

SECTION 03 01 00.61 CONCRETE REPAIR MATERIAL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A All of the Contract Documents, including General and Supplementary Conditions and Division 01 General Requirements, apply to the work of this Section.

1.02 SCOPE

- A Section Includes: Furnishing and installing Concrete Repair Material.
- B Related Sections: Other specification sections which directly relate to the work of this section include, but are not limited to, the following:
- 1 Section 03 35 33 – Ground Concrete Finishing
 - 2 Section 03 06 30 – Cast-In-Place Concrete Installation and curing requirements according to ACI 302.
 - 3 Section 03 01 00 – Pre-Cast Concrete Repair
 - 4 Section 07 90 05 – Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.
 - 5 Section 32 13 13 – Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

- A The following standards and publications are applicable to the extent referenced in the text.
- B American Society of Testing and Materials (ASTM) and Others:
- | | |
|--------------------|---|
| ASTM E1155 | Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008). |
| ASTM C1077 | Standard Practice for Laboratories Testing |
| ASTM E329 | Standard Specification for Agencies Engaged in Construction Inspection and/or testing. |
| ASTM C293 | Standard Test Method for Flexural Strength of Concrete. |
| ASTM D2794 | Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation. |
| ASTM C672/C672M-12 | Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals. |
| ASTM C666/C666M-03 | Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing. |
| ASTM C642 | Standard Test Method for Density, Absorption and Voids in Hardened Concrete. |
| ASTM C567 | Standard Test Method for Determining Density of Structural Lightweight Concrete. |
| ASTM C42/C42M | Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete. |
| ASTM 7234 | Standard Test Method to Measure the Adhesion Strength between Coating and a Substrate. |
| ASTM C1583-04 | Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Material by Direct Tension (Pull-off Method). |
| ACI 301 | Specifications for Structural Concrete for Buildings. |
| ACI 117 | Specifications for Tolerances for Concrete Construction and Materials. |
| ACI 347 | Guide to Formwork for Concrete. |
| ACI 302.1R | Guide for Concrete Floor and Slab Construction. |
| ACI 503-30 | Pull-off Adhesion Tester for Pull-Off Strength or Bond Testing. |

1.04 SYSTEM DESCRIPTION

Concrete Repair Material should be a high early strength, non-shrinking mortar, using no water and containing no Portland cement.

1.05 SUBMITTALS

- A General: Submit in accordance with Section 01 33 00.
- B Product Data: Submit manufacturer's product literature and installation instructions, use limitations and recommendations.
- C Submit product design drawings for review and approval to the Architect/Specifier prior to fabrication.
- D Material Certificates: For each material specified, signed by the manufacturer, certifying that materials meet or exceed specified requirements.
- E Design Mixtures: For each Concrete Repair Material. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- F Material Test Reports: For each material specified, from a qualified testing agency, indicating compliance with requirements.
- G Field Quality-Control Reports.
- H Samples: Manufacturer to provide, upon request, sized to represent material adequately.
- I Technical Support: Contact the engineering group of Manufacturer as stated in 2.01A.
- J Warranty: Submit a sample of Manufacturer's warranty identifying the terms and conditions stated in 1.09.
- K Substitutions: To be accepted as an equal a product, substitution must have demonstrated documented field trials, independent testing and must comply with all performance criteria. Contractor guarantees that proposed substitution shall meet the performance and quality standards of this specification in addition to submitting alternative manufacturers independent testing and product information.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: A firm with not less than **[10]** years' experience in manufacturing Concrete Repair Materials of the type specified, capable of providing test reports indicating compliance with specified performance requirements.
- B Installer Qualifications: A firm having at least 3 years' experience in installing Concrete Repair Materials.
- C Materials: For each type of material required to complete the work of this section, provide primary materials which are the products of a single Manufacturer.
- D Pre-Application Conference (as needed): A pre-application conference with Contractor, Manufacturer or Authorized Representative, shall be held to establish procedures and to review conditions, installation procedures and coordination with other related work. Meeting agenda shall include review of the special details.
- E Factory Trained Concrete Repair Contractor: The concrete repair contractor must be factory trained by the Concrete Repair Material Manufacturer, prior to bid.
- F Testing Agency Qualifications: An independent agency, acceptable to Authorities Having Jurisdiction (AHJ), qualified according to ASTM C1077 and ASTM E329 for testing indicated.

- G Bond Testing: Bond tests results shall be evaluated by the Concrete Repair Material Manufacturer as part of the Warranty process.
- H Source Limitations: Each type of Concrete Repair Material shall be procured from the same Manufacturer.
- I Manufacturer's Representative: Arrange to have trained representative of the Manufacturer available (in-person or electronically) to review installation procedures.
- J Review special inspection, testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold and hot weather concreting procedures, curing procedures, construction contraction and isolation joints, joint-filler strips, concrete repair procedures and concrete protection.

1.07 DELIVERY, STORAGE, HANDLING

- A Materials should be delivered to site in Manufacturer's original, unopened containers with original labels attached and bearing the following information:
 - 1 Name of material.
 - 2 Manufacturer's batch code including date of manufacture.
 - 3 Materials Safety Data Sheets
- B Concrete Repair Material shall be unloaded and stored carefully. Cartons and containers must be protected from weather, sparks, flames, excessive heat, cold and lack of ventilation. Do not double stack cartons. Cartons should be stored on pallets and covered to protect from water damage. Any damaged material must be removed from the site and disposed of in accordance with applicable regulations.
- C Setting time of the mixed material will be greatly accelerated if the components are stored in a warm or hot environment; conversely, the setting time is extended if the materials are kept cool.
- D Flush all spills with water.
- E Keep container closed when not in use. Follow MSDS and label warning even after package is empty. Do not cut, puncture, or weld on empty container. Product applications, which generate dust, mist, or fumes may require exposure limit modification.
- F Comply with Manufacturer's written instructions for handling prior to installing.
- G Comply with Manufacturer's written instructions for storage.

1.08 PROJECT CONDITIONS

- A Work should be performed only when existing and forecasted weather conditions are within the limits established by the Manufacturer.
- B Verify that other trades with related work are completed prior to applying Concrete Repair Material.
- C Observe all appropriate OSHA safety guidelines for this work.
- D Waste Disposal: Dispose of waste in accordance with all federal, state and local regulations.
- E Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from the site daily.

1.09 WARRANTY

- A Manufacturer's Warranty: Standard form warranty document, warrants all goods sold to be free from defects in manufacturing, but limits liability to **[1]** year(s) from date of substantial completion.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A Basis-of-Design Product: The Concrete Repair Material is based on **1260 MG-KRETE™** manufactured by **Imco® Technologies Inc.** 6254 Skyway Road, PO Box 915, Smithville ON, LOR 2A0, Canada; Telephone: 888-818-4626; fax: 905-527-0606; Email: info@imcotechologies.com; Web Site: www.imcotechologies.com.
- B Substitutions will be considered, subject to compliance with requirements of this section, under provisions of Section 01 60 00.

2.02 PRODUCTS

- A Once installed, Concrete Repair Material must meet the properties listed below:

PHYSICAL PROPERTIES:	
PROPERTY	ENGLISH
Flash Point	none
Compressive Strength:	
45 minutes	2,610 psi/18.0 MPa
24 hours	5,148 psi/35.5 MPa
7 days	5,815 psi/40.1 MPa
28 days	11,194 psi/77.2 Mpa
Set time:	
Initial @ 20°C (68°F)	15 minutes
Application temp:	minimum -10°C (14°F)(with Low Temp. Accelerator)
	over 40°C (100°F)(with High Temp. Retarder)
Primer	No primer required
Clean-up	Water (before material sets)
Shelf Life	6 months, if stored away from direct heat
No. of Components	Two (Part A and B)
Available Grade	fine or regular grade
Packaging:	
Regular grade	22.7 kg (50lb) Part A with 3.78L (1 gal) Part B
Fine grade	20.0 kg (45lb) Part a with 3.78L (1 gal) Part B
Available in bulk packaging	
Yield:	
Regular grade	1 unit = 0.45 cu. ft. of mixed material 78 units = 1 cu. Meter
Fine grade	1 unit = 0.40 cu. ft. of mixed material

2.03 MATERIAL CHARACTERISTICS

- A The concrete repair, re-sloping, overlay and deep fill material must have the following characteristics:
- 1 Two component system with no water allowed
 - 2 Contain no Portland cement
 - 3 Ability to retard set times
 - 4 Ability to accelerate set times
 - 5 Must be able to install horizontal, overhead and vertical applications with the same product
 - 6 Non-critical mix ratio
 - 7 Deep fill to feather edge with same product

PART 3 – EXECUTION

3.01 INSPECTION

- A Verify that installation meets the requirements of the Authority Having Jurisdiction (AHJ).
- B Verify that the Concrete Repair Material installation will not disrupt other trades.
- C Verify that the substrate is dry, clean, and free of foreign matter. Report and correct any defects prior to any installation.
- D For applications at ambient temperatures below 50°F (10°C), a low temp accelerator must be used to ensure a full cure.
- E For applications at ambient temperatures above 68°F (20°), a high temp retarder must be used to ensure a full cure.
- F Do not pre-wet surface.
- G Verify by comparing packing slip and box label that product is per specification.
- H Before placing Concrete Repair Material verify that installation of formwork is complete and that required inspections have been performed.

3.02 SURFACE PREPARATION

- A Refer to Manufacturer's specifications for surface preparation requirements. Surfaces should be structurally sound, free of voids, spalls, loose aggregate and sharp ridges. Prior to installation, remove dust, dirt, debris or any other foreign materials.

3.03 INSTALLATION

- A Follow Manufacturers guidelines for proper installation of Concrete Repair Material.
- B Mixing:
- 1 Keep all materials dry. **Do not add water to the mix.**
 - 2 Maintain the mix ratio as supplied, i.e. one container of liquid activator to one bag of dry component.
 - 3 Proper mixing will give a trowellable consistency suitable for most floor applications.
 - a. Slump may be adjusted to the applicators preference or to suit the specific job conditions by increasing either of the two components.
 - b. **DO NOT ADJUST THE SLUMP BY THE ADDITION OF WATER.**
 - 4 Mix the two components by mechanical means until all the material is wetted and place quickly.
 - 5 Dry pea gravel may be added to the mix to increase the yield on deep placements.

C Placement:

- 1 **DO NOT ADD WATER** to concrete repair material at any time. Refer to Manufacturer's requirements.
- 2 Consolidate concrete repair material per Manufacturers requirements.
- 3 Deposit and consolidate concrete repair material for slabs in continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - a. Consolidate concrete repair material during placement operations per the Manufacturers requirements.
 - b. Finish Concrete Repair Material appropriate to application.
 - c. Slope surfaces uniformly to drains where required.

D Cold-Weather Placement:

- 1 Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- 2 Comply with ACI 306.1, Concrete Repair Material Manufacturers requirements, and as follows:
 - a. When substrate and air temperature are below 50°F, provide a low temp accelerator, per Manufacturers requirement.
 - b. Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture design.

E Hot-Weather Placement:

- 1 Comply with ACI 301, Concrete Repair Materials Manufacturers requirements, as follows:
 - a. When substrate and air temperature are warm, provide a high temp retarder, per Manufacturers requirement.

3.04 FINISHING

- A Concrete Repair Material can be finished with screed, trowel or broom.
- B **OVER COATING** – Allow Concrete Repair Material to cure, per manufacturer's specification, prior to over coating.
- C Clean all tools with water immediately after each use.
- D Do not attempt to place Concrete Repair Material in water or where running water will disturb the worksite.

3.05 CURING

- A Concrete Repair Material must cure effectively in temperatures of 10°C/50°F or above.
- B Once the Concrete Repair Material is mixed, an immediate cure must be initiated.
- C When Concrete Repair Material is placed ½ inch thick at 20°C/68°F, it must set up in approximately 15 minutes (dependent upon other environmental conditions – for example sunlight or wind).
- D Concrete Repair Material must cure faster on thicker applications than it will on thin applications.
- 1 The larger the mass, the more heat generated by the product and the quicker the cure.

3.06 FIELD QUALITY CONTROL

- A Testing: Retain a qualified testing agency to perform tests and to submit reports.
- B Test results shall be reported in writing to Architect, Concrete Repair Material Manufacturer and Contractor within 48 hours of testing.

C Reports of compressive-strength tests shall contain:

- 1 Project identification name and number.
- 2 Date of placement.
- 3 Name of testing and inspecting agency.
- 4 Location of Concrete Repair Material in Work.
- 5 Design compressive strength at 28 days.
- 6 Concrete Repair Material mixture proportions and materials.
- 7 Compressive breaking strength.
- 8 Type of break for 3 day, 7 day, and 28 day tests.

3.07 CLEANING AND PROTECTION

- A Concrete Repair Material must be cleaned up with water, before it cures.
- B Dispose of damaged material in accordance with all governmental regulations.
- C Protect completed work from subsequent construction activities as recommended by Manufacturer.

END OF SECTION 3 01 00.61