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MAPEI®

Planitop® XS

One-Component, Fast-Setting Extended-Working-Time, Vertical, Horizontal and Overhead Repair Mortar

DESCRIPTION

Planitop XS is an extended-working-time variation of *Planitop X*. Shrinkage-compensated, fiber-reinforced, polymer-modified and containing a proprietary corrosion inhibitor, *Planitop XS* features *Planitop X*'s outstanding workability and versatility. Ideal for a wide variety of vertical, overhead and horizontal concrete repairs, *Planitop XS* can be applied from featheredge to 4" (10 cm) per lift. *Planitop XS* dries to a light gray color, blending well with most concrete surfaces.

FEATURES AND BENEFITS

- Easy to use, requiring only the addition of potable mixing water or *Planicrete® AC*
- Formulated with extended working time (double the working time of *Planitop X*) and fast-curing, to reduce downtime and expedite return to service
- Excellent compressive and flexural strengths
- The outstanding sculptability after initial set provides unrivaled finishing flexibility and quality of finished repair.
- The high density (with very low coulombs) produces greater resistance to chloride attack and carbonation than ordinary mortars.
- Strong bond to existing properly prepared concrete
- Shrinkage-compensated with exceptional resistance to micro-cracking
- Excellent resistance to freeze/thaw cycling and de-icing salts
- Outstanding workability: easily blended into the concrete surface to help disguise the repaired area
- The light gray color resembles originally placed concrete.

INDUSTRY STANDARDS AND APPROVALS

- Meets or exceeds requirements for ASTM C928 R2 mortar

WHERE TO USE

- For repairing cast-in-place, precast, tilt-up and post-tensioned concrete structures, such as tunnels, bridges, overpasses, retaining walls, beams, building facades, parking garages, ceilings and balconies
- For treating blemishes and defects on vertical and overhead concrete surfaces, such as the filling of honeycombs, voids, cavities and rigid joints
- For repairing surfaces exposed to high abrasion: canals, industrial floors, curbs, ramps, roads and sidewalks
- For reconstructing architectural features requiring a moldable and sculptable mortar
- For smaller horizontal repairs with light foot traffic

LIMITATIONS

- Only use on surfaces properly prepared in accordance with International Concrete Repair Institute (ICRI) guidelines regarding proper surface preparation based on the intended installation (surface profile amplitude of between 1/4" and 3/4" [6 and 19 mm] clearance behind corroded reinforcing steel). Reference "Related Documents" section for applicable ICRI and ACI guidelines.
- Aside from using *Planicrete AC* in place of water, do not add additives, cement or aggregates to *Planitop XS*.
- Use at temperatures above 41°F (5°C). For temperatures over 85°F (29°C), use ACI hot-weather guidelines.
- Do not use *Planibond 3C* as a bonding agent between new and existing concrete and *Planitop XS*.
- Use only unopened, undamaged bags of *Planitop XS*.
- Mix to the desired consistency depending on application. Do not attempt to re-temper *Planitop XS* after it has been mixed.

- Do not use solvent-based curing compounds.
- For smaller horizontal repairs with light foot traffic (consult with Technical Services Department for installation recommendations and conditions not listed)

SUITABLE SUBSTRATES

- Properly prepared, structurally sound, fully cured concrete substrates (at least 28 days old)

Consult MAPEI's Technical Services Department for installation recommendations regarding substrates and conditions not listed.

SURFACE PREPARATION

- Remove any deteriorated, carbonated or otherwise distressed concrete, as well as any previously applied repair mortar, to provide a sound substrate.
- Ensure that all substrates are structurally sound, stable, solid, clean and free of dust, oil, grease, paint, tar, wax, sealers, curing compounds, form release agents, primers, laitance, loose particles, and any foreign substance or debris that could reduce or impair adhesion.
- Mechanically roughen the surface to a surface profile of between 1/4" and 3/4" (6 and 19 mm) clearance behind corroded reinforcing steel by abrasive blasting, shotblasting, water-jetting, scarifying or other engineer-approved mechanical means.
- Reference ICRI Technical Guideline #310.1R-2008 and ACI RAP Bulletins 6 & 7 for repair geometry, surface preparation and material application details.
- Neutralize any trace of concentrated alkalies or acids, as required.
- Clean the exposed metal in accordance with The Society for Protective Coatings (SSPC) guidelines and coat with *Mapefer™ 1K* or *Planibond® 3C*.
- Ensure that the concrete substrate is saturated surface-dry (SSD) before installation of *Planitop XS*. The concrete surface should be free of any standing water. Do not apply the mortar on a substrate covered with a film of water.

MIXING

Note: Choose all appropriate safety equipment before use. Refer to Material Safety Data Sheet (MSDS) for more information.

1. Into a clean container, pour 3/4 of cool, clean potable water as needed for the intended installation – about 0.9 U.S. gals. (3,41 L) of water per 50 lbs. (22,7 kg) of powder. Add the remaining 1/4 of potable water to bring to the desired consistency.
2. If *Planicrete AC* is to be substituted for water, mix about 0.9 to 0.95 U.S. gals. (3,41 to 3,60 L) of *Planicrete AC* per 50 lbs. (22,7 kg) of *Planitop XS* powder.
3. Slowly and continuously add *Planitop XS* to the water or *Planicrete AC*, while mixing with an electric drill (of at least 7.8 amps at 350 to 650 rpm) with a box or propeller-type mixing paddle. Mix for 2 to 3 minutes to obtain a lump-free, homogenous consistency. *Planitop XS* has a pot life of 15 to 20 minutes at 73°F (23°C).

PRODUCT APPLICATION

1. Read all installation instructions thoroughly before installation.
2. Application should take place as soon as the *Planitop XS* is mixed. First, apply a scrub or bond coat of *Planitop XS* onto the SSD concrete surface. The scrub coat should be applied thinly (at about 1/8" [3 mm]) and worked thoroughly into the surface profile to ensure full coverage of the area to be repaired. Use a trowel to immediately begin the build process, pressing the material firmly around all pretreated reinforcement. Apply up to a maximum thickness of 4" (10 cm). Large, unconfined or overhead repairs may require multiple lifts of no more than 2" (5 cm) per lift.
3. If successive lifts are to be completed, leave the first lift rough and immediately score the surface (about 1/4" [6 mm] deep) with the edge of the trowel in a continual "X" or "H" pattern (a hand rake may be used). Allow the *Planitop XS* to take an initial set (after about 50 minutes at 73°F [23°C] and 50% relative humidity). Dampen the surface lightly with potable water and again install a scrub coat followed by a build coat. Avoid building the material in multiple lifts that exceed 8" (20 cm), to avoid excessive heat generated in the hydration process.
4. Sculpting and molding of the repair area should begin as soon as the *Planitop XS* takes an initial set. Use the edge of a trowel to shave off excess material. Using a medium-density sponge lightly dampened with potable water, gently rub the repair area in a circular motion to remove surface imperfections and blend the repair with the original substrate configuration. Do not overwet the sponge or repair area during the finishing process.
5. When placing *Planitop XS* in vertical and overhead installations, use either existing/new reinforcement or a pinning system to provide adequate mechanical anchoring and bond to the structure. Review this issue with the project engineer before beginning the repair process.

CURING

1. Curing should begin as soon as possible after application of *Planitop XS*. Protect surfaces against accelerated water evaporation aggravated by exposure to direct sun, heat or wind.
2. Cure larger repair areas by misting or by standard damp-curing methods. Using a fine mist tip, spray water periodically on the surface for the first 24 hours after placement of *Planitop XS*, or use damp burlap or white polyethylene sheets.
3. Water-based curing agents may be used. Do not wet-cure or use a solvent-based curing agent. Reference ACI 308 for curing.

CLEANUP

Fresh *Planitop XS* is easily removed from tools and equipment with water. Cured *Planitop XS* must be mechanically removed.

PROTECTION

- See also the "Curing" section. If a coating system is to be used over the *Planitop XS*, any existing curing membrane should first be mechanically removed.
- Follow ACI guidelines when placing and curing *Planitop XS*.
- In hot weather, avoid installations in the direct sun and use cold mixing water.

Product Performance Properties

Application Properties (mixed with water)*

Laboratory Tests	Results	
Mixing ratio	0.9 to 1.05 U.S. gals. (3,41 to 3,97 L) of water per 50-lb. (22,7-kg) bag, or by volume about 3.8 to 4.3 : 1 (*Planitop XS* : water) . On vertical/ overhead surfaces, use minimum water at 0.90 U.S. gal. (3,41 L); on horizontal surfaces, use maximum water at 1.05 U.S. gals. (3,97 L).	
Working time	15 to 20 minutes	
Initial set	50 minutes	
Final set	2 hours	
Density	131 lbs. per cu. ft. (2,100 kg per m^3)	
Pull-off bond strength – ASTM C1583 (CSA CAN/A23.2-6B) (failure in concrete substrate)		
7 days	> 290 psi (2 MPa)	
28 days	> 290 psi (2 MPa)	
Compressive strength – ASTM C109		
1 day	> 4,600 psi (31,7 MPa)	
7 days	> 5,900 psi (40,7 MPa)	
28 days	> 6,500 psi (44,8 MPa)	
Flexural strength – ASTM C348		
1 day	> 825 psi (5,69 MPa)	
28 days	> 1,200 psi (8,28 MPa)	
Tensile strength – ASTM C307		
7 days	> 400 psi (2,76 MPa)	
28 days	> 450 psi (3,10 MPa)	
Modulus of elasticity (MOE) – ASTM C469		
28 days	3.23×10^6 psi ($2,23 \times 10^4$ MPa)	
Permeability to chlorides – ASTM C1202		
28 days	Very low – 372 coulombs	
Scaling resistance – ASTM C672		
28 days	0 loss, no scaling (50 cycles)	
Slant/shear bond strength – ASTM C882 (modified)		
1 day	> 1,320 psi (9,10 MPa)	
7 days	> 1,500 psi (10,3 MPa)	
28 days	> 2,000 psi (13,8 MPa)	
Length change – ASTM C157 (meets ASTM C928 requirement)	ASTM C928 specification	*Planitop XS* typical value
Air-cured	< -0.15%	< -0.06%
Water-cured	< +0.15%	+0.04%

** All tests performed at 73°F (23°C) and 50% relative humidity with a mixture of at least 0.99 U.S. gals. (3,75 L) of water per 50-lb. (22,7-kg) bag of Planitop XS. An increase in water content will alter listed properties.*

Application Properties (mixed with *Planicrete AC*)**

Laboratory Tests	Results
Mixing ratio	0.9 to 0.95 U.S. gals. (3,41 to 3,60 L) of *Planicrete AC* per 50 lbs. (22,7 kg) of powder
Working time	20 minutes
Initial set	35 minutes
Final set	70 minutes
Compressive strength – ASTM C109	
1 day	> 5,500 psi (37,9 MPa)
7 days	> 6,900 psi (47,6 MPa)
28 days	> 7,600 psi (52,4 MPa)
Flexural strength – ASTM C348	
1 day	> 950 psi (6,55 MPa)
7 days	> 1,300 psi (8,97 MPa)
28 days	> 2,000 psi (13,8 MPa)
Pull-off bond strength – ASTM C1583 (CSA CAN/A23.2-6B) (failure in concrete substrate)	
7 days	> 290 psi (2 MPa)
28 days	> 290 psi (2 MPa)
Slant/shear bond strength – ASTM C882 (modified)	
1 day	> 1,400 psi (9,66 MPa)
7 days	> 1,600 psi (11,1 MPa)
28 days	> 2,100 psi (14,5 MPa)

*** All tests performed at 73°F (23°C) and 50% relative humidity with a mixture of 0.93 U.S. gals. (3,52 L) of Planicrete AC per 50-lb. (22,7-kg) bag of Planitop XS. An increase in Planicrete AC content will alter listed properties.*

Planitop® XS

Shelf Life and Application Properties (before mixing)

Shelf life	1 year in original packaging stored in dry, covered and heated place
Physical state	Powder
Color	Light gray
Dry- solids content	100%

Protect containers from freezing in transit and storage. Provide for heated storage on site and deliver all materials at least 24 hours before work begins.

CSI Division Classifications

Maintenance of Concrete	03 01 00

Packaging

Product Code	Size
13050000	Bag: 50 lbs. (22,7 kg)
13051000	Pail: 50 lbs. (22,7 kg)

Approximate Product Coverage*

Size	Yield (ASTM C138)
Bag, 50 lbs. (22,7 kg)	0.46 cu. ft. (0,013 m^3)

** Coverage shown is for estimating purposes only. Actual jobsite coverage may vary according to substrate conditions and setting practices.*

- In cold weather, use water that is conditioned to about 70°F (21°C).
- Store *Planitop XS* in its original packaging in a dry, covered and heated area.

RELATED DOCUMENTS

MAPEI's Technical Bulletin "The Impact of Cold Weather on Repair Materials"	010810-TB**
Vertical and Overhead Spall Repair by Hand Application	ACI RAP Bulletin 6
Spall Repair of Horizontal Concrete Surfaces	ACI RAP Bulletin 7
Standard Specification for Curing Concrete	ACI 308.1
Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion	ICRI Technical Guideline #310.1R-2008 (formerly #03730)

*** At www.mapei.com*

Refer to MAPEI's MSDS for specific data related to VOCs, health and safety, and handling of product.

STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**

We proudly support the following industry organizations:

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