

NOTE TO SPECIFIER: Be sure to obtain the latest version of this Guide Specification.

This Guide Specification is not a completed document ready for use. It must be edited (i.e., deleting, adding, or modifying text) as required to suit project requirements.

The design professional and the contracting parties of the Contract Documents are responsible for the accuracy of issued project specifications, including use of this SCP™ Guide Specification.

Contact SCP™ for instructions for other applications not included in this specification.

SCP™ (SPRAY-LOCK CONCRETE PROTECTION™) SHALL NOT BE LIABLE FOR DAMAGES ARISING OUT OF THE USE OF THIS GUIDE.

CSI 3-PART LONG-FORM GUIDE SPECIFICATION

EDIT TO SUIT PROJECT REQUIREMENTS

SECTION 03 39 00

PENETRATING COLLOIDAL SILICA CONCRETE TREATMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes SCP™ spray-applied, penetrating, colloidal silica concrete treatments and substrate protection, applied after finishing.

NOTE TO SPECIFIER: SCP™ products are based on colloidal technology that penetrates into concrete capillaries and pores. SCP™ Technology then reacts with free alkali (i.e. – Na⁺, K⁺, and Ca⁺⁺) to form an insoluble gel within the capillaries and pores of the concrete, providing a waterproof seal, but uniquely leaving the concrete surface in a condition to receive adhesives, toppings, other finish systems, and/or coatings.

- B. Related Requirements: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. Documents and Sections include, but are not limited to, the following:
1. Drawings and General Provisions of the Contract
 2. General and Supplementary Conditions
 3. Division 01 General Requirements
 4. Section 03 30 00 Cast-in-Place Concrete for concrete materials, mixes, and placement of general building applications of concrete.
 5. Section 09 00 50 Spray-Applied Floor Adhesives for floor adhesives sprayed on concrete slabs treated with SCP™ penetrating colloidal silica concrete treatment.

6. Section 32 13 13 Concrete Paving for concrete material, mixes, and placement of concrete pavement and walks.

NOTE TO SPECIFIER: Coordinate application sections between concrete, SCP™, adhesive systems, subfloor-substrate finish coatings, and floor-finish coverings.

1.2 REFERENCES

- A. Reference Standards: Refer to Section 01 42 00 References and the following:
 1. American Association of State Highway and Transportation Officials (AASHTO)
 - a. AASHTO TP 95 - Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration
 2. American Concrete Institute (ACI):
 - a. ACI 211 – Standard Recommended Practice for Selecting Proportions for Concrete
 - b. ACI 300 Series (Design & Construction Practices)
 - c. ACI 500 Series (Special Products & Processes)
 3. ASTM International (ASTM)
 - a. ASTM C39/C39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - b. ASTM C157/C157M – Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
 - c. ASTM C666 / C666M – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 - d. ASTM C876 – Standard Test Method for Corrosion Potentials of Uncoated Reinforcing Steel in Concrete
 - e. ASTM C1543 – Standard Test Method for Determining the Penetration of Chloride Ion into Concrete by Ponding
 - f. ASTM C1583/C1583M – Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
 - g. ASTM E96/E96M – Standard Test Methods for Water Vapor Transmission of Materials
 - h. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
 - i. ASTM E699 – Standard Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E-6
 - j. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
 4. British Standards Institute (BS)
 - a. BS EN 13295 – Products and systems for the protection and repair of concrete structures. Test methods. Determination of resistance to carbonation
 - b. BS EN 12390-8 – Testing hardened concrete. Depth of penetration of water under pressure
 5. ISO/IEC: International Organization for Standardization/ International Electrotechnical Commission
 - a. ISO 5470-1 – Rubber- or plastics-coated fabrics — Determination of abrasion resistance — Part 1: Taber abrader

- b. ISO/IEC 17025 – General requirements for the competence of testing and calibration laboratories
- 6. Nordic Council of Ministers (NORDTEST)
 - a. NORDTEST Method NT BUILD 492 – Concrete, Mortar and Cement-Based Repair Materials: Chloride Migration Coefficient from Non-Steady-State Migration Experiments
- 7. USGBC "Leadership in Energy and Environmental Design (LEED)

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference according to Division 01. Review requirements for preparation and application.

1.4 SUBMITTALS

- A. Submittals: Comply with requirements of Section 01 33 00 Submittal Procedures.
- B. Product Data: Submit manufacturer's printed descriptions of materials, components and systems; performance criteria; use limitations; preparation instructions and recommendations; storage and handling requirements and recommendations; and installation methods.
- C. Sustainable Design Submittals:
 - 1. Laboratory Test Reports: For SCP™ penetrating colloidal silica concrete treatment, indicating compliance with low-emitting material requirements.
 - 2. For wet-applied products, submit volume used.

NOTE TO SPECIFIER: [Coordinate and edit to the correct Section numbers below.](#)

- D. Quality Assurance Submittals: Certificates, and Test and Evaluation Reports.
- E. Field quality-control reports.
- F. Sample Warranty: For special warranty.
- G. Closeout Submittals:
 - 1. Operation and Maintenance Data: Including, but not limited to, methods for maintaining installed products and precautions against cleaning materials with methods detrimental to finishes and performance.
 - 2. Record Documents: Comply with requirements of Section 01 78 39 Project Record Documents.

1.5 QUALITY ASSURANCE

- A. Material Requirements: Concrete mixes shall be designed according to ACI 211.
- B. Structural Requirements: Concrete shall be "fit for use" per the applicable Guides, Manuals, Specifications, and/or Standards of the following ACI Manual of Concrete Practice series:
 - 1. ACI 300 Series (Design & Construction Practices)
 - 2. ACI 500 Series (Special Products & Processes)

- C. Manufacturer Qualifications: ISO 9001 Certified Manufacturer with a minimum 15 years' experience and capable of providing field service representation;
- D. Applicator Qualifications: SCP™ confirmation of successful application training.
- E. Testing Agency Qualifications: An independent agency qualified according to ISO/IEC Standard 17025 or ASTM E699 and ASTM E329.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, storage, and handling shall be according to the manufacturer's written recommendations, industry guidelines, and/or Division 01 requirements whichever is more stringent.

1.7 FIELD CONDITIONS

- A. Environmental Requirements per manufacturer's written recommendations, Division 01, and as follows:
 - 1. Allow surfaces to attain a minimum temperature of 36 deg F (2 deg C) and rising before proceeding with product application.
 - 2. Product should not be allowed to freeze.
 - 3. Protect application surfaces during periods of exposure to high winds.
 - 4. Ensure that frost or frozen surfaces are thawed with no standing water.
 - 5. Surfaces over 90 deg F and Direct Sunlight Conditions: Apply a fine mist spray of water on the surface before the application of SCP™ treatment to help alleviate premature chemical reaction and/or drying from taking place prior to achieving maximum penetration.

1.8 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace SCP™ penetrating colloidal silica concrete treatment that fails in materials within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. SCP™ Spray-Applied Penetrating Colloidal Silica Concrete Treatment Performance: Concrete treated with SCP™ or approved equal, shall be capable of the following laboratory performance when tested by qualified testing agency:
 - 1. Penetration Depth: Determine penetration depth in the laboratory or in the field by extracting a core from treated concrete, cleaning the cored surface with water, and allowing the core to air dry for 24 hours. After air drying, a spray bottle or similar device shall be used to lightly spray water upon the cut surface of the core. After 3 to 7 minutes, the water on the untreated portion of the core will absorb into the concrete, leaving only the treated area with water on the surface. The average of

- five measurements of the depth of treated concrete from the original surface of the core shall serve as the depth of penetration measurement.
2. Confirmed Chemical Reaction: Using scanning electron microscopy and/or gas chromatography, compare treated and untreated concrete to demonstrate a significant (greater than 5 percent) increase in C-S-H observed (in the case of SEM), or a significant (greater than 5 percent) increase in silica accompanied with a significant (greater than 5 percent) reduction in hydroxides.
 3. Reduction in Capillary Void Diameter/ Increased Tortuosity: Determine by one or more of the following methods:
 - a. AASHTO T-259 *Resistance of Concrete to Chloride Ion Penetration*: Treated concrete shall show at least a 50-percent reduction in chlorides at 1/2-inch depth after 90 days of ponding with a 3 percent NaCl solution when compared to a control.
 - b. NT Build 492 *Chloride Migration Coefficient from Non-Steady-State Migration Experiments*: Determine initial voltage by reading current magnitude through untreated sample. Use the same voltage for both the treated and untreated samples in order to assess the treatment effect. Treated samples shall demonstrate at least 20-percent reduction in chloride penetration depth.
 - c. EN 12390-8 *Depth of Penetration of Water Under Pressure*: Treated sample shall demonstrate at least 75-percent reduction of water penetration at 72 hours under 5 bar of pressure as compared to the control sample.

Do not use ASTM C1202 *Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration* as a substitute for one or more of the above tests.

4. Surface Residue: Demonstrate no more than 5-percent reduction in skid resistance when tested according to ASTM E303 – *Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester*
5. Reduction in Drying Shrinkage Strain: Treated concrete shall demonstrate at least 30-percent reduction in drying shrinkage strain when tested according to ASTM C157 *Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete* as compared to an untreated control.

NOTE TO SPECIFIER: Retain or revise paragraph and subparagraphs below for LEED requirements.

- B. Low-Emitting Materials:
 1. General Emissions Evaluation: Building products shall be tested and determined compliant according to California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario.
 2. Adhesives and sealants wet-applied on site shall meet applicable chemical-content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168. Provisions of SCAQMD Rule 1168 do not apply to adhesives and sealants subject to state or federal consumer product VOC regulations.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide spray-applied products by the following:
1. Spray-Lock Concrete Protection, LLC, 5959 Shallowford Road, Suite 405, Chattanooga, TN 37421; (office) 423.305.6151 / (fax) 423.305.6150; www.concreteprotection.com
 2. Substitution Limitations: Manufacturers of equivalent products beyond those listed above shall be considered when submitted per Division 01, using CSI Substitution Request Form 1.5C (During the Bidding Phase) or Form 13.1 (After the Bidding Phase). Project Engineer/Manager shall assess the equivalency of the submitted product(s).
- B. Source Limitations: Obtain SCP™ penetrating colloidal silica concrete treatment through one source from a single manufacturer.

NOTE TO SPECIFIER: SCP™ will analyze the concrete mix design for product selection. SCP™ will need to have the mix design, specific gravities of the constituents, and individual aggregate gradations. These factors contribute to the permeability of the concrete. Mixes with low permeability require products formulated to penetrate this type concrete.

2.3 PENETRATING COLLOIDAL SILICA CONCRETE TREATMENT FOR NEW CONCRETE

- A. Product: Spray-Lock Concrete Protection, LLC; SCP™ 327 – Time of Placement is a green-tinted (dries clear), odorless, non-toxic, and non-flammable penetrant in a colloidal liquid base. SCP™ 327 penetrates concrete substrates to chemically react with free alkali components in the concrete resulting in:
1. Superior cure at time of placement
 2. A surface ready to accept adhesives, coatings, and/or underlayments when applied according to the respective manufacturer's recommendations
 3. Reduced drying shrinkage and curling/warping of the concrete section.
 4. Minimizes scaling and spalling
 5. Enhanced durability
 6. Waterproofing benefit
 7. Flooring and coating systems can be applied as soon as 14 days after application

NOTE TO SPECIFIER: Use SCP™ 578 on concrete that is older than 24 hours.

2.4 PENETRATING COLLOIDAL SILICA CONCRETE TREATMENT FOR EXISTING CONCRETE

- A. Product: Spray-Lock Concrete Protection, LLC; SCP™ 578 – Premium Concrete Protection is a cloudy white (dries clear), odorless, non-toxic, and non-flammable penetrant in a colloidal liquid base. SCP™ 578 penetrates concrete substrates to chemically react with free alkali components in the concrete, resulting in:
1. Waterproofing and sealing benefits
 2. Hardening and densifying
 3. Reduced surface dusting (i.e., concrete carbonation)

4. Enhanced resistance to chemical and environmental attack
5. Access to floors, slabs, and other treated areas in as little as 1 hour
6. Minimizes mold and mildew
7. Flooring and coating systems can be applied as soon as 24 hours after application

NOTE TO SPECIFIER: Use SCP™ 743 for high-performance concrete and remediation of existing concrete. SCP™ 743 is suitable for Time of Placement and for remediation of Existing Concrete

2.5 PENETRATING COLLOIDAL SILICA CONCRETE TREATMENT FOR HIGH-PERFORMANCE CONCRETE AND REMEDIATION OF EXISTING CONCRETE

- A. Product: Spray-Lock Concrete Protection, LLC; SCP™ 743 – for High Performance Concrete and Concrete Remediation is a blue-tinted (dries clear), odorless, non-toxic, and non-flammable penetrant in a colloidal liquid base. SCP™ 743 deeply penetrates concrete and masonry substrates to chemically react with free alkali components in the concrete resulting in:
 1. Protection of reinforcing steel
 2. Fills concrete capillary and pore structure
 3. Stabilizes concrete chemistry
 4. Curing benefits
 5. Waterproofing benefits
- B. Product Requirements: SCP™ penetrating colloidal silica concrete treatments shall conform to the information provided in the most current product data sheet supplied by Spray-Lock Concrete Protection or product manufacturer approved by the Project Engineer/Manager.

2.6 ACCESSORIES

- A. Large Surface Areas and/or Volumes: Low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa).
- B. Small to Medium Surface Areas and/or Volumes: Pump or backpack sprayer for areas under 1000 sq ft (9.3 sq m), or sprayers indicated for large surface areas above.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare according to SCP™'s written instructions, industry guidelines, Division 01, and as follows:
 1. Prepare substrates to ensure proper application of SCP™ treatment.
 - a. Protect in-place assets from overspray.

- b. NEW CONCRETE: As soon after concrete placement, floating, and/or troweling, so that it is hard enough for foot traffic or other surface loading without causing damage to the surface.
 - 1) Concrete shall not be treated with any other curing system including internal or externally applied, i.e., ASTM C309 membranes or cure and seal products.
 - 2) Concrete shall not be treated with sealers or densifiers, including silicate sealers, i.e., sodium, potassium, lithium, etc.
 - 3) Remove standing water.
 - 4) Do not burnish the surface or close pores, by over finishing with trowels.
- c. EXISTING CONCRETE & CONCRETE REMEDIATION: Physically remove curing membranes, laitance, plaster, oil, adhesive residue, crystalline silicate hardeners, or other contaminants from the substrate surface (i.e. – sand or shot blast, high-pressure wash, etc.) then clean to remove all residue and penetration blocking products.
 - 1) Prepare surface to provide an open or porous surface that allows water penetration/absorption.

3.2 APPLICATION

- A. For horizontal applications, apply according to SCP™'s written instructions, industry guidelines, Division 01, and as follows:
 - 1. SCP™ Application to NEW CONCRETE:
 - a. Apply SCP™ treatment as soon as the concrete is hard enough for foot traffic or other surface loading without damage to the surface. Maintain a flood coat for 15 minutes or apply at a rate of approximately 140 to 180 sq ft per gallon using low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa).
 - b. If necessary, spray a second application of SCP™ for porous concrete at a rate of approximately 140 to 180 sq ft per gallon.
 - c. After 14 days, apply leveling cements, acrylic primers, applicable Spray-Lock™ adhesive, and/or the final surface finish materials according to the respective manufacturer recommendations.
 - 2. SCP™ Application to EXISTING CONCRETE and for CONCRETE REMEDIATION:
 - a. Apply SCP™ onto existing concrete as soon as the application surface has been properly prepared. Apply at a rate of approximately 70 to 180 sq ft per gallon depending on the product and application, using low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa).
 - b. If necessary, spray a second application of SCP™ for porous concrete at a rate of approximately 140 to 180 sq ft per gallon.
 - c. After a minimum of 24 hours, lightly sand & vacuum, or pressure wash, to remove any leftover contaminants and excess materials.
 - d. After 24 to 48 hours, apply leveling cements, acrylic primers, applicable Spray-Lock adhesive, and/or the final surface finish materials according to the respective manufacturer published recommendations.

- B. For vertical and inverted applications, apply according to SCP™'s written instructions, industry guidelines, Division 01, and as follows:
1. SCP™ Application to NEW CONCRETE:
 - a. Apply SCP™ treatment as soon as the concrete formwork is removed. Use a low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa), set to a pressure that will not damage the surface, i.e., approximately 20 to 500 psi (0.21 to 3.4 MPa). Apply at a rate of approximately 300 sq ft per gallon. The surface needs to be dampened while minimizing any run off the surface. This is achieved by using lower pressure and lower delivery rate spray tips and moving faster.
 - b. Continue applications at the above rate until surface starts to reject the product. This is evidenced by product rilling and starting to run down the surface.
 - c. After 14 days, or after manufacturer's testing protocol approves application, apply the final surface finish materials according to the respective manufacturer recommendations.
 2. SCP™ Application to EXISTING CONCRETE and for CONCRETE REMEDIATION:
 - a. Apply SCP™ using a low-pressure, high-volume sprayer less than 100 psi (0.69 MPa), or medium-pressure airless sprayer less than 500 psi (3.4 MPa) onto existing concrete as soon as the application surface has been properly prepared. Apply at a rate of approximately 300 sq ft per gallon. The surface needs to be dampened while minimizing any run off the surface. This is achieved by using lower pressure and lower delivery rate spray tips and moving faster.
 - b. Continue applications at the above rate until surface starts to reject the product. This is evidenced by product rilling and starting to run down the surface.
 - c. After a minimum of 24 hours, lightly sand & vacuum, or pressure wash, to remove any leftover contaminants and excess materials.
 - d. After 24 to 48 hours, or after manufacturer's testing protocol approves application, apply the final surface finish materials according to the respective manufacturer published recommendations.

3.3 FIELD QUALITY CONTROL

- A. Site Tests and Inspections per Division 01, and as follows:
1. Inspect applied SCP™ for non-conforming work including, but not limited to:
 - a. Dried SCP™ treatment material on the concrete substrate due to slab not being wetted during very hot, direct sunlight, and/or windy conditions.

3.4 CLEANING

- A. Immediately clean overspray or splash off glass and metal with soap and water, and dry.
- B. Waste Management per Division 01, and as follows:
1. Store and recycle shipping cartons and empty bucket containers.

3.5 PROTECTION

- A. Protect concrete from staining, laitance, and contamination during remainder of construction period.

END OF SECTION