

# MasterEmaco<sup>®</sup> S 443

A single component, microconcrete, based upon applied Nanotechnology especially designed for cast repairs to corrosion damaged concrete

## DESCRIPTION

**MasterEmaco S 443** is a combination of Portland cement, well graded sands, aggregates and special additives to reduce the possibility of shrinkage cracks and to improve physical, and installation properties.

When mixed with water **MasterEmaco S 443** produces a flowable micro concrete ideally suited to cast/poured applications.

## TYPICAL APPLICATIONS

Large volume repairs, to all structural elements within:

- Oil gas and petrochemical foundations supports and retaining walls.
- Jetties piles, harbour walls and other marine structures.
- Columns, Piers and cross beams on highway structures.
- Water production, treatment, intake and outfall structures and sewerage facilities.
- Tunnels, pipes and other below ground construction.
- Cooling towers and chimneys and other industrial environments.
- Beams, columns, walls and slabs in high rise buildings.

## ADVANTAGES

- Improved cement hydration, reduced micro-defects and drying shrinkage better bond using applied Nanotechnology
- Dimensional stable repairs, low permeability and enhanced durability through synergistic shrinkage control systems and best binder models
- High modulus ensuring transfer of loads to parent concrete
- Reduced installation time, easy mixing, and placing of repairs with excellent flow characteristics

## PACKAGING

**MasterEmaco S 443** is available in 25kg bags.

## TYPICAL PROPERTIES\*

@ 3.25 L of water per 25kg bag

Comp. strength @ 28 days BS EN 12190	>65 N/mm <sup>2</sup>
Flexural Strength 28 day BS EN 12190 BS EN 1015	>10 N/mm <sup>2</sup>
Drying shrinkage (ASTM C157 : 93)	<750 microstrain @ 28 days
Modulus of Elasticity BS 1881 Part 121 1983	>27,000 N/mm <sup>2</sup>
Water penetration BS EN 12390 Part 8 2000	<10 mm
Slant shear bond strength ASTM C882	>20 N/mm <sup>2</sup>
Rapid chloride permeability AASHTO T 277 93 ASTM C1202 : 2010	Low
Determination of resistance to carbonation	<2mm @ 60 min

## APPLICATION GUIDELINES

### Substrate preparation

All repair areas must be clean, sound and free from all dirt dust, loose material and any oil or grease which would impair adhesion.

Defective concrete, honeycombing and cold joints must be removed to obtain a roughened surface. The chosen method of preparation should avoid the formation of micro-cracks and fractured aggregate.

The edges of all repairs should be cut vertically to a minimum depth of 20mm.

### Reinforcing steel preparation

Where **MasterProtect 8500CI** is to be applied to the complete structure for corrosion protection and to mitigate the 'incipient anode effect' only removal of loose corrosion products from the reinforcing steel by mechanical means is necessary prior to repair.

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Where **MasterProtect 8500Cl** is not to be applied to the concrete structure and for enhanced durability where chlorides are present in the parent concrete the reinforcing steel should be primed with **MasterEmaco 8100 AP**.

## Priming of the substrate

Generally priming of the substrate is not necessary however the concrete should be thoroughly soaked constantly, to a saturated but surface dry condition for a minimum of 4 hours prior to installation of the repair.

Where soaking with water is not practical an alternative method of priming is by the use of **MasterBrace ADH 1414**.

## MIXING

It is recommended that only full bags of 25kg are mixed.

Single bags may be mixed using a slow speed drill and spiral paddle. For larger repairs and multiple bag mixes a forced action mechanical mixer should be used.

Place the gauging water into the mixing bucket and start the mixer and add the **MasterEmaco S 443** powder. The **MasterEmaco S 443** should be mixed for a approximately 3 minutes until a smooth lump free consistency is achieved.

The water additions shall be 3.0 to 3.5 L per 25kg bag.

In elevated temperatures the **MasterEmaco S 443** should be mixed using chilled water to ensure that the mixed temperature is no higher 32°C.

## Repair installation

Following mixing the **MasterEmaco S 443** can be installed by shutter and casting techniques. Where large pours are necessary the **MasterEmaco S 443** shall be introduced into the shuttering in layers working along the length of the formwork.

**MasterEmaco S 443** is self-compacting and does not require vibration. Simply light tapping of the formwork is required.

The **MasterEmaco S 443** shall be applied at a minimum thickness of 15 mm and a maximum layer thickness of 200mm.

## Additional Aggregate for repairs > 150 mm to 300 mm

For repair areas greater than 150 mm aggregate “bulking” is required. The addition rate for the 5-10mm aggregate should be confirmed by site trials. Typically, the addition rate would be between 20kg of clean dry aggregate (**MasterEmaco FL 100**) per 50kg bag (25kg x 2) of **MasterEmaco S 443**.

Add the aggregates to the mixing water in the forced action mixer and then slowly add the **MasterEmaco S 443** powder and mix thoroughly for 3-5 minutes until a lump-free, free-flowing consistency is achieved.

## CURING

Good curing practice must always be followed. Curing of the installed repair should be carried out by either.

- **MasterKure** curing agents
- Damp Hessian and polythene

## COVERAGE / YIELD

A 25kg bag of **MasterEmaco S 443** will yield approximately 12.2 L of mortar.

One bag of **MasterEmaco S 443** will cover 0.61m<sup>2</sup> at thickness of 20mm. This coverage is theoretical and depends upon the surface profile of the substrate and the wastage.

## WATCHPOINTS

- During summer months or where elevated ambient temperatures are encountered the **MasterEmaco S 443** should be mixed using chilled water to ensure that the mixed temperature does not exceed 32°C.
- Do not add cement sand, or which may affect its properties.
- Do not add water or fresh mortar to material which has begun to set.

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## STORAGE AND SHELF LIFE

**MasterEmaco S 443** should be stored in dry conditions out of direct sunlight. Shelf life is 12 months when stored as above.

## HEALTH AND SAFETY

Avoid contact with eyes and prolonged contact with skin. In case of contact with eyes immediately flush for at least 15 minutes with fresh clean water. Call a physician.

In case of contact with skin wash skin thoroughly.

## QUALITY AND CARE

All products originating from Master Builders Solutions Dubai, UAE facility are manufactured under a management system independently certified to conform to the requirements of the quality, environmental and occupational health & safety standards ISO 9001 and ISO 14001.

\* Properties listed are based on laboratory controlled tests.

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