

GUIDE SPECIFICATION FOR CEM-KOTE® FLEX CR: FLEXIBLE, CHEMICAL-RESISTANT CEMENTITIOUS WATERPROOF COATING

07 16 00 – Cementitious and Reactive Waterproofing

Specifier Notes: This guide specification is written according to the Construction Specifications Institute (CSI) format. The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project. Coordinate this section with other specification sections and drawings.

Specifier Notes: CEM-KOTE FLEX CR is designed for waterproofing and concrete restoration in thin sections where superior flexibility, chemical resistance, and breathability are required. It protects and waterproofs structures subjected to various chemicals, such as concrete floors, tanks, secondary containment structures, and clarifiers. The material is suitable for concrete waterproofing, finishing, and protection. CEM-KOTE FLEX CR provides excellent protection of concrete against acidic attack of H₂SO₄, formed by bacteriological conversion of H₂S in sewers, waste-water treatment facilities, lift stations, "wet wells," and oxidation tanks.

CEM-KOTE FLEX CR is a flexible, fibre-reinforced, hydraulic cement-based material. It is a two-component system consisting of dry Component A and liquid Component B. For additional tensile strength, it may be reinforced with REINFORCING FABRIC HD.

CEM-KOTE FLEX CR exhibits a high resistance to a majority of mineral acids in moderate concentrations for shorter periods of time. It is highly resistant to concentrated salt solutions and caustic environments. Chemical resistance data is available on request. Due to the wide array of chemicals and concentrations, prior to specification of CEM-KOTE FLEX CR, contact W. R. MEADOWS® to ensure the suitability of this material for the application.

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of a flexible, chemical-resistant, cementitious, waterproofing coating.
- C. The general conditions, supplementary conditions, and general requirements of this document apply to general contractors, subcontractors, material suppliers, and all other persons furnishing labor and materials under this section.

1.02 WORK INCLUDED

- A. Provide all labor, material, and equipment necessary to apply cementitious coating in application over concrete surfaces as shown on the contract drawings and specified herein.

Specifier Notes: The concrete surfaces in new construction may have "bug holes," poor compaction areas, "honeycombing," "form displacements," and other imperfections. These may have to be repaired/leveled prior to application of CEM-KOTE FLEX CR waterproofing system. The project specification must identify the responsibility for leveling these imperfections.

1.03 RELATED SECTIONS

Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.

- A. Section 03 30 00 – Cast-In-Place Concrete.
- B. Section 03 01 30.61 – Rehabilitation of Cast-in-place Concrete.

- C. Section 07 10 00 – Dampproofing and Waterproofing.

1.04 REFERENCES

- A. ASTM C672 - Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
- B. ASTM D412 (modified) - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
- C. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials ("Wet Cup" Procedure).
- D. International Concrete Restoration Institute (ICRI) Technical Guidelines No. 03730.
- E. TT-P-1411 – Federal Specification, Paint, Copolymer-Resin, Cementitious (for Waterproofing Concrete and Masonry Walls).

1.05 QUALITY ASSURANCE

- A. Contractor will provide the proper equipment, manpower, and supervision at the jobsite to install the cementitious coating in compliance with the project plans and specifications.
- B. Prepare a site sample approximately 4' x 4'. This sample will be regarded as the minimum standard of workmanship acceptable for this project.
- C. Installation must be carried out by an experienced contractor with an adequate number of skilled personnel, experienced in the application of the crystalline coating systems.
- D. Maintain a record of the batch numbers of all materials supplied for this project.

1.06 PRE-CONSTRUCTION MEETING

- A. Convene [one] [_____] week [_____] prior to commencing work of this section, in accordance with Section 1.05 - Quality Assurance, meeting with manufacturer's technical representative, General Contractor, and Site Engineer to review the installation procedures.

1.07 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store cementitious coating in a clean, dry area protected from direct sunlight, weather, and other damage. Store all wet materials at a temperature of not less than 44° F at all times.
- C. Protect materials during handling and application to prevent damage or contamination.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse.

- B. Product must never be applied if ambient temperatures cannot be kept above 40° F during application and for 48 hours thereafter.
- C. Avoid applications at temperatures above 82° F.
- D. Protect surrounding surfaces from damage due to work of this trade.
- E. Hot Weather Application
 - 1. Protect the surface against rapid evaporation of water between the finishing and the final set time.
 - 2. Use water misting or apply a surface evaporation retarder.
- F. Cold Weather Application
 - 1. Apply in temperatures above freezing point.
 - 2. Protect the material against freezing for a minimum of 48 hours.
 - 3. Use electrical heaters to avoid carbonation and carbonation cracking.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. W. R. MEADOWS, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax: (847) 683-4544. Website: www.wrmeadows.com.
- B. GEMITE PRODUCTS, INC., 1787 Drew Road, Mississauga, Ontario, Canada L5S 1J5. (888) 443-6483. Fax: (905) 672-6780. Website: www.gemite.com.

2.02 MATERIALS

- A. Flexible Chemical Resistant Cementitious Coating: CEM-KOTE FLEX CR manufactured by Gemite Products, Inc. and distributed by W. R. MEADOWS.

2.03 ACCESSORIES

- A. Reinforcing Fabric (Woven) for cove reinforcement or entire surface application: REINFORCING FABRIC HD manufactured by Gemite Products, Inc. and distributed by W. R. MEADOWS.
- B. Reinforcing Fabric (Non-Woven) for crack treatment: REINFORCING FABRIC NW manufactured by Gemite Products, Inc. and distributed by W. R. MEADOWS.
- C. Flexible Cementitious Coating for existing crack repairs: CEM-KOTE FLEX ST manufactured by Gemite Products, Inc., and distributed by W. R. MEADOWS.
- D. Bonding Mortar for coves on protruding steel and plastic pipes: CEM-KOTE BARRIER COAT 100 manufactured by Gemite Products, Inc. and distributed by W. R. MEADOWS.
- E. Thin Patching Mortar for thin repairs, including bug holes: MEADOW-PATCH™ T1 manufactured by W. R. MEADOWS. For spray application, use CEM-KOTE FLEX ST manufactured by Gemite Products and distributed by W. R. MEADOWS.
- F. General Purpose Structural Repair Mortar for repairs or coves: MEADOW-CRETE® GPS manufactured by W. R. MEADOWS.
- G. Thin-Set Concrete Finishing Mortar: GEM-PLAST TC manufactured by Gemite Products, Inc., and distributed by W. R. MEADOWS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive the flexible cementitious coating.
- B. Report to owner's representative, in writing, any defects in previously prepared Work or unsatisfactory site conditions.

Specifier Notes: The concrete surfaces in new construction may have "bug holes," poor compaction areas, "honeycombing," form displacements, and other imperfections. These may have to be repaired/leveled prior to application of the CEM-KOTE FLEX CR waterproofing system. The project specification must identify the responsibility for leveling these imperfections.

- C. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- D. Starting work under this section means acceptance of the surface and previously prepared work.

3.02 SURFACE PREPARATION

- A. Remove all deteriorated and loose concrete and any contaminants by dry or wet sand blast or shot blast to achieve a CSP 3 surface profile.

Specifier Notes: Refer to International Concrete Restoration Institute (ICRI) Technical Guidelines No. 03730: Selecting and Specifying Concrete Surface Preparation for Sealers, Coating, Polymer Overlays, and Concrete Repair for information regarding recommended surface profiles.

- B. Ensure all soft concrete surfaces and any bond-inhibiting materials, such as release agents, are removed.
- C. Pressure wash the surface thoroughly with water prior to the application of the cementitious coating.
- D. Allow all surface water to dry off to achieve a saturated surface dry (SSD) condition.
- E. To ensure proper surface preparation, a bond test should be performed in accordance with manufacturer's instructions.
- F. Surface Repair
 - 1. Use thin patching mortar to patch the "honeycombing" and air pockets.
 - 2. Use polymer-modified structural repair mortar for patching in excess of 1/4".
 - 3. Uneven concrete, due to concrete form misplacement, must be chipped away and surface patched smooth.
 - 4. Build corner coves 2" x 2" minimum using an overhead or vertical structural repair mortar.
- G. Thin Set Concrete Restoration Mortar

Specifier Notes: Clean the surface of GEM-PLAST TC (finishing plaster) with pressure water in the same manner as cleaning of the concrete surface. Note: Pressure washing the GEM-PLAST TC surface the next day, while the material has not developed a full strength, makes the surface preparation of GEM-PLAST TC for application of CEM-KOTE FLEX CR easier.

- 1. Hand application
 - a. Apply thin set mortar using a trowel, in a manner similar to stucco application; a "scratch" coat and the second (third) coat, and finish using a float, to obtain an "open structure" surface.
- 2. Spray Application
 - a. Apply first a thin "scratch" coat and brush the surface to obtain continuity.
 - b. Apply the second (third) coat – "wet to green condition."

- c. Compact the material using a trowel to eliminate entrapped air and finish with float to obtain "open structure" surface.

Specifier Notes: If GEM-PLAST TC layer must be left overnight prior to application of consecutive coat, leave the surface "rough" and pressure wash with minimum 3,500 psi water.

3. Air dry cure GEM-PLAST TC for a minimum of three days prior to application of flexible cementitious coating.

H. Treatment of Existing Cracks and All Non-Structural Joints

Specifier Notes: In some underground projects, the concrete wall/slab might be completely saturated with water. The water-leaking cracks indicate this situation. Alternatively, the general information about the structure also indicates the possibility of "water head" behind wall or below the slab. In such situation, use a strip of REINFORCING FABRIC HD, instead of REINFORCING FABRIC NW, to treat the cracks, to allow better drying/curing of CEM-KOTE FLEX ST over the crack. The active water-leaking crack must be sealed using either the "cut and fill method" with hydraulic water plugs or by urethane injection. The crack must be free of water leaks for at least three days to allow CEM-KOTE FLEX CR to cure/dry over the cracks and become watertight.

1. Identify all the existing cracks and joints and apply a thin layer of the flexible cementitious coating (approximately 10" wide and 1/32" thick) by trowel or brush.
2. Embed the non-woven reinforcing fabric over the entire area of this coating and work in using trowel.
3. Ensure this coating application totally covers the reinforcing fabric.
4. Let dry sufficiently and apply an additional coat of this flexible cementitious coating to build up to a total thickness of 1/16" over the entire area.

I. Treatment of Inside Corners

1. Install a 2" x 2" cove over the inside corners using polymer-modified structural repair mortar.
2. Apply a thin layer of flexible cementitious coating (approximately 10" wide and 31 mils thick) by trowel or brush.
3. Embed the woven reinforcing fabric over the entire area of this coating and work in using trowel.
4. Ensure this coating application totally covers the reinforcing fabric.
5. Apply an additional coat of this flexible cementitious coating to build up a total thickness of 63 mils over the entire area.

J. Treatment of Protruding Elements

1. Apply two coats of flexible cementitious coating at a thickness of 63 mils to both the concrete surface and protruding element.
2. Form a 2" x 2" minimum cove using polymer-modified structural repair mortar in the corner.
3. Allow polymer-modified structural repair mortar to cure.

Specifier Notes: In case the concrete structure is less than six weeks "old" after casting concrete and the drying shrinkage cracking had not yet occurred, REINFORCING FABRIC HD should be used throughout, since it is unknown where the cracks will be formed. The REINFORCING FABRIC HD fabric is there to allow the maximum crack spanning during the formation of cracks after installation of the membrane.

When applying the REINFORCING FABRIC HD over the entire surface, use the same procedure as described in 3.2.9. Overlap the fabric by a minimum of 1". Avoid "sharp" corners. Apply MEADOW-CRETE GPS into the corner to form a "cove" (gradual transfer from one side to the other side of the corner).

Specifier Notes: In existing facilities, REINFORCING FABRIC HD is used only over the existing (non-structural, typically drying shrinkage) cracks, cold (construction) joints. Use a strip of the REINFORCING FABRIC HD over any coved corners. The expansion joints must be respected.

Specifier Notes: When using CEM-KOTE FLEX CR in ozone treatment tanks of potable water facilities, REINFORCING FABRIC HD is used on the entire surface and the minimum thickness of the CEM-KOTE FLEX CR system must be 79 mils.

3.03 MIXING

- A. Mix the content of the bag, component A, with the liquid component B.
- B. Use a heavy-duty drill (400 - 600 RPM) with a helix screw or paddle mixer to achieve thorough mixing.
- C. Pour approximately 80% of the liquid component B into the mixing container (mixer) and gradually add the dry component A into the liquid and mix until a smooth and lump-free mix is obtained.
- D. Add the remaining liquid as required for a given application consistency.
- E. At high ambient temperatures, and depending on application, one to two cups of water can be added if required.

3.04 APPLICATION

Specifier Notes: For spraying, use peristaltic, moyno, or diaphragm pumps. CEM-KOTE FLEX CR contains fine silica sand and requires plastering nozzles. Please contact W. R. MEADOWS Technical Service for names of the manufacturers of suitable equipment. When spraying, each layer needs to be brushed or trowel finished to eliminate pinholes and achieve uniform thickness. When a smooth surface is required, the second layer is finished either with a fine brush or trowel.

A. Application

Specifier Notes: If there is a requirement for REINFORCING FABRIC HD to be used throughout the CEM-KOTE FLEX CR application, the minimum thickness for the two coats needs to be a minimum of 80 mils in order to fully embed the fabric within the material. The maximum thickness should not exceed 120 mils.

- 1. Brush or spray apply the first coat of cementitious coating to a thickness of 1/32".
- 2. If spraying, brush the first coat to eliminate any pinholes.
- 3. Apply the second coat after approximately 15 - 30 minutes at the same thickness as the first coat (1/32"), giving a finish thickness of 1/16").
- 4. Brush the second coat to eliminate pinholes.
- 5. Protect against surface water evaporation.

Specifier Notes: If the first coat is left to dry overnight or longer, use 3,500 psi water to clean the surface before application of an additional coat.

B. Finishing

- 1. To obtain a smooth surface, if required, finish the surface using a steel trowel.

C. Curing

- 1. Air-dry cure flexible cementitious coating for 72 hours at 68° F and 70 – 80% RH prior to filling with water.
- 2. Protect from rain, wind and intense sunlight for 12 hours.
- 3. Allow for longer curing/drying time will be required with cooler temperatures and a higher relative humidity.

Specifier Notes: Use electrical (NOT propane) heaters or hot air generators to avoid carbonation and carbonation cracking.

3.05 SITE CLEANUP

- A. Remove all excess and waste materials from the jobsite in accordance with contract provisions.
- B. Ensure all surrounding areas where the material has been applied and is free of debris.

END OF SECTION