

# MasterEmaco® S 496

Ultra-high strength, non-shrink, free-flowing “micro-concrete” for structural concrete repairs

## DESCRIPTION

**MasterEmaco S 496** is a pre-packaged blend of Portland cement, carefully graded natural aggregate, specially selected sand, shrinkage control agents, fillers, fluidity aids. When mixed with the stated amount of water it produces a very high strength, cohesive, dimensionally stable, free flowing, precision micro-concrete suitable for form and pour repair applications.

## TYPICAL APPLICATIONS

**MasterEmaco S 496** is the ideal material for vertical or horizontal structural repairs where large concrete section loss warrants the use of formwork or where there is congested reinforcement or impeded access that prevents the use of hand or spray applied repair mortars. Its high ultimate strength makes it ideal for use in heavy load bearing structural repairs.

**MasterEmaco 496** has been developed to fulfill the requirements of EN 1504 Principle 3.2: recasting with concrete, and Principle 4.4: structural strengthening by adding mortar or concrete. Other areas of use include;

- Interior and exterior concrete repair
- Large volume structural repairs Principle 3.1 EN 1504
- Columns strengthening according to Principle 3.2 EN 1504
- Repair of honeycombed concrete
- Foundation rebuilding
- Floors & soffits

## ADVANTAGES

- Shrinkage compensated - unique formulation provides dual expansion system in plastic and hardened states for reduced risk of cracking.
- Reduced heat of hydration allows large scale repairs to be carried out with a drastically reduced risk of thermal cracking.
- Proven and predictable performance - material is precision blended in the factory to ensure consistent results.
- Free flowing / self-compacting: ensures complete filling and eliminates honeycombing in areas of congested reinforcement
- Excellent workability retention even at high ambient temperatures
- High bond strength to steel and concrete

- High early strength development even at flowable consistency enables formwork to be stripped at an early age thus saving time and money
- Impermeable thus high durability
- Very high ultimate compressive strength
- Excellent resistance to chloride ion Ingress

## PACKAGING

**MasterEmaco S 496** is supplied in 25kg bags. Can also be supplied in jumbo 1500kg bags for very large applications.

## STANDARDS

EN 1504 Part 3 R4

## TYPICAL PROPERTIES\*

Wet density	approx. 2200 kg/m <sup>3</sup>
Length change ASTM C157/ C157M:2006	<0.05 % at 7 days <0.03% at 28 days
Compressive strength at 25°C EN 12390 Part 3	>25 N/mm <sup>2</sup> at 1 day >65 N/mm <sup>2</sup> at 7 days >90 N/mm <sup>2</sup> at 28 days
Tensile strength BS 6319 Part 7	>4 N/mm <sup>2</sup> at 28 days
Flexural strength BS EN 12390 Part 5	>12 N/mm <sup>2</sup>
Rapid Chloride Permeability Test ASTM C1202: 2012	<500 coulombs at 28 days
Depth of water penetration under pressure EN 12390 Part 8: 2009	<5 mm
Modulus of Elasticity ASTM C 469/C469M-2014	>30,000 N/mm <sup>2</sup>

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## APPLICATION GUIDELINES

### SURFACE PREPARATION

It is essential that the surface of the concrete to be repaired is sound, clean and uncontaminated. Chloride contaminated or carbonated concrete should be removed by hydro blasting or light chipping hammers taking care not to fracture the aggregate.

A surface profile exposing the large aggregate should be achieved. The repair area should be regular in shape with no sharp returns / internal corners and should be delineated with a 20mm deep saw cut. Feather edging is not allowed. Reinforcing steel should be cleaned to SA 2½. Care should be taken to ensure formwork is water tight and constructed in line with normal concreting practice. The use of formwork tape is recommended in order to eliminate grout loss. The unrestrained surface of the repair should be kept to a minimum and care should be taken to ensure at least 20mm cover to the reinforcement is achieved.

Fill the form with potable water for at least 24 hours and then drain completely before mixing and placing the **MasterEmaco 496**.

The use of **MasterBrace ADH 1414**, epoxy bonding agent is recommended where high soluble salts are present in the parent concrete.

**MasterBrace ADH 1414** epoxy bonding agent is recommended as it prevents migration of deleterious salts such as chlorides or sulphates to the repair area, as well as providing an excellent bond of the new concrete to old.

When **MasterBrace ADH 1414** is used, pre-soaking is not necessary, but care should be taken to ensure formwork is erected and **MasterEmaco S 496** placed within open time of **MasterBrace ADH 1414** (generally within 4 hours) at 25°C.

### PRIMING

Prime reinforcing steel with 2 coats of **MasterEmaco 8100 AP**.

### MIXING

**MasterEmaco S 496** is a precision micro-concrete. It is important that care is exercised in mixing and placing. A mechanically powered mixer or suitable drill and paddle must be used. The specified amount of water to obtain the desired consistency can be varied according to site conditions but should not exceed 3.75 litres per 25kg bag. Never retemper by the later addition of water. Damp down the inside of the

mixer with water prior to mixing the initial batch of **MasterEmaco S 496**. Ensure the mixer is damp but free of standing water. Add the pre-measured quantity of water. Slowly add the **MasterEmaco S 496** powder mixing continuously for 3 to 5 minutes until a uniform, homogenous mix is achieved.

### Additional Aggregate for repairs > 300 mm

For repair areas greater than 300mm aggregate "bulking" is required. The addition rate for the 5-13mm aggregate should be confirmed by site trials. Typically, the addition rate would be between 10 - 15kg's of clean dry aggregate (**MasterEmaco FL100**) per 25kg bag of **MasterEmaco S 496**.

Add the aggregates to the mixing water in the forced action mixer and then slowly add the **MasterEmaco S 496** powder and mix thoroughly for 3-5 minutes until a lump free, free flowing consistency is achieved.

## PLACING / APPLICATION

**MasterEmaco S 496** should be placed in a single continuous operation. Poured material should be introduced slowly to prevent entrapment of air. It is essential to place the mixed material within 15 minutes of batching. Ensure the formwork is secure and watertight to prevent movement and leaking during the placing and curing of the grout. The area should be free of excessive vibration. Shut down adjacent machinery until the "micro-concrete" has hardened (at least 24 hours).

In hot weather, base plates and foundations must be shaded from direct sunlight. Bags of **MasterEmaco S 496** should be stored in the shade prior to use.

## CURING

As with all cementitious material curing is of vital importance to ensure that optimum properties are obtained. Protect exposed surfaces with polythene sheet or apply **MasterKure** curing compound.

# MasterEmaco<sup>®</sup> S 496

## CLEANING

Clean all tools with water. Hardened material can only be removed mechanically.

## COVERAGE / YIELD

When mixed with 3.75 litres of water, one 25kg bag of **MasterEmaco S 496** yields 12.8 litres of mixed mortar.

Therefore, for 1m<sup>3</sup> of repair mortar 78 x 25kg bags are required.

## WATCHPOINTS

The temperature of both the micro-concrete and elements coming into contact with the micro-concrete should be in the range of >10°C to 35°C. Do not use water in an amount or at a temperature that will produce a consistency more than fluid or cause bleeding or segregation. **MasterEmaco S 496** should be placed to a minimum thickness of 50mm and to a maximum depth of approximately 800mm. Actual repair dimensions and location etc. have a large bearing on the overall quantities of material that can be placed. Consult Master Builders Solutions Technical Dept if in doubt. To simulate on-site conditions, it is necessary to restrain cubes for the first 24 hours immediately after casting. **DO NOT OVERWORK AND AVOID USING MECHANICAL VIBRATION. UNDER NO CIRCUMSTANCES SHOULD MasterEmaco S 496 BE RETEMPERED BY THE LATER ADDITION OF WATER.** It is essential that a mechanically powered mixer is used to obtain the optimum properties.

## STORAGE AND SHELF LIFE

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

## HEALTH AND SAFETY

As with other products containing Portland cement, **MasterEmaco S 496** 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.

## 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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## STATEMENT OF RESPONSIBILITY

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## NOTE

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