DIVISION 3 - CONCRETE

Section03550 - Concrete Toppings
Section 03720 - Concrete Resurfacing
Section 03730 - Concrete Rehabilitation

Part 1 – General

1.01 Summary

A. This specification describes the patching of interior and/or exterior horizontal, vertical or overhead surfaces with a polymer modified, portland cement mortar.

1.02 Quality Assurance

A. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have experience with the application concrete repairs products preferably with the product specified.

B. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 Delivery, Storage, and Handling

A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, and product identification. Damaged material must be removed from the site immediately.

B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.

1.04 Job Conditions

A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 50ºF (5ºC) and rising.

B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified material.

1.05 Submittals

A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.06 Warranty

A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year.

Part 2 - Products

2.01 Manufacturer

A. **PATCHCRETE**, as manufactured by Lyons Manufacturing, Inc, is considered to conform to the requirements of this specification.

2.02 Materials

A. **PATCHCRETE,** a Polymer-modified Portland cement mortar:

1. Component A shall be a liquid polymer emulsion of an acrylic copolymer base and additives.

2. Component B shall be a blend of selected portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability, and an organic accelerator.

3. The materials shall be non-combustible, both before and after cure.

4. The materials shall be supplied in a factory-proportioned unit.

5. The polymer-modified, portland cement mortar must be placeable from featheredge to 2 1/2" for horizontal underlayment applications, 3/8" to 2 1/2" for horizontal wearing surface applications, and no more than 2 1/2" for vertical/overhead applications per lift. Vertical and overhead applications are generally limited by mortar stiffness and configuration of repair.

B. Optional Primer for standard absorbent concrete shall be **P-100 Primer**.

C. Optional Primer for non-porous subfloors shall be **EP-200 Epoxy Primer**.

D. Aggregate for mixing, if used, shall be well graded, washed non-limestone gravel (3/8" or larger).

E. Water shall be clean, potable, and sufficiently cool (not warmer than 70°F).

2.03 Performance Criteria

A. Typical Properties of the mixed polymer-modified, portland cement mortar:

1. Working Time: Approximately 25 minutes

2. Initial Set: 4 Hours

3. Color: concrete gray

B. Typical Properties of the cured polymer-modified, portland cement mortar:

1. Compressive Strength (ASTM C-109 Modified)
    a. 7 day: 4000 psi min.
    c. 28 day: 5000 psi min.

2. Flexural Strength (ASTM C-348 Modified) @ 28 days: 1500 psi

3. Bond Strength (ASTM C-1043 Modified) @ 28 days: 1200 psi

Note: Tests above were performed with Air Cured

Part 3 – Execution

3.01 Surface Preparation

A. All surfaces must be clean and structurally sound; free of dust, grease, oil, paint, sealers, etc. Pores of the concrete surface must be open to permit proper bonding, especially on fresh "green" concrete. Any necessary surface preparation may be done by shotblasting, scarifying, sandblasting or acid etching. If acid etch is used, be sure to neutralize surface, clean and brush thoroughly.

B. For heavy traffic applications, mechanical abrasion of the surface is recommended.

C. When using as a wearing surface topping, install at least 3/8" thick

D. Concrete surfaces should be surface saturated but dry to touch (SSD).

E. Do not bridge cracks with **PATCHCRETE**. They will "telegraph" through. Fill cracks prior to placement of **PATCHCRETE**. Expansion joints should be extended through the **PATCHCRETE**.

F. For surfaces with low porosity, **EP-200 EPOXY PRIMER** can be used per installation instructions on the **EP-200** Literature.

G. Over interior plywood floors, use two coats of **P-100 PRIMER** applied at right angles. Allow **P-100 PRIMER** to dry between coats. Floor must be rigid and sound. Anchor metal lathe into wood. This will help hold the **PATCHCRETE** in place.

H. For vertical or overhead applications where substantial build out is required consider improving bond of material to substrate by adding mechanical anchors into substrate for **PATCHCRETE** to form around, such as stainless steel screws or bolts.

3.02 Mixing and Application

A**. PATCHCRETE** may be mixed in a mortar mixer, with a heavy duty low-to-medium speed drill or by hand. Always use a clean mixing container. Place **PATCHCRETE Acrylic Polymer #1003** in container and add **PATCHCRETE Powder #1005**, mixing while adding powder. DO NOT ADD WATER. Added water will reduce strength and bonding. Mix for 2 to 3 minutes until a smooth, lump-free mixture is obtained. Mixing time should not exceed 3 minutes. DO NOT OVERMIX and DO NOT entrap air while mixing.

B**. HORIZONTAL USE AS UNDERLAYMENT OR TOPPING -** For use as an underlayment, mix to desired screedable consistency, no more liquid than 1 bag to 1 gallon of polymer. For areas over 1/2" in depth aggregate is required.

C. **VERTICAL or OVERHEAD USE AS A TROWELABLE NON-SAG REPAIR MATERIAL-** For wall and overhead repairs, mix about 3/4 to 7/8 of liquid polymer to a bag of powder to get a stiffer, trowelable non-sag consistency. Make a trial batch to get desired consistency. Lubricate trowel with polymer to prevent dragging. For wall applications such as coating or filling concrete block, **PATCHCRETE** may be applied with a hopper gun and then floated smooth.

D. **AGGREGATE MIX**: Dry clean, non limestone 3/8" pea gravel is the aggregate recommended, not sand. Aggregate should be added after polymer and powder are mixed thoroughly. Aggregate should not exceed 22lbs per 45lb bag of material. Do Not add extra polymer or water with aggregate.

E. **BOND COAT** - To insure proper bonding, use **P-100 PRIMER** or apply a bond slurry coat scrubbed into the surface. The **P-100 PRIMER** will give more reliable and consistent results.

1. The bond slurry coat is a syrup-like consistency mix of **PATCHCRETE** Powder and **PATCHCRETE** Acrylic Polymer. Scrub the slurry coat into the surface with a brush. Place **PATCHCRETE** and smooth and spread while slurry coat is still damp. **DO NOT LET SLURRY COAT DRY.**

2. For situations where there is concern a bond slurry coat may dry before application of **PATCHCRETE** due to size of repair or timing, or areas where there is concern over surface preparation use **P-100 PRIMER** is an optional bond method. Apply **P-100 PRIMER** per insturctions on **P-100 PRIMER** Literature**.** Allow the **P-100 PRIMER** to dry to touch (usually by 45 minutes) and install **PATCHCRETE** material. Material may be applied up to 24 hours after the **P-100 PRIMER**. **The P-100 PRIMER** will re-emulsify one time and may be used for inside and outside applications. (See **P-100 PRIMER** instructions for more details).

3. For horizontal surfaces with low porosity, **EP-200 EPOXY PRIMER** can be used per installation instructions on the **EP-200** Literature.

F. **MATERIAL PLACEMENT - HORIZONTAL** As an underlayment, apply from featheredge to 2-1/2". Material may be screeded for low places or spread into place with a squeegee. When using as a wearing surface topping, install at least 3/8" thick. DO NOT FEATHEREDGE as a wearing surface topping. (Use aggregate for any application over 1/2"). Screed off to get a smooth flat surface. Use a trowel for touch-up and featheredging. DO NOT OVERTROWEL. Lubricate trowel with polymer to prevent dragging. The **#1003 Polymer** makes the materials darker. Less polymer will give a lighter finished surface. For best results, smooth and spread into place and touch-up as needed. A latex film will form when **PATCHCRETE** begins to set. This is normal and will disappear.

G. **MATERIAL PLACEMENT - VERTICAL/OVERHEAD** - Apply as much material as can be held in place based on stiffness and repair configuration. Vertical applications can be formed and poured if applicable to repair. Additional lifts can be applied after 24 hours, always reapply bonding coat between layers.

H. **CURING -** In general, **PATCHCRETE** will air cure without any need for curing products. However, care should be taken in areas where **PATCHCRETE** is exposed to rain, wind or direct sunlight, sometimes these can cause cracking as the top dries before the bottom has cured. For these fast drying situations, the **PATCHCRETE** should be covered with plastic for 48 hours. Avoid letting plastic touch surface of **PATCHCRETE**. Cold weather or substrate will slow **PATCHCRETE** cure significantly.

I. **POST INSTALLATION - FLOOR COVERINGS -** Normally floor coverings may be applied the next day. With thick applications or cold or damp weather, another day may be required. No heavy traffic should be permitted for 4 to 5 days. When used as an underlayment, always follow

the directions of floor covering manufacturers concerning maximum moisture content and perform required tests.

J. **POST INSTALLATION - COATINGS PATCHCRETE** is more resistant to moisture penetration than regular concrete. Breathable water based sealers may be applied over **PATCHCRETE** as soon as 24 hours. Paints and coatings may be applied over **PATCHCRETE** as you would over concrete. For solvent based sealers and coatings, wait 3-4 days for the **PATCHCRETE** to harden. For non-breathable coatings, ensure moisture has left **PATCHCRETE**. A simple poly test can be performed over the deepest areas. Always follow manufacturer recommendations and testing for applying over fresh concrete.

3.05 Cleaning

A. The uncured polymer-modified portland cement mortar can be cleaned from tools with water. The cured polymer-modified portland cement mortar can only be removed mechanically.

B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.