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SUPER-KRETE SPECIFICATION S-1 EXISTING CONCRETE SURFACE PREPARATION

SECTIONS 01 71 16; 02 25 16/19; 03 01 30; 0716 16

This product guide specification is written according to the Construction Specifications Institute (CSI) with numbers and titles from the Master Format 2004 Edition. This section must be carefully reviewed and edited by the Architect to meet the requirements of the project and local building codes. Coordinate this section with other specification sections and drawings. This is the recommended specification for the Super-Krete Surface Preparation of Cementitious Substrates prior to applying Super-Krete coatings, paints, stains and sealers.

Super-Krete Concrete Surface Preparation Specification S-1 is a guide for designers, specifiers and contractors for preparation of concrete substrates prior to application of Super-Krete products and application systems. For the purpose of this specification, surface preparation is the process required to produce sound, clean and porous cementitious substrates to accept Super-Krete products and systems. This specification includes substrate testing of MVT and pH, removal of bond inhibiting films, strength verification, creating surface porosity, increasing substrate strength, providing chemical encapsulation, and providing an internal moisture barrier. Also included are methods of field testing cementitious substrates to determine rate of moisture vapor emissions transmission and pH levels. Super-Krete acknowledges that moisture vapor emissions otherwise referred to as MVE and excessive alkalinity within Portland based substrates is the leading cause of concrete disintegration, dusting and coating delamination, and we highly recommend and require that all applicators of Super-Krete products or any other coatings protect themselves from short and long term liabilities that may be incurred by not performing such tests prior to applying any type of Super-Krete coatings, paints or sealers.

PART 1 GENERAL

1.1 SUMMARY

- A. This is Super-Krete's recommended specification for Concrete Surface Preparation required prior to placement of Super-Krete products or other finished products over cementitious substrates, both interior and exterior.

1.2 SECTION INCLUDES

- A. Visual inspection of substrate
- B. Evaluation and Testing of substrate
- C. Surface preparation.
 - a. Removal of bond-inhibiting films.
 - b. Creating surface porosity.
- D. Application of clear, liquid concrete hardener, full depth densifier and moisture reduction barrier.
 - a. Increase of substrate strength.
 - b. Chemical encapsulation.
- E. Addressing cracks in concrete.
- F. Application of cementitious coating.
- G. Bond Testing.

1.3 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.



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- A. Section 01 71 16 Acceptance of Conditions
- B. Section 02 25 00 Existing Material Assessment
- C. Section 03 01 30.61 – Resurfacing of Cast-in-Place Concrete.
- D. Section 03 30 00 – Cast-in-Place Concrete: New or Existing Concrete.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Submit manufacturer's most recent product data and application instructions on each product to be used including preparation instructions and recommendations, test data, recommendations, storage and handling requirements and installation methods.
- C. Limitations on admixtures, curing compounds, bond breakers, etc.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications
 - 1. All applicators of this system must be certified in writing by manufacturer.
- B. Installer Qualifications
 - 1. All installers of this system must apply and file with Manufacturer a copy of project specifications, Applicator Certificate and required products list, tools and equipment to be utilized on the project prior to application for manufacturer warranty.
 - 2. Installers are to be Certified Applicators of Super-Krete products, experienced with required tools and have an appropriate sized crew for the size of the project.
- C. This system shall be installed over porous concrete surfaces profiled in accordance with ICRI CSP #4; which have a vapor rate not exceeding 12 lbs. per 1,000 square feet of surface area and tested in accordance with ASTM F1869 or equal.
- D. All products and systems must be applied in strict accordance with manufacturer's written instructions for use and installation of all systems.
- E. This treatment system shall reduce MVE to 3 lbs. per 1,000 square feet of area
 - 1. and provide a compatible substrate for coatings, paints, sealers and floor coverings when properly installed by trained and skilled certified applicators.
- F. Manufacturer warrants that its products and application systems are warranted to perform according to their written specification when applied by Certified Applicators in accordance with them.
- G. Pre-Bid Conference:
 - 1. A pre-bid conference shall be held between prospective installers and the Engineer to resolve design details prior to bidding of project.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Packaging and Shipping
 - a. All components of the system shall be delivered in unbroken original packages bearing the Manufacturer's name and brand designation, batch number and date of manufacture.
- B. Storage and Protection:
 - a. The Installer shall be provided with a storage area for all components. The area shall be between 35 degrees F and 85 degrees F, dry, out of direct sunlight, and elevated from the floor to avoid contact with moisture, and in accordance with the Manufacturer's recommendations and relevant health and safety regulations. Liquid products are to be kept from freezing and dry goods to be protected from humidity and moisture.
 - b. Copies of MSDS for all components shall be kept on site for review by the Architect, Engineer and other personnel.



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- c. Protect materials during handling and application to prevent damage or contamination.
- d. Dispose of cementitious materials as concrete and dispose of solvent-based materials in accordance with requirements of local authorities having jurisdiction.
- e. Product to be purchased through authorized Super-Krete distributor.

1.7 SEQUENCING AND SCHEDULING

- A. The installer, general contractor and owner shall agree upon a schedule for coordination between trades working in the area which is to receive the system.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Apply products only when surface temperature is at least 55 degrees F and rising.. Do not apply products when rain is imminent. Ensure precipitation is not expected within the time required for the surface to be completely dried and cured. Do not apply products when surface or ambient temperatures exceed 90 degrees F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: SUPER-KRETE International, Inc. USA. 1290 N. Johnson Ave., El Cajon, CA 92020. Toll Free: 800.995.1716. Direct: 619.401.8282 Fax: 619.401.8288. Email: sales@super-krete.com. Web: super-krete.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 62 00.

2.2 APPROVED MATERIALS

- A. CONCRETE SURFACE PREPARATION SYSTEM
 - a. S-12000 Heavy Duty Degreaser™
 - b. S-1300 Pene-Krete®
 - c. S-9300 Super-Krete Bond-Kote®
 - d. S-3500 Elastique Matting™

2.3 RELATED MATERIALS

- A. Proprietary Based Specification: Products and System shall be manufactured by Super-Krete International, Inc.
- B. Water for mixing shall be clean, potable and not exceed 70 degrees F.
- C. Surface Cleaning: The surface cleaning system shall be Super-Krete S-12000 Heavy Duty Degreaser. Performance of this product is required to ensure the maximum chemical reaction within the pores of concrete. Required pH of this cleaning product is 11.5.
- D. Concrete hardener, densifier and MVE reducer: The Moisture Vapor Emission reduction and chemical encapsulation treatment shall be a combination of Super-Krete S-1300 Pene-Krete and Super-Krete S-9300 Bond-Kote.
- E. Addressing Cracks: Cracks shall be addressed using the Super-Krete Crack Treatment System of Super-Krete S-3500 Elastique Matting in conjunction with S-9300 Bond-Kote.



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- F. Toppings: The Portland cement-based underlayment or topping shall be based upon the pre-specified finished appearance. All Portland cement-based underlayment or topping shall be a single-component (add water only) to ensure quality control.

2.4 MIX DESIGNS

- A. Super-Krete S-12000 Heavy-Duty Degreaser/Cleaner is pre-mixed. Mix for 1 minute before use.
- B. Super-Krete S-1300 Pene-Krete is pre-mixed. Mix for 1 minute before use.
- C. Super-Krete S-3500 Elastique Matting shall be cut to length of crack.
- D. Super-Krete S-9300 Bond-Kote is pre-mixed. Add water only to desired consistency and mix until no lumps or segregation using a 1/2" drill and mixing paddle. For large projects use a plaster mixer.
- E. To determine the appropriate mix designs for each Super-Krete underlayment or topping refer to the manufacturer's specific product guide and systems.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Visually examine substrate for structural damage, reinforcing steel corrosion and placement of expansion joints.
 - a. When not certain, consult a structural engineer for professional evaluation.
 - b. Spalling, carbonation and reinforcement damage require professional evaluation and testing to determine if substrate is treatable or requires complete replacement.
- B. Application will proceed when the moisture vapor emissions rate from the slab is less than and not higher than 3 lbs per 1,000 SF per 24 hrs for interior floors only. The test method shall be ASTM E1869-98 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- C. If the vapor drive exceeds 3 lbs per 1,000 SF per 24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
- D. A carbonation depth analysis should be completed at this time to determine if substrate to be treated is of sufficient strength to receive repairs.
- E. Alkalinity levels shall be tested using a pencil pH test method in accordance with ASTM 4262-83. SUPER-KRETE requires that pH levels do not exceed that of 9.
 - a. Concrete substrates with pH levels higher than 9 are not acceptable to receive treatments and the surface must be removed to a depth that provides a pH level maximum of 9.5.
- F. Examine surface to receive treatment. Do not begin installation until substrates have been properly prepared. Surfaces that are not profiled to the acceptable level will not provide the required penetration and cohesive bond between toppings and substrates. Notify architect if surfaces are not acceptable.
- G. All coatings, paints, sealers and hard-trowelled surfaces must be removed from the substrate to create a profiled surface.
- H. Examine substrate to insure proper expansion joints were placed. Add additional expansion joints as needed to relieve stress on any substantial cracking.
- I. If substrate preparation is the responsibility of another installer and is unacceptable, notify architect of unsatisfactory preparation before proceeding.



3.2 SITE REQUIREMENTS

- A. Application may proceed while air, material and substrate temperatures are between 55 degrees F and 90 degrees F provided the substrate temperature is at least 5 degrees F above the dew point. Outside of this range, the Manufacturer shall be consulted. SUPER-KRETE products are not to be applied when precipitation is expected within 24 hours following completion of application or when rain is imminent.
- B. For interior installations, the Applicator shall ensure that adequate ventilation is available for the work area. This shall include the use of manufacturer's approved fans, smooth bore tubing and closure of the work area.
- C. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- D. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.
- E. New concrete shall be moisture-cured for a minimum of 7 days and have fully cured a minimum of twenty eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.
 - a. Sealers and curing agents should not to be used.
 - b. Concrete surfaces on-grade shall have preferably been constructed with a vapor barrier for additional protection against the effects of vapor transmission and possible delamination of the system.
- F. Safety Requirements
 - a. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application when using solvent-based products.
 - b. "No Smoking" signs shall be posted at the entrances to the work area.
 - c. The Owner shall be responsible for the removal of foodstuffs from the work area.
 - d. Non-related personnel in the work area shall be kept to a minimum.

3.3 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Super-Krete recommends shot blasting, grinding, scarifying or high-pressure water blasting to remove existing coatings, paints, sealers or other bond-breakers from existing surfaces.
- B. All cementitious based substrates must be structurally sound, solid, profiled and of adequate porosity to provide product penetration a co-adhesive bond. Surface profile shall be that of ICRI's #4 on surface profile template. Refer to International Concrete Repair Institute's surface profile template.
- C. The substrate shall be cleaned and prepared in accordance with manufacturer specifications and free of any surface contamination that may create a bond-breaker and prevent product from penetrating the surface and providing a co-adhesive bond.
- D. Substrates shall be tested prior to treatment to determine the MVT rate using testing procedure ASTM F1869. Rate of moisture vapor transmissions shall not exceed 12 lbs. per 1,000 square feet at time of application.
- E. Protect adjacent surfaces not designated to receive treatment.
- F. When applying Super-Krete Portland cement based underlayments and toppings the surface will require a lightly water dampened surface to open the pores of the substrate to achieve a co-adhesive bond, to dissolve fine dust particles and to provide additional workability.
 - a. Apply products in accordance with manufacturer's instructions.
 - b. Ensure application equipment is clean and free of previously used materials.
 - c. Ensure proper and safe clean-up of materials.
 - d. Do not dilute products unless specified or permitted by manufacturer.



- G. All cracks and spalls shall be repaired prior to installing the overlayers or toppings to resist future crack reflection.
- H. Clean, repair and honor all control joints during entire application process. Clean and repair all cracks and spalls in accordance with manufacturer's specifications.
- I. Allow all surface repairs to cure for 24 hours before applying underlayment or toppings.

3.4 STRUCTURAL REINFORCEMENT TREATMENT

- A. Substrates requiring repair shall have all loose material removed.
 - 1. Remove all concrete surrounding any corroded reinforcement to a minimum of 1" in depth.
 - a. Reinforcement placed too close to surface may require further concrete removal to ensure reinforcement has sufficient coverage of repair material.
 - b. Clean loose rust from reinforcing steel with wire brush or sandblasting. Do not remove entirely.
- B. Apply 2 coats of Super-Krete rust converting treatment RUST BUSTER to rusted steel by brush.
 - a. Treatment will convert rusted steel into a carbon steel coating and will provide primer for the new coating.
 - b. Allow 4 hours between applications.
 - c. Allow treatment to cure for 24 hours before continuing work.
- C. Complete repair of deteriorated concrete with Super-Krete Structural Mix, Super-Quik or Bond-Kote.

3.5 APPLICATION OF CONCRETE CLEANER

- A. All surfaces to be coated must be thoroughly cleaned with Heavy Duty Degreaser.
- B. Heavy Duty Degreaser contains a high level of alkalinity which encourages a strong reaction with the moisture vapor barrier treatment to be applied as in Section 3.5.
- C. Heavy Duty Degreaser shall be used to remove any contaminants on the surface. Apply Heavy Duty Degreaser undiluted using a hand-held a hand held pump sprayer and immediately scrub the surface with a stiff bristled broom.
- D. Allow Heavy Duty Degreaser to sit for a minimum of thirty minutes for deep penetration. Rinse thoroughly using clean water. High pressure waterblasting may be required for heavy-duty cleaning.
- E. Allow surface water to dry prior to application of internal moisture barrier.

3.6 APPLICATION OF MOISTURE BARRIER: INTERIOR AND EXTERIOR

- A. Existing Concrete
 - a. Saturate the surface with PENE-KRETE concrete treatment and apply in accordance with manufacturer's specifications by sprayer and soft broom.
 - b. Re-apply treatment product to areas absorbing product too rapidly.
 - c. Do not allow treatment product to puddle on surface. If this occurs, immediately spread material with soft-bristled broom to area with porosity.
 - d. Saturate the surface with water one hour after application. Repeat wetting two additional times at 1-hour intervals for full penetration up to 8.5".
 - e. If product does not penetrate substrate, remove immediately by rinsing and profile surface before attempting re-application of product.
- B. Allow treated surface to cure for 24 hours followed by pressure washing for exterior surfaces or wet mopping for interior floors to remove any excess chemicals forced to the surface during the curing period. If treatment product does not penetrate the substrate, remove immediately before it hardens on surface.



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- a. Additional applications of PENE-KRETE treatment may be required to achieve the required 3 psi per 1000 SF.
- b. If severe efflorescence is present, remove and re-apply treatment product until efflorescence is no longer present.

3.7 CRACK TREATMENT

- A. Cracks shall be addressed and treated per Super-Krete Specification S-9900 CRACK TREATMENT SYSTEM. Structural cracks that present risk to structural integrity shall be repaired per architects recommendation.
 - a. Inspect and establish extent and cause of damage.
 - b. Clean debris from crack using Shop-Vac or compressed air.
 - c. Clean crack with HEAVY DUTY DEGREASER and allow to dry.
 - d. Fill crack with STRUCTURAL MIX or SUPER-QUICK repair product until flush with surface.
 - e. Apply thin layer (1/16") of BOND-KOTE 8" wide with trowel or painter's brush or squeegee.
 - f. Immediately embed ELASTIQUE MATTING into wet material and remove any wrinkles or lifted matting using trowel, brush or squeegee.
 - g. Apply 1 additional coat of BOND-KOTE material over matting to ensure bondability.
 - h. Allow 24 hours before proceeding with work, or until totally dry.

3.8 APPLICATION OF UNDERLAYMENT OR TOPPING

- A. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
- B. Handling, mixing and addition of components shall be performed in a safe manner to achieve desired results in accordance with Manufacturer's recommendations.
- C. System shall follow contour of substrate unless pitching, re-grading or other leveling work has been specified by Architect.
- D. Applicator shall provide a neat finish with well-defined boundaries and straight edges.

3.9 BOND TEST

- A. Perform random tests for adequate bond strength on substrate while surface preparation is ongoing and prior to application of other products, in accordance with ASTM D 3359 "Adhesion by Tape Test" per Manufacturer's recommendations, at a minimum frequency of 3 tests per 5000 square feet. Smaller areas shall receive a minimum of 3 tests.
- B. Based on test results, additional substrate preparation may be required before proceeding with installation of system.

3.9.1 FINISHING

- A. Cementitious Coating
 - a. Bond-Kote shall be applied using squeegee, trowels or other systems approved for use by the Manufacturer.
 - b. Repairs shall be completed prior to application of Bond-Kote overlayment.
 - c. Bond-Kote is to be applied at a maximum thickness of 1/8 inch per coat.
 - d. Two applications of Super-Krete Bond-Kote Mix shall be applied over all bare concrete prior to any finish coatings. These applications will make the floor uniform and reduce moisture vapor emissions significantly. Reducing vapor emissions reduces the chances of flooring



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failure due to moisture vapor transmission. Allow each application to dry thoroughly before additional applications are applied.

- e. Remove any ridges or irregularities using a floor scraper or floor sander between each application.
- f. Check surface for uniformity.
- g. Finished surface shall be free of ridges and tool marks.

B. Decorative Coating System (optional)

- a. Super-Krete Decorative overlayment system of choice or preference may be applied at this time. Refer to Super-Krete overlayment systems.

C. When another topping is not to be applied over BOND-KOTE:

- a. BOND-KOTE is not a finish surface product and must be sealed with appropriate sealer.
- b. Apply a sealer for added protection and durability. Refer to Super-Krete Specification S-2 Selecting the Right Sealer.

3.9.2 PROTECTIVE SEALING

- A. All cementitious underlayments and toppings require a protective sealer.
- B. Appropriate sealer must be selected based upon expected traffic and the level of protection required for the surface.
- C. Apply protective sealer in accordance with manufacturer's specifications.

3.9.3 FIELD QUALITY CONTROL

- A. Super-Krete products are available as ready-mixed pre-package goods that require minimal mixing (add water only) or are ready to use as packaged. This provides excellent quality field control when mixing and applying product. Ready-mixed products allow the field superintendent or architect to properly estimate the proper amount of material to be used based upon the coverage rate of each unit or product.
- B. For testing of product Super-Krete International, Inc. will provide an unopened pre-packaged container of the required product to be tested by an independent laboratory specializing in the required test procedures. Since the underlayment and topping products contain Portland cement, the finished surface will vary in color the same as traditional concrete. Super-Krete S-9500 Color-Stains or S-11000 Ure-Kote paints are available to establish a more consistent colored finish.
- C. Precautions and cleaning are the responsibility of the General Contractor until project completion.

3.9.4 MAINTENANCE

- A. To provide long term maximum life of the newly installed surface, Super-Krete recommends the surface be properly sealed using the appropriate sealer, depending upon the use of the surface. Clean and reseal as required depending upon traffic conditions and wear and tear. Refer to Super-Krete Specification No. S-2 Selecting the Right Sealer.
- A. For proper maintenance instructions, refer to Super-Krete Specification No. M-1.

END OF SECTION