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Cementitious Systems

FASTAPLUG Structural Grade Repair

Description

Fastaplug Cement is a pre-packaged, specialised repair cement based on the latest polymer cement technology, it provides a simple, cost effective, rapid repair system for insitu and precast concrete levelling applications, patching water retaining structures or pipes, plugging voids and repair of damaged waterproof screeds. **Fastaplug** is a structural grade repair product being waterproof and slump free with exceptional compressive adhesion strengths and shrinkage compensation. This product has many and varied applications with and without additional aggregate. It can be used in vertical, overhead and other difficult areas of repair without the use of primers, special lightweight aggregates or support. To achieve a matched surface finish to any Fastaplug repair, Fastapatch cements can be used, being totally compatible.

Benefits

- Ready to use; simply add clean water.
- A versatile cement which, when mixed with water and various aggregate combinations, can produce end product from a grout through to a structural concrete mix.
- Produces shrinkage compensated, high strength (60N/mm²), rapid setting, slump free, hardwearing mortar mix.
- Completely compatibility with existing cured concrete properties, ensuring excellent monolithic performance.
- Bond strength higher than tensile strength of standard concrete. No special primers necessary.
- Waterproof when cured (ISAT).
- Polymer modified to provide superior adhesion (50N/mm²) and give protection from acid gasses, moisture ingress and chloride attack.
- Ideal for use in cold and damp conditions.
- Exceptional freeze/thaw resistance.
- Excellent finishing and feather edging characteristics.
- Compliance with WRAS (Cert No 0503518) and DWI (Cert No.56495) requirements ensures **ideal for use in structures containing potable water**.
- Complies with Clause 6, of DTP Standard BD 27/86 "Materials for the repair of Concrete Highway Structures".

Technical Data

Typical values

Compressive Strength to BS 4551: 1980

Age 20°C	Density (Kg/mm ³) BS 1881 Pt: 114	Compressive Strength (N/mm ²)
1 hr	2148	9-15
2 hrs	2135	20-22
4 hrs	2117	28-32
24 hrs	2128	45-50
7 days	2140	55-60
28 days	2182	65-75

Water Permeability BS 1881 Pt 5: 1970 (ISAT)

Time	Initial Absorption (MI/M ² /sec)		
10 mins	Zero	Zero	1.140
2 hours	Zero	Zero	0.60

Cured at 20°C and 100% RH, Water/Cement ratio is 14%

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Coefficient of Thermal Expansion: The coefficients for **Fastaplug** are full compatible with typical concrete, $15 \times 10^{-6}/^{\circ}\text{C}$

Flexural Strength: Flexural Strength to BS4551: 1980 8.5-9.5 N/mm²

Bond Strength: Bond Strength to Concrete BS 6319 Pt 4: 1984, 28 day slant/shear method 45-55 N/mm²

Shrinkage Compensation: 0.007% at 28 days without curing assistance in a free unrestrained situation.

Setting Times: Standard Mix 10-15 minutes

Aggregate Mix 20-25 minutes dependent upon ambient temperature and water content.

NB. During a plastic state (just prior to initial set) Fastapatch can be cut, shaped and smoothed, use a clean, dampened steel spatula or trowel.

Temperature Limitations: As with concretes, do not apply below 5°C, without protection system.

In hot climatic conditions use good curing practice and keep powder below 25°C.

Yield: 1Kg of **Fastaplug** yields 500 cc or 2.15Kg/mm/m².

Application

Surface Preparation

Ensure surface for repair is clean and free from any deleterious substances. Laitance should be removed by mechanical means and any oils or greases, etc. can be removed using Degreaser

Exposed reinforcement should be cleaned and dimensionally checked. With **Fastaplug** there is no requirement for excessive mechanical keying or rebating of edges, 5mm minimum is sufficient, due to its superior bonding and feather edge capabilities.

NB. Do not attempt repairs at ambient temperatures below 5°C without protective measures or to a substrate with a strength less than 20N/mm².

Priming

Fastaplug cement does not use a separate primer system. The prepared surface should be thoroughly dampened with clean water, to reduce suction and any excess surface water removed prior to filling or commencing the repair.

N.B. If concrete to be repaired is new (hours old) use warm water to prevent thermal shock.

Mixing

Mix **Fastplug** cements with clean water 14% by weight or 5.5 parts to 1 part water by volume. Mix only enough **Fastplug** as can be used in a period of 10-15 minutes (dependent upon ambient temperature), if aggregate is introduced this placing time is increased (assess by trial mix).

Always add powder to water to ensure ease and thoroughness of mixing without ingress of air.

For large quantity mixes (over 4Kg) at one time mix thoroughly by mechanical means (slow speed drill and paddle) to obtain a cohesive thixotropic material, for larger mixes (over 25Kg) use a forced action pan mixer. DO NOT attempt to remix mortars by the addition of more water after initial mixing process is completed. Clean equipment and any spillage with water immediately after use.

Application

1 CRACK FILLING. For „dead cracks“ chase out a minimum of 5mm depth, dampen down thoroughly with clean water, remove any excess surface water prior to repairing. For horizontal crack repair use **Fastplug** at a grout consistency achieved with increased W/C ratio. For vertical cracks chase out to depth of crack and fill with **Fastaplug** standard mix (putty consistency).

NB. Fastaplug can be used as putty filler in conjunction with proprietary crack injection systems.

For „live“ cracks contact our Technical Department for assistance.

2 For SMALL REPAIRS apply **Fastaplug** standard mix onto prepared substrate using a compaction technique. This helps to remove entrapped air. Apply in layers not exceeding 50mm on vertical and soffits situations or 100mm in

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pockets. If necessary support with shuttering to allow for compaction if working to reveals. For deeper repairs, subsequent layers can be applied, providing previous layers are well keyed and stable but not fully cured – usually 20 to 30 minutes dependent on temperature. This will ensure a complete monolithic bond. Inter layer pre-wetting is unnecessary. For final profiling use a steel trowel, cleaned regularly with a damp cloth. If surface colour match is required refer to Application 8.

- 3 **PLUGGING and TIE HOLE FILLING.** Using the standard mix ratio, a putty like consistency is achieved (without additional aggregate) that is ideally suited to hand placement for most plugging applications. All seepage or infiltration of water through the substrate must be temporarily stopped prior to the application of **Fastaplug** filler. For tie hole filling or other cast in component applications, **Fastaplug** or Tieplug can be plugged easily into a tie hole after withdrawal of the „she” bolt and corking procedures are completed. For „through ties” ensure any plastic tube left in the wall is removed or drilled out back to 50mm from the concrete face. Dampen down the hole surface concrete and plug with standard mix, compacting thoroughly to ensure a watertight fill. If a cosmetic finish is required leave the last 20mm of fill for Fastapatch (see Application 8).
- 4 **REPAIRS GREATER THAN 100mm DEEP.** Use preparation techniques as previously specified, except in the area of rebating edges which will now be dependent on the size of the aggregates introduced. A clean, coarse, hard aggregate (5-10mm size) can be introduced in equal proportions by weight without adversely affecting the physical performance of **Fastaplug**. For a deeper repair than 300mm use a layer build technique (as per Application 2) in 300mm maximum layers. With an addition of up to 50% by weight (2:1 approx) of aggregate there will be an extension of initial setting time (20-25 minutes) and a similar delay period (35-45 minutes) will be necessary between interlayer applications to ensure complete monolithic bond. These figures are dependent on the ambient temperature and the temperature of the substrate. If setting time is critical test by trial mix or contact our Technical Department for assistance.
- 5 **PATCHING.** **Fastaplug** and aggregate mixes are ideal for use on roadways, bridges, reservoirs, water treatment tanks, deteriorated concrete or masonry structures, concrete pipes and sewage culverts. Deep repairs can be filled (as per Application 4) with or without additional aggregate. In the case of porous substrates an initial slurry coat of **Fastaplug** should be applied prior to the use of the repair mix. The use of **Fastaplug** cement with its fibre reinforcement, fast setting time and high bond/compressive strengths properties will allow traffic bearing patches to be in service within an hour (9-10N/mm²). Other properties of freeze/thaw resistance, durability, shrinkage and slump characteristics are essential in this type of application.
- 6 **LEVELLING.** Manholes, runways, fixings, crane rails, floors, kerbs, stairs, copings and other areas where trafficking and speed of repair is important. A slight increase in water content will give a more mobile mix without loss of waterproofing qualities and facilitate ease of placement. Aggregates can be added to give increased yield and economy, ensure clean, hard and graded; dependent on application, use medium sand graded up to 5mm aggregate. For setting manhole rings and covers, **Fastaplug** mixes have a consistency which permits the ring to be levelled even on a slope or curve allowing application of hot or cold applied asphalt coats and trafficking within 1-2 hours.
- 7 **REPAIR OF DAMAGED WATERPROOF SCREEDS.** **Fastaplug** is ideally suited to spot and small repairs (i.e. less than 0.5 m² by 50mm depth). Modification of the water/cement ratio can be implemented within the following criteria:- 5.4 to 5.6 parts **Fastaplug** to 1 part water by volume. Addition of up to 30% by weight (3:1 approx) of clean, hard, medium grade sand can also be considered for special finishes. To achieve a strong monolithic repair, ensure substrate has a clean, well keyed surface and a step back lap joint of approximately 100mm onto the existing screed material. Additionally, lap joints as well as day joints must be well keyed to enhance adhesion and provide a weatherproof repair. The minimum recommended thickness of **Fastaplug** standard mix should be 12mm with a maximum 50mm in single layer applications. (Refer to layer build data in Application 2 for thicker repairs to screeds.)
- 8 **COLOUR AND TEXTURE MATCHING.** For matching existing concrete surface texture and colour use Fastapatch Cements. Supplied in grey and white formulations, used individually or mixed; in conjunction with fine aggregate from existing concrete mix (if necessary for colour) a perfect matched concrete can be achieved. Fastapatch is fully compatible with **Fastaplug** and can be used to finish off the last 20mm depth (minimum) of any repair using the interlayer technique.

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Cleaning

Always keep equipment clean, washing off **Fastaplug** mixes with water before they have set. If allowed to set, mechanical cleaning will be required.

Curing

Fastaplug cement used in small repairs does not normally require curing. However, for large repairs, or use in hot climatic conditions, normal concrete curing techniques are recommended, i.e. damp hessian or white polythene sheet.

Compatibility and Subsequent Treatments

Fastaplug repairs are compatible with concretes based on different types of hydraulic cement, its unique properties providing the necessary repair parameters in a majority of cases. It is also compatible with all recommended coatings and finishes as applied to concrete, application of these should be carried out after a cure period of 7 days minimum (concrete being 21 days minimum). The use of impregnates however will not be effective as the repair is already waterproof. Cementitious based coatings can generally be applied within hours of a repair.

Packaging

Sealed polybags inside:
25Kg self seal poly tubs

Storage

No precautionary label requirements. Store in dry conditions where possible and always reseal tubs after use. **Fastaplug** is supplied with double protection consisting of polybags and sealed tubs, ideally suited for transportation and storage even in the most difficult climatic conditions.

Health and Safety

The principle ingredient of Fastaplug is modified Portland cement, non-toxic but alkaline;
Irritating to eyes, respiratory system and skin.
Risk of serious damage to eyes.
Keep out of reach of children.
In case of contact with eyes, rinse immediately with plenty of soap and water.
Wear suitable protective clothing, gloves and eye/face protection.

Separate **Fastaplug** Health & Safety Sheet is available on request.

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