

SECTION 030130 – MAINTENANCE OF CAST IN PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

Provide labor, materials, equipment and supervision necessary to complete the application of product to the existing substrate.

1.2 SYSTEM DESCRIPTION

The products shall meet or exceed the following performance requirements:

Base		Portland cement		
pH		>12		
Aggregate type		Sharp silica quartz with 3/8 inch pea stone		
Slump	ASTM C143	8-9 inches at 2.5 quarts of water		
Length change	ASTM C517	<500 µstrains at 28 days		
Restrained shrinkage cracking	ASTM C1581	No cracking after 256 days		
Chloride ion penetration	ASTM C1202	1,218 coulombs at 28 days		
Short-term bond strength	ICRI 03739*	400 psi		
Scaling resistance	ASTM C672	weight loss after 50 cycles (kg/m ²) .04		
Freeze/thaw resistance – procedure A	ASTM C666	Weight gain (%) 0. Expansion (%) 0. Durability Factor DF (%) 99.		
		1 day	7 days	28 days
Compressive strength – psi	ASTM C39	1500	4230	5325
Flexural strength – psi	ASTM C78	382	516	662
Splitting tensile strength – psi	ASTM 496/C496M	182	299	463
Direct tensile strength – psi	CRD C164		293	420
Modulus of elasticity	ASTM C469	1.96	2.64	3.07
Compressive creep (10 ⁶ psi)	ASTM C512		0.64	0.97

1.3 SUBMITTALS

- A. Manufacturer’s current product data bulletin containing independently generated test data.
- B. The trained applicator shall prepare a test panel of the repair installed on the actual building as a submittal for approval of proper application and adhesion.
- C. The trained applicator shall submit to the specifier a list of five projects that he has completed within the last five years, exhibiting the applicator’s skills. The list shall include project name, location, and description of work and completion date.

1.4 QUALITY ASSURANCE

Products shall be installed by a trained applicator with a minimum of five years’ experience and meet the requirements of specifier.

1.5 DELIVERY, STORAGE & HANDLING

- A. Deliver all products and accessories in original labeled, sealed, and undamaged containers.
- B. Store all products in accordance with manufacturer's printed instructions.
- C. Handle all products in accordance with manufacturer's printed instructions.

1.6 PROJECT/SITE CONDITIONS

All products shall be applied at substrate and ambient temperatures of 40 degrees F or above. A minimum temperature of 40 degrees F shall be maintained 24 hours after completion of work. Protect products from weather and other damage for a period of 24 hours after installation. Do not apply products to frozen surfaces.

1.7 SCHEDULING

The work requires close coordination with related sections and trades.

PART 2 PRODUCTS

2.1 MANUFACTURERS

The following manufacturers are approved for the project.
Conproco Corp.

2.2 MATERIALS

ISR AG: A trowel and/or Form & Pour/Pump applied single component, pre-extended Portland cement concrete repair material with integral ECB-Tech corrosion protection. Formulated with ISR mechanism to counteract internal tensile stress and the resulting cracking associated with drying shrinkage of repair mortars.

While conducting ASTM C1581 testing for restrained shrinkage cracking, ISR AG did not crack within the specified 14 day testing period, and showed no shrinkage cracking a full 256 days later, at which time observation of the sample was discontinued.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installation shall be performed strictly in accordance with manufacturer's current product data bulletin.
- B. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.
- C. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas and landscaping from contact due to mixing, handling, and application of materials.

3.2 SURFACE PREPARATION

- A. Horizontal Trowel Applied Repairs:
 - 1. Remove loose and deteriorated material, laitance, dirt, dust, oil and any surface

contaminants that will inhibit proper bond.

2. Saw cut edges with a diamond blade at a 90-degree angle to eliminate feather edging. Avoid polishing the edges, as this will inhibit bond.
3. Avoid bruising or micro cracking during surface preparation. Refer to ICRI Surface Preparation Guide 03732.
4. Repair zone must be a minimum of 3/4-inch deep, of simple geometry, with no complex edge conditions.
5. Avoid long narrow repairs; these have a greater tendency to crack.
6. Apply Conpro Start where a consolidant is of benefit (soft, powdery surfaces).
7. Saturate substrate with clean water, (saturated surface dry/SSD), with no standing water during Priming or Application.
8. Remove concrete from corroded steel and several inches beyond to expose non-corroded steel.
9. Provide a 3/4-inch clearance between the concrete and steel.
10. Damaged reinforcing steel should be inspected by a qualified engineer and appropriate action taken.

B. Form and Pour or Pump Repairs:

1. Remove all loose or unsound concrete, saw cutting and squaring the perimeter to a minimum depth of 1 inch. Mechanically chip or hydro-prep the area to be repaired.
2. The average depth of the repair should not be less than 2 inches.
3. Formwork- Refer to ACI 347R-88 (Recommended Practice for Concrete Formwork) for details on erecting forms. All forms should be tight at all joints to prevent loss of material.
4. Use a form release agent on all forms.
5. Run a bead of polyurethane caulking around the perimeter of the form to prevent leakage.
6. Include vent holes at the top or ends of the forms for the release of escaping air.
7. Prior to application of products, inspect the substrate for proper cleaning and treatment of structural cracks, texture differences, damage, etc. Work shall not proceed until unsatisfactory conditions are corrected.

3.3 APPLICATION

A. Priming

1. Concrete:
 - a. Apply Conpro Primer, or ECB as a bonding primer to all exposed surfaces. Refer to the individual product technical data bulletin for information.

2. Reinforcing Steel:
 - a. Remove all scaling rust from reinforcing steel.
 - b. Apply ECB anti-corrosion coating.

B. Mixing

1. Mechanically mix using a mortar mixer.
2. Pour 2.5 quarts of potable water into a clean mixing vessel and slowly add all of the powder.
3. Mix continuously for 3 minutes to a uniform, lump-free consistency.
4. Add additional water to increase slump and flowability. Do not exceed 3 quarts of water per 60 lbs. of material.
5. For form and pump applications, add up to a total of 3 quarts of water to produce an 8 inch slump.
6. Allow product to breathe for 1 minute.
7. Do not overmix, as this will entrain excess air.

C. Application

1. Trowel Applied:
 - a. At the time of application, surfaces should be saturated surface dry (SSD) but hold no standing water.
 - b. Follow instructions for Priming.
 - c. Form applications must be consolidated with vibrator.
 - d. Place material continuously to break points.
 - e. Finish with a magnesium float or trowel.
 - f. Avoid overworking material during placement and finishing – this will produce surface cracking.
2. Form and Pour or Pump Applied:
 - a. Fill forms with clean water several hours prior to placement.
 - b. Locate drainage outlets at the bottom of the forms to allow the water from presoaking to drain.
 - c. Pour or pump ISR Deck Mix into the forms.
 - d. Refer to ACI 304R-85 (Placing Concrete by Pumping Methods) for details on pumping procedures.

- e. Do not allow ISR AG to sit unagitated in the mixer or lines for longer than 5 minutes, as the material could begin to set up. Recycle material if necessary.
- f. ISR AG should be placed within 30 minutes of mixing when surrounding conditions are 70 degrees F, 50 percent humidity. Higher temperatures will reduce open time. Under continuous mixing conditions, ISR Deck Mix will be pumpable for approximately 30 minutes.
- g. Care should be taken to completely fill the forms and properly consolidate the material.
- h. Cap the vents when a steady flow is evident.
- i. Prevent loss of material when removing the line and placing the plugs, as this will result in lack of bond with the substrate.
- j. Remove the forms after 24 hours. The outside edges of the repair and the anchor holes may need to be cleaned and/or repaired with Conpro Set or ISR VO.

D. Curing

- 1. Dampen the repair with a fine mist of water for 24 hours or moist cure with wet burlap and polyethylene.
- 2. Protect repair from direct sunlight, wind, rain and frost.

3.4 CLEANING

- A. Material left over at the job site by the approved applicator shall be removed.
- B. Clean tools and equipment with water immediately after use.
- C. Cured material must be removed mechanically.

END OF SECTION 030130