

### PRODUCT SPECIFICATION

Where designated on the drawings, repairs to concrete will be made using a free flowing, shrinkage compensated micro-concrete mortar compatible with concrete 30-60MPa.

### MATERIAL SPECIFICATION

Unless otherwise shown on Engineering Drawings, a high strength, free-flowing micro-concrete reinstatement mortar compatible with 30 to 45MPa concrete, shall be used for:

- Large Structural sections of concrete up to 200mm thick
- Locations where difficulties of access make hand or trowel applied mortars impractical.

The concrete repair material shall be a blended, pre-packaged cement-based mortar requiring only the addition of potable water. The concrete repair material shall meet all the following typical performance criteria when tested at 21°C as per the below table.

TYPICAL PHYSICAL PERFORMANCE			
PERFORMANCE TEST	TEST METHOD	TYPICAL VALUES	
Determination of compressive strength:	UNE-EN 12190:1999	45.0 MPa (class R4)	
		24 Hours	26.4 MPa
		7 Days	36.8 MPa
		28 Days	45 MPa
Bond strength by pull-off (Without primer (28 days))	UNE-EN 1542:1999	2.5 MPa (Cohesive Failure in Mortar)	
Bond strength by pull-off (With primer (28 days))	UNE-EN 1542:1999	2.5 MPa (Cohesive Failure in Mortar)	
Shrinkage	UNE-EN 12617-4:2002. Controlled movements method	2.5 MPa	
Expansion	UNE-EN 12617-4:2002. Controlled movements method	2.4 MPa	
Carbonation Resistance	UNE-EN 13295:2005	Dk ≤ reference concrete MC(0.45)	
Elastic Modulus	UNE-EN 13412:2008	20.8 GPa	
Chloride ion content	UNE-EN 1015-17:2000	<0.01%	
Capillary absorption	UNE-EN 13057:2002	0.3 kg/(m <sup>2</sup> x h <sup>0.5</sup> )	
Coefficient of thermal expansion	UNE-EN 1770:1990	16.2 μm/m °C	

*\*The repair mortar shall be applied using "form and pour" process or pumped in accordance with the manufacturer's product data sheet.*

#### A repair material that meets the requirements is:

- Eucocrete FLO – Available from: TREMCO CPG – [www.tremco.com.au](http://www.tremco.com.au)

#### Ancillary products from Tremco Include:

- Eucocrete Zincrich Primer – Primer for steel reinforcing
- Evencure AC or Evencure XDS-NXGEN – Curing compound
- Formrelease WB – Form release oil
- Sentinel Galvanic Anodes- Galvanic anodes

### SURFACE PREPARATION

#### Concrete Surfaces

- All areas to be repaired are to be clearly marked out by the client's representative in rectangular, or square shapes.
- Saw-cut concrete around the outlines of the marked-up areas to a minimum depth of 25mm, ensuring all cuts are perpendicular to the surface, to avoiding featheredging.
- Long narrow repair areas shall be avoided.
- Side edges of the saw cuts must be mechanically roughened to create adequate mechanical bond.
- The perimeter of the repair shall be kept to a simple shape and sharp angles avoided.

- ❑ Completely remove all loose, delaminated and weak concrete to a minimum depth of 50mm up to the saw cut edge. Avoid abrupt changes in depth.
- ❑ Clean the surface and remove any dust, oil, grease, paint and / or other contaminants.
- ❑ Prepare concrete using acceptable mechanical means and concrete cleaners and degreasers as necessary to obtain clean, sound and rough surfaces. Coarse aggregate shall be exposed.
- ❑ All cracks shall be brought to the attention of the engineer and a determination made of whether the cracks are subject to movement.
- ❑ The cracks shall be repaired as directed by the engineer prior to application of the repair material.
- ❑ Soak concrete thoroughly with potable water for a minimum of 2 hours prior to placement of the repair material.
- ❑ Concrete shall be saturated and free of standing water at time of repair material placement (surface saturated dry). Any free-standing water should be drained from formwork or vacuumed up immediately before application of the repair mortar takes place.

## STEEL REINFORCEMENT

- ❑ All reinforcing steel that has lost bond with the concrete must be fully exposed around the entire perimeter of the bar to a minimum depth of two times the maximum aggregate size.
- ❑ Continue to remove concrete along all exposed reinforcing bars to at least 50mm beyond the point of corrosion.
- ❑ All steel reinforcing bars must be securely anchored, with an appropriate lap length as directed by the engineer.
- ❑ If more than 10% of the diameter of a reinforcing bar has been deteriorated, the bar will require replacement or will need to be spliced as directed by the engineer.
- ❑ Corroded steel should be mechanically cleaned to remove all signs of oxidation and thoroughly high pressure washed with clean water to ensure removal of debris and residual contamination.
- ❑ All exposed steel reinforcing bars shall be free of all loose scale, rust, and other contaminants around the entire perimeter of the bar to achieve a surface preparation at least equivalent to Class SA 2.5 "near white metal" as per AS 1627.4.
- ❑ Particular attention is to be paid to the back of the exposed steel reinforcing bars.
- ❑ The minimum cover over reinforcement shall be in accordance with job specifications.
- ❑ If required, any additional protective treatments, and electrochemical protection for the steel reinforcement shall be undertaken as directed by the engineer, as soon as practically possible after the steel reinforcement has been appropriately prepared.

## FORMWORK

- ❑ Formwork shall be constructed of rigid and non-absorbent materials to ensure that no water is absorbed from the repair material.
- ❑ Formwork must be securely anchored, watertight and strong enough to resist forces created when placing the repair material.
- ❑ Formwork shall be coated with a suitable form release agent.
- ❑ Formwork must include drainage outlets for pre-soaking and air relief holes for pumping / pouring applications.
- ❑ Pump Ports, or "Bird Mouth" formwork shall be provided as necessary for the installation of repair material, venting and/or monitoring progress of the repair materials placement.

## ENVIRONMENTAL CONDITIONS

- ❑ Repair material & surfaces to be repaired should be pre-conditioned to between 4°C and 35°C.
- ❑ Optimum temperatures will be between 12°C & 25°C.
- ❑ Shade the material from direct sunlight as necessary.
- ❑ Store material in an area that is clean, dry & protected from the elements.

## MIXING

### Pan Mixer (Stationary Barrel with Moving Paddles for multiple unit mixes)

- ❑ Provide an adequate number of mixers in good operating condition for uninterrupted placement.
- ❑ Do not exceed one-half of the maximum capacity of the mixer.
- ❑ Pre-wet mixer ahead of mixing and then empty excess water.
- ❑ Start by adding the minimum amount of pre measured clean water to mixer.
- ❑ While mixing, gradually add the repair material and mix to a uniform consistency.
- ❑ Add remaining water as necessary to achieve desired workability.
- ❑ Total mixing time should be between 4 to 5 minutes.
- ❑ Do not exceed maximum water content as printed on product packaging or an amount that will cause segregation.
- ❑ Do not mix more material than can be placed within the working time of the repair material.
- ❑ Do not re-activate the mix by adding additional water.
- ❑ Avoid splitting kits of repair material i.e., only mix full units.

- Aggregate Extension:
  - For pours deeper than 200mm the concrete repair material may be extended by the addition of coarse aggregate.
  - For pours requiring aggregate extension, add aggregate before final water adjustment.
  - Contact manufacturer for detailed aggregate extension guidelines.

### Drill and Paddle Mixer (Single Bag Mixes)

- Place the minimum amount of pre measured potable water into a clean mixing bucket.
- While mixing at a slow speed, slowly add repair material and mix to a uniform consistency.
- Add remaining water to achieve desired workability.
- Do not exceed maximum water content as printed on product packaging or an amount that will cause segregation.
- Total mixing time should be between 4 to 5 minutes.
- Do not mix more material than can be placed within the working time of the repair material.
- Do not re-activate the mix by adding additional water.

## PLACEMENT

### Form & Pour

- Chutes, "Birds Mouth" formwork, wheelbarrows, buckets or similar equipment may be required for material placement.
- For vertical repairs, material shall be poured into formwork in a manner to avoid segregation.
- Do not allow material to fall freely over reinforcement or other embedded materials.
- Repair material must be poured continuously from one side of repair area to the other starting at the lowest point.
- Placement must be continuous to prevent cold joints.
- Continue placement until repair area is completely filled.

### Form & Pump (For large vertical and overhead repairs with congested reinforcing)

- For pumping applications, standard concrete pumping practice must be followed.
- The size and type of the pump and the diameter of the discharge hose used are dependent on the installation parameters.
- The minimum inside diameter of the discharge hose shall be three times greater than the maximum aggregate size
- Contact pump and material manufacturers for equipment recommendations and additional technical guidelines.
- The repair material shall be mixed to a consistency that will not segregate while pumping.
- Before pumping, determine working time of material under jobsite conditions. Pump-ability shall be determined by field testing and / or pre installation mockup trials if required.
- The pump shall be set up to minimize pumping distance.
- Immediately prior to pumping, the pump and hoses shall be primed with a slurry of repair material and run until the hopper is empty.
- Once pumping has begun, it is important not to use any of the priming slurry from the discharge hoses. The primer mix must be discharged as waste.
- Pumped material shall not be used until a uniform consistency is obtained at the discharge nozzle.
- Mix enough repair material to keep the pump hopper at least half full. The material shall be placed into pump hopper in a manner to prevent air entrapment and segregation.
- Once form is completely filled, close off all air vents and ports and stop pumping. Then close off the formwork inlet port.

## CURING

- Correct curing is essential to ensure optimum performance.
- Formwork must be left in place for as long as practically possible to provide best possible curing conditions.
- Immediately after formwork is stripped, all exposed faces of the repair should be thoroughly soaked with clean water.
- The surface saturated dry repair material must then be sprayed with a liquid curing membrane.
- In extreme weather conditions, supplementary curing with polyethylene sheeting or an AS 3799 compliant curing compound should be considered.
- Wet curing shall begin as soon as the material has set.

## PRE-SOAKING - SUBSTRATE PRIMING

- Pre-soaking the formed repair area with clean water helps to ensure good adhesion of the Eucocrete FLO at the interface of the concrete and improves the flow of the product during the installation. The area should be filled with clean water for a minimum 2 hours before the application takes place.
- Immediately before application takes place, any free water should be removed by draining or vacuum.

## DISCLAIMER

Tremco CPG Australia Pty Ltd products are manufactured to rigid standards of quality. Any product which has been applied (a) in accordance with Tremco CPG Australia written instructions and (b) in any application recommended by Tremco CPG Australia, but which is proved to be defective, will be replaced free of charge.

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