Mixing:

EMACO R307 is formulated to give an easily mixed material. For full bag quantities, it is preferable to mix the material in a Crete angle or similar forced action mixer. Alternatively, a slow speed, hand held electric mixer with a suitable paddle can be used. Over mixing should be avoided. When mixing full bags, pour 3-4 litres water in the mixing vessel and commence mixing. Add the powder to the water whilst mixing, add water as required to achieve the desired consistency. No more than 7.5 litres of water per 20 kg of EMACO R307 should be added.

Coverage

One 20 kg bag of EMACO R307 will typically yield 16 litres of mortar and will cover approximately 16m² at 1mm thickness.

Equipment care

Tools should be washed with water immediately after use.

Specification clause

Surface finishing:

All slight surface imperfections should be made good by the application of EMACO R307 as manufactured by Degussa Applications should be strictly in accordance with the manufacturer's instructions.

Storage

Store out of direct sunlight, clear of the ground on pallets protected from rainfall. Avoid excessive compaction.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult Degussa's Technical Services Department.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs. Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Reseal containers after use. Use in well ventilated areas and avoid inhalation. For further information refer to the material safety data sheet.

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Quality

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EMACO® S88P

(Replaces Atrorepair)

Shrinkage compensated, polymer fibre reinforced, thixotropic repair mortar

Description

EMACO S88 P, is a cementitious pre-bagged ready-to-use structural repair mortar in powder form. When mixed with the correct amount of water, it produces a thixotropic, high strength repair mortar, reinforced with acrylic polymer fibres. It possess excellent bond characteristics to steel reinforcement and to concrete.

EMACO S88 P mortar is shrinkage compensated. It has low permeability and is extremely durable. EMACO S88 CT-P contains no metallic aggregate and is chloride free.

EMACO S88 P is formulated for sprayed or trowelled applications, in thicknesses up to 50 mm in one layer by hand application. Greater thicknesses can be achieved when spray applied.

Typical applications

- All types of structural repair which can be applied by trowel or wet spray.
- Repair of structural members subjected to repetitive loading.
- Repairs to reinforced or pre-stressed beams or columns.
- Protection of concrete subject to attack from water containing chlorides and sulphates etc.
- Repairs in industrial areas, especially those containing mineral oils, lubricants.
- Repairs in marine environments.

Advantages

- Shrinkage compensation - reduces the risk of cracking due to shrinkage and ensures full contact with host concrete and load transfer in structural repair situations.
- No primer required - allows rapid application at reduced cost.
- Can be spray applied - rapid application of large quantities.
- Low rebound - when spray applied rebound is minimal, with subsequent saving in material cost.
- Extremely low permeability - gives excellent resistance to attack by aggressive elements.

Packaging

EMACO S88 P is available in 25kg bags.

Typical properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Appearance:	grey powder containing micro fine fibres
Plastic density:	approx. 2300 kg/m³
Compressive strength at 20°C	> 22 N/mm² at 1 day
BS 1881 : Part 116:	> 60 N/mm² at 28 days
Indirect tensile strength	3.6N/mm² at 28 days
BS 1881 : Part 117:	
Resistivity approx.:	12500Ωcm
Water penetration	<5mm
DIN 1048 : Part 5:	

Application procedure

Preparation of substrate:

It is essential that the substrate to be repaired is sound, clean and free of all contamination.

The damaged areas of concrete to be removed should be clearly identified. The perimeter of the area should be saw cut to a depth of 10 mm and the edges cut as neatly as possible keeping the sides square. Feather-edging is not permitted and a minimum thickness of 10 mm must be maintained over the whole repair area.

The substrate should be prepared to provide a rough surface having at least a 5 mm amplitude at 20 mm frequency.

If unsound or contaminated concrete is found to extend beyond the premarked area, consult the engineer in charge. Subject to his approval cut out as necessary back to clean sound concrete.

If reinforcement is corroded ensure that the back of the steel has been exposed. Reinforcement should have all rust removed by the use of power tools, abrasive blasting (wet or dry) or wire brushing. Reinforcing steel should be exposed and cleaned around its whole circumference. Steel should be prepared to Swedish Standard SIS 05-900:1967-SA 2½ or BS 4232 Ref. 24 second quality.

Extra protection to the reinforcement can be provided by use of CONCRESIVE ZR dependant upon the circumstances of use and requirement of the client.

Severely corroded reinforcement may require replacement and the engineer must be consulted.

Water saturation:

Thoroughly saturate the surface of the concrete to provide a saturated surface dry condition. Poor quality concrete may require soaking for a significant length of time. Any surface water should be removed using an oil free compressed airjet.

Mixing:

EMACO S88 P must be mixed mechanically. The following mixing equipment is suitable, heavy duty slow speed drill with spiral mixing paddle, forced action mixer, such as Creteangle, Mixal, Pan Mixers etc. Mixers attached to spray units such as Meyco Deguna or Putzmeister are suitable.

Add 3.5 litres of water into the mixer. Start the mixer and add the EMACO S88 P powder rapidly and continuously. Mix for 3 minutes after all the powder has been added until mortar is homogeneous and lump free.

Add water, if necessary, within the limits given, until the required consistency is achieved. Mix for a further 1-2 minutes. The amount of water required will be affected by ambient temperature and relative humidity.

EMACO S88 P can be used when the ambient temperature is between 5 and 50°C. If ambient temperature is >30°C, use chilled water and condition the bagged product in an air-

conditioned store prior to use. Maximum mixed temperature should be no more than 35°C.

Application:

After mixing, EMACO S88 P can be sprayed or trowel applied. Suitable spraying units are Meyco Deguna 20, Turbosol T20 and Putzmeister P11.

When applying by hand EMACO S88 P must be forced tightly into the substrate to ensure intimate contact with the pre-wetted substrate.

Levelling and initial finishing should be carried using a wooden or plastic float.

Final finishing should be carried out using a steel float.

When the material has stiffened to the point where finger pressure lightly marks the surface, a final firm trowelling should be given using the steel float.

Curing:

Good curing is essential. Particular care is required in hot and/or windy conditions. Curing can either be with a single coat of MASTERKURE 181 curing membrane, which is compatible with most subsequent protective coatings, or by covering the work with plastic sheet fixed over wet hessian or wet foam rubber.

Coverage:

One 25kg bag of EMACO S88 P with 4 litres of added water will yield approximately 12.6 litres of mortar which will cover 1m² at 12.6 mm average thickness.

Note: In addition to shrinkage compensation, this product has been designed to develop tensile strength sufficient to withstand the internal stress generated by volume change to reduce the incidence of drying shrinkage cracking.

Storage

Store out of direct sunlight, clear of the ground on pallets, protect from rainfall. Avoid excessive compaction. Shelf life is 12 months when stored as above.

Safety precautions

As with other products containing Portland cement, the cementitious material in EMACO S88 P grout may cause irritation. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Call a physician. In case of contact with skin, wash skin thoroughly.

Note

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local Degussa representative.

Degussa reserves the right to have the true cause of any difficulty determined by accepted test methods.

Quality

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04/2006 Degussa-IR

RHEOMIX®
141

(Formerly Atrolatex B 250)

Multi-purpose admixture for cementitious systems. Waterproofs and improves mortars. Bonding agent.

Description

RHEOMIX 141 is a (SBR) styrene-butadiene co-polymer latex specifically designed for use with cement compositions. It is used in mortar and concretes as an admixture to increase resistance to water penetration, improve abrasion resistance and durability. It is used with cement as a reliable water-resistant bonding agent.

Primary uses

- Concrete repair.
- Floor screeds and toppings.
- External rendering.
- Waterproofing and tanking.
- Fixing slip bricks and tiles.
- Corrosion protection of steel.

Typical applications

Concrete repair:
Spalled concrete, repairing floors, beams and pre-cast slabs.

Floor screeds and toppings:
Abrasion resistant and non-dusting floors, underlay for special finishes, mild chemical and effluent-resistant floors.

External rendering:
Waterproof, weatherproof and frost resistant render.

Waterproofing and tanking:
Basements, lift pits, inspection pits, water towers, liquid tanks, effluent tanks and swimming pools.

Other typical applications:
Bedding tiles, fixing or re-fixing slip bricks, bonding new concrete to old.

Advantages

- Earlier hardening.
- Improved flexibility.
- Greatly reduced shrinkage.
- Prevents bleeding.
- Lower water-cement ratio.
- aIncreased durability and toughness.
- High resistance to water penetration.
- Good abrasion resistance.
- Good frost resistance and resistance to salt permeation.
- Good resistance to many chemicals and to mineral oil.
- Excellent adhesion to steel and concrete. Adheres well to brick, glass, asphalt, wood, expanded polystyrene and most building materials.

- Prolonged corrosion protection.
- Proven performance.
- Similar thermal expansion and modulus properties to concrete (unlike resin mortars and primers).
- Non-toxic. Can be used with potable water.
- More economical than epoxy or polyester resin mortar.

Action

The use of RHEOMIX 141 synthetic latex in cement-based slurries and mortars compensates for many deficiencies in the mixes without detracting from their inherent strength and properties.

RHEOMIX 141 has been developed specifically for use with Portland cements. As ordinary mortar dries out, voids are left which make it permeable and weaker. When RHEOMIX 141 is added, the RHEOMIX 141 particles bind together to form continuous films and strands - these stitch the opposite sides of the voids together and block up the spaces, thus increasing strength and resistance to water penetration. RHEOMIX 141 combined with cement produces an excellent adhesive; each component compliments the properties of the other in this respect.

Composition

RHEOMIX 141 is a milky, white liquid, produced from styrene and butadiene by high pressure emulsion polymerisation. The latex consists of microscopic particles of synthetic rubber dispersed in an aqueous solution. RHEOMIX 141 modified mixes may be slightly darker than corresponding unmodified mixes.

Packaging

RHEOMIX 141 is supplied in 4,10,20 and 220 litres containers.

Properties*

* Properties listed are only for guidance and are not a guarantee of performance.

Unless otherwise stated typical properties are based on a 3:1 sand/cement mix in which 10 litres of RHEOMIX 141 per 50kg of Type I OPC cement has been incorporated.

+Compressive strength:	40N/mm² dependent on cement used and workability.
Freeze thaw resistance:	Excellent.
Water vapour permeability:	Less than 4gm/m²/24hr, through an 11mm thick test piece.*
Adhesion:	Excellent to concrete, steel, brick, glass, etc.
Co-efficient of thermal expansion:	-20°C to +20°C: 12.8 x 10^{-6} -20°C to +60°C: 12.9 x 10^{-6}
Chemical resistance:	Resists mild acids, alkalis, sulphates, chlorides, urine, dung, lactic acid, sugar, etc.
Resistance to water under pressure - 30m head:	Excellent - no water through a 15mm thick test piece.*

+ indicated strengths are typical. Variation in cement used and workability can give increased strengths.

* RHEOMIX 141 added at 10ltr / 50kg cement.

Standards

WRC (Water Research Council) approved for use with potable water.

Directions for use

Surface preparation

Surfaces to which RHEOMIX 141 is to be applied should be clean, sound and free of deleterious substances.

Remove all laitance, oil, grease, mould oil or curing compound from concrete surfaces using wire brush, scabbler or other equipment as appropriate. Ensure that reinforcing steel is clean and free from grease or oil; remove scale and rust. When repairing spalled or damaged concrete, ensure that the concrete has been cut back to sound material.

Bonding slurry

Wet down absorbent surfaces, such as concrete, brick, stone, etc., ensuring that they are saturated but free of surface water. Prepare a bonding slurry of 1½ to 2 parts cement to 1 part RHEOMIX 141, mixed to a lump-free creamy, consistency. Using a stiff brush, work the bonding slurry well into the damp surface, ensuring that no pinholes are visible. Do not apply bonding slurry at a thickness in excess of 2mm. If a second coat is necessary, it must be applied after the first coat is touch dry. The second coat must be applied at right angles to the first to ensure complete coverage.

(Approximately 20ltr of RHEOMIX 141 mixed with 50kg of OPC Type I cement will give a creamy slurry which will cover 20 square metres of substrate dependent on surface texture and thickness applied.)

Materials for RHEOMIX 141 modified mixes

Sand

Sand should be sharp washed, well graded and free from excessive fines. For general use select a BS 882 C&M (previously Zone 2) sand. For rendering, select a sand complying with BS 1199 Table 1.

Cement

RHEOMIX 141 is compatible with all types of OPC, sulphate resisting Types II and V. For use with other cements, contact Degussa Technical Services Dept. for advice.

Water

The strong plasticising action of RHEOMIX 141 greatly reduces the water cement ratio for any given workability.

RHEOMIX 141

Standard dose is 5ltr per 50kg of cement. For more demanding situations, such as exposure to chemicals or wear, 10ltr per 50kg of cement is recommended.

Mixing

Mixing should be preferably be carried out in an efficient concrete mixer - where available a pan type mixer, such as a Creteangle, is recommended. Hand mixing is only permissible when the total weight of the mix is less than 25kg.

Charge the mixer with the required quantity of sand and cement and premix for approx. 1 minute. Add the RHEOMIX 141 and mix for 2 minutes only, to avoid excessive air entrapment.

Finally, without delay, add the water slowly until the required consistency is achieved. Owing to the strong plasticising properties of RHEOMIX 141, rapid thinning can occur - avoid adding excessive water!

Guide to application

Rendering to vertical surfaces:

Apply the bonding slurry to the prepared surface and then apply the RHEOMIX 141 render into the wet bonding slurry.

Apply RHEOMIX 141 modified mortars in coats at a maximum thickness of 6mm per coat. Greater thickness can lead to slumping. Several coats can be applied in fairly rapid succession, usually within 15 to 30 minutes of the previous coat. Close the surface using a wooden float or steel trowel.

Another method is to let the first coat of render dry overnight and apply another slurry coat before applying the second coat of render. For further details refer to the "Guidelines and Recommendations using RHEOMIX 141".

Screeds and toppings, applied to horizontal surfaces:

Screeds, patches, etc., based on RHEOMIX 141 modified cements, can be laid to any thickness from 60mm down to 6mm minimum. After mixing, the RHEOMIX 141 modified mix should be placed over the still wet bonding slurry, well compacted and struck off to level. It may then be trowelled to the required finish using a wooden float or steel trowel.

Note: Whenever screeds are being laid over existing concrete surfaces, it is important that expansion joints in the sub-floor are carried through the RHEOMIX 141 modified mix. This can be done by fitting a temporary timber batten wrapped in polythene sheet into the joint.

Curing

Correct curing of RHEOMIX 141 modified mixes is important.

Moisture cure for 24 hours and then allow to dry out slowly. (Note that initial curing is necessary to provide good curing conditions for the hydration of the Portland cement, then the latex mortar must be allowed to dry out to permit the latex particles to join together to form the continuous films and strands.)

Watchpoints

1. Never apply RHEOMIX 141 modified mixes or concrete to a bonding slurry that has been allowed to dry out.
2. Always use fresh, cool cement and sharp, clean, well graded aggregate, free of excessive fines.

1. Keep mixing time to a minimum - see recommendations.

2. Until the user becomes familiar with its workability the appearance of a RHEOMIX 141 modified mix is deceptive; when of correct consistency it may appear to be too dry. However, it will be found that it can be compacted and trowelled satisfactorily. Avoid using excessive water.
3. Trowelling should proceed with the work. Do not overtrowel and avoid retrowelling. Protect from too rapid drying out prior to trowelling.

Equipment care

All tools should be cleaned with water immediately after use. If delayed, use of soap and coarse wire wool may help. Solvents such as white spirit can be used to remove partially hardened mortar.

Dosage rate

For all normal use the standard dose of 5ltr of RHEOMIX 141 per 50kg cement is adequate.

For extreme conditions and/or when adhesion, waterproofing, water vapour resistance or chemical resistance are critical, the dosage should be increased to 10ltr of RHEOMIX 141 per 50kg cement. For this higher dosage, the extra water addition required is low and, therefore, use of wet aggregate may result in excessive workability.

Compatibility

RHEOMIX 141 is specifically designed for use with Portland cements. It is also compatible with sulphate-resisting cement, Types II and V.

Lime (more than 10% cement weight), air entraining agents and masonry cement must not be used in conjunction with RHEOMIX 141.

Effects of over dosage

The recommended levels should not be exceeded. Gross overdosage at an acceptable workability is not likely, but will result in an increase of the polymer properties to the detriment of the compressive strength.

Specification clause

All cementitious mixes stated shall be modified with RHEOMIX 141, styrene butadiene copolymer latex, manufactured by Degussa or similar approved, to the following specification:-

Composition	A milky, white styrene butadiene copolymer latex, specifically made for use with Portland cement.

pH	10.5.
Specific gravity	1.01.
Mean particle size	0.17 micron.
Butadiene content	+/- 40% by weight of RHEOMIX 141 polymer.

The material shall be used in bonding slurries at the rate of approximately 1 volume of RHEOMIX 141 to 1½ to 2 volumes of OPC cement and in cementitious mixes at the rate of 5 or 10 litres per 50kg cement, as recommended in the manufacturer's literature.

Storage

Store under cover, out of direct sunlight and protect from extremes of tempe
Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging.
For specific storage advice consult Degussa's Technical Services Department.

Safety precautions

Avoid contact with eyes and prolonged contact with skin.

During application always wear gloves and appropriate clothing to minimise contact. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Should skin contact occur, wash immediately with soap and water. Seek the advice of a physician should symptoms persist.

Note

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