

SECTION 09 91 33

SILICA-SOL INTERIOR COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Application of one coat of silicate primer and two coats of interior silica-sol coating. Specification includes surface preparation.

B. Related Sections: Related sections include the following:

*PLACE RELATED SECTIONS BELOW. EXAMPLES INCLUDE:*

1. Section 03 01 00 – Maintenance of Concrete
2. Section 04 21 13 – Brick Masonry
3. Section 04 22 00 – Concrete Unit Masonry
4. Section 09 24 00 – Portland Cement Plastering
5. Section 09 25 23 – Stucco Repairs
6. Section 03 30 00 – Cast-In-Place Concrete
7. Section 03 40 00 – Precast Concrete
8. Section 04 20 00 – Unit Masonry
9. Section 04 40 00 – Stone Assemblies
10. Section 04 70 00 – Manufactured Masonry
11. Section 09 20 00 – Plaster and Gypsum Board
12. Section 09 23 00 – Gypsum Plastering
13. Section 09 24 00 – Portland Cement Plastering
14. Section 09 24 13 – Adobe Finish
15. Section 09 24 23 – Portland Cement Stucco
16. Section 09 24 33 – Portland Cement Parging
17. Section 09 25 00 – Other Plastering
18. Section 09 25 23 – Lime Based Plastering
19. Section 09 25 33 – Lime Cement Based Plastering
20. Section 09 26 00 – Veneer Plastering
21. Section 09 26 13 – Gypsum Veneer Plastering
22. Section 09 27 00 – Plaster Fabrications
23. Section 09 27 13 – Glass-Fiber-Reinforced Plaster Fabrications
24. Section 09 28 13 – Cementitious Backing Boards
25. Section 09 28 16 – Glass-Mat Faced Gypsum Backing Boards
26. Section 09 28 19 – Fibered Gypsum Backing Boards
27. Section 09 29 00 – Gypsum Board
28. Section 09 29 82 – Gypsum Board Fireproofing

29. Section 09 50 00 – Ceilings

C. Related Products *[DELETE ARTICLE C. IN FINAL SPECIFICATION]*

1. Cleaning Agents
  - a. KEIM Lime Remover
2. Paint Remover
  - a. KEIM Bio Stripper
  - b. KEIM Plastic, polyethylene
3. Primers
  - a. KEIM Grundierweiss
  - b. KEIM Fixativ
  - c. KEIM Contact Plus
  - d. KEIM Contact Plus Grob
4. Stain Blockers
  - a. KEIM Stain Blocker
5. Crack Fillers
  - a. KEIM Optil Grob
  - b. KEIM Dolomit Spachtel
  - c. KEIM Contact Plus
  - d. KEIM Contact Plus Grob
  - e. KEIM Universalputz Fine Render
  - f. KEIM Universalputz Standard Render
  - g. KEIM Concretal Fine Filler
  - h. KEIM Concretal Universal Mortar-S
6. Water Repellents/Sealers
  - a. KEIM Spezial Verdünnung
  - b. KEIM Sealer
7. Repair Mortars
  - a. KEIM Concretal Fine Filler
  - b. KEIM Concretal Universal Mortar-S
  - c. KEIM Concretal Mortar-R
  - d. KEIM Restauro Base
  - e. KEIM Restauro Top
  - f. KEIM Restauro Giess
8. Stuccos/Plasters/Renders
  - a. KEIM Dolomit Spachtel
  - b. KEIM Universalputz Fine Render
  - c. KEIM Universalputz Standard Render

- d. KEIM NHL Kalkputz Fine
- e. KEIM NHL Kalkputz Grob
- f. KEIM Porosan Equalizer
- g. KEIM Porosan Top Coat

## 1.2 REFERENCES

- A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. ASTM (ASTM):
  - 1. ASTM E 96, "Standard Test Methods for Water Vapor Transmission of Materials."
  - 2. ASTM G 154, "Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials."
  - 3. ASTM D 6886-12, "Standard Test Method for Determination of the Individual Volatile Organic Compounds (VOCs) in Air-Dry Coatings by Gas Chromatography."
- C. Deutsches Institute for Normung (DIN), European Standard (EN), and International Organization for Standardization (ISO):
  - 1. DIN EN 1062, manufacturing standard for silica-sol paint.
  - 2. DIN EN 13 300, manufacturing standard for interior silicate coating.
  - 3. ISO 11998, "Paints and varnishes - Determination of wet-scrub resistance and cleanability of coatings."
  - 4. ISO 6504-3, "Paints and varnishes - Determination of hiding power - Part 3: Determination of contrast ratio of light-colored paints at a fixed spreading rate."
  - 5. ISO 2813, "Paints and varnishes - Determination of specular gloss."
  - 6. EN 1062-3, "Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 3: Determination of liquid water permeability."
  - 7. DIN EN ISO 7783-2, "Coating materials and coating systems for exterior masonry and concrete - Part 2: Determination and classification of water-vapor transmission rate (permeability)."
  - 8. DIN 4102-A2, "Fire Behavior of Building Materials and Building Components - Part 2: Building Components; Definitions, Requirements and Tests."

## 1.3 DEFINITIONS

- A. Concrete Cleaner: An acidic liquid cleaner.
- B. Silicate Primer: A silicate based interior primer.
- C. Silicate coating, base coat: The first applied coat of the silica-sol coating.
- D. Silicate coating, top coat: The second applied coat of the silica-sol coating.

## 1.4 SYSTEM DESCRIPTION

- A. A materials-compatible highly vapor permeable decorative coating system for interior exposure.
  - 1. Concrete Cleaner: A silicic acid based cleaner used to remove mold release oils, and soiling from concrete and mineral surfaces.
  - 2. Silicate Primer:

- a. An interior low viscosity clear-drying silicate primer that penetrates through the surface to chemically bind with the substrate.
  - b. Consolidates fine surface particles from sanded plaster or chalking surfaces of soft brick.
  - c. Develops uniform absorbency across mixed substrates such as drywall and plaster resulting in uniform absorbency so a two coat silicate paint application will reflect a homogenized appearance even in critical light conditions.
3. Silicate Coating: An incombustible two coat system comprising a smooth base coat and a smooth top coat.
- a. Silicate coating penetrates the surface and in a chemical reaction combines with the substrate through chemical and mechanical bonds forming a hard amorphous microporous layer with extremely high vapor permeability.
  - b. Unaffected by acids, UV exposure, or air-borne pollutants.
  - c. Unique alkaline mineral layer structure prevents liquid water penetration into the coated substrate and maintains moisture balance through vapor diffusion to keep wall assemblies breathable and dry, thus resisting mold and biological growth.
  - d. Will not reduce substrate vapor permeability.

### 1.5 SUBMITTALS

- A. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Provide published documentation describing materials, characteristics, and limitations.
- B. Samples: Submit samples for verification purposes, fabrication techniques and workmanship.
- C. Manufacturer's Instructions: Submit manufacturer's instructions including technical data sheets, material safety data sheets, mixing instructions, application requirements, special procedures, and conditions requiring special attention.
- D. LEED Submittals: Submittals that are required to comply with requirements for LEED certification include the following:
  1. Low Emitting Materials: Submit certification by the manufacturer confirming that products (i.e., adhesives, sealants, paints, coatings, etc.) meet or exceed the volatile organic compound (VOC) limits set by specific agencies or other requirements. Clearly state VOC limits in the submittal.

### 1.6 QUALITY ASSURANCE

- A. Qualifications:
  1. Manufacturer Qualifications: Provide evidence that Manufacturer is a firm engaged in the manufacture of silicate coatings of types required, and whose products have been in satisfactory use in similar service for a minimum of fifteen years.
  2. Applicator Qualifications: *(BELOW, KEEP ONE AND DELETE THE OTHER)*
    - a. Provide evidence Applicator is a firm having a minimum of three years of successful application experience with projects similar in type and scope to that required for this Project, and having passed a product certification training course provided by the manufacturer prior to the execution of this unit of work.
    - b. Provide evidence Applicator is a firm having successful application of products within this specification with at least one project in the last 18 months similar in type and scope to that required for this Project, and having passed a product certification training course provided by the manufacturer prior to the execution of this unit of work.

B. Mock ups:

1. Prior to application of the work, fabricate and erect mock ups for each type of finish and application to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution.
2. Build mock ups to comply with the following requirements using materials indicated for final unit of work.
3. Locate mock ups as directed by the Architect.
4. Demonstrate the proposed range of aesthetic effects and workmanship to be expected in the completed work.
5. Obtain the Architect's acceptance of mock ups before start of final unit of work.
6. Retain and maintain mock ups during construction in undisturbed condition as a standard for judging completed unit of work.
7. Maintain a record of approved mock up's product mixing and application steps to incorporate into final unit of work to ensure color consistency and textural aesthetics.

C. Tracking Job Progress with Daily Logs

1. Maintain a daily record of the weather conditions, of material ordered and delivered, material used, inspections, areas of work that began, areas of work that were completed, and questions raised and answers received.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with manufacturer's name, material and product brand name, and lot number, if any.
- B. Store materials in their original undamaged packages and containers inside a well ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

## 1.8 WARRANTY

- A. Provide manufacturer's written product warranty.
  1. Warranty period from date of Substantial Completion is 10 years.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

A. Basis of Design:

1. Items specified are to establish a standard of quality for design, function, materials, compatibility, performance, warranty, and appearance.
2. Equivalent products by listed manufacturers are acceptable.
3. The Architect is the sole judge of the basis of what is equivalent.

B. Listed Manufacturers

1. KEIM Mineral Coatings of America, Inc., 10615 Texland Blvd. #600, Charlotte, North Carolina 28273. Telephone 704-588-4811. Email keim-info@keim.com.

### 2.2 MATERIALS

- A. Concrete Cleaner: Provide a pretreatment and cleaning agent meeting or conforming to:
  1. Fluorosilicic acid based.

2. Is diluted with water.
3. Upon application immediately reacts to form harmless compounds.
4. Clear, colorless liquid.
5. No VOC.
6. Basis of Design: "KEIM Concrete Cleaner", KEIM Mineral Coatings of America, Inc.

B. Silicate Primer: Provide a primer meeting or conforming to:

1. Based upon a binder combination of hydrosol and silica sol.
2. Penetrates deep and chemically consolidates surface for improved adhesion.
3. Highly vapor permeable at 75 to 85 perms—allows vapor diffusion for dry wall assemblies.
4. Approximately 9 pH (alkaline)
5. Solvent-free, odor-free, less than 1 gram per liter VOC (Volatile Organic Content).
6. For interior application over mineral and organic substrates, sound existing coatings, or mixed substrates.
7. Basis of Design: "KEIM Soliprim", KEIM Mineral Coatings of America, Inc.

C. Silicate Coating, Base and Top Coat: Provide silica-sol based opaque coating meeting or conforming to:

1. DIN EN 1062, manufacturing standard for silica-sol coating.
2. DIN EN 13 300, manufacturing standard for interior silicate coating.
3. DIN 4102-A2, non-flammable standard – will not burn.
4. ASTM E 96 Vapor Permeability – 75 to 85 perms.
5. ASTM G 154 Accelerated Weathering – no fading, cracking, peeling.
6. ASTM D 6886-12 Standard Test Method for Individual Volatile Organic Compounds (VOCs) – Less than 1 gram per liter VOC (Volatile Organic Content).
7. pH value – approximately 11
8. ISO 2813, gloss at 85 degrees – dull matte
9. ISO 6504-3, contrast ratio (hiding power) – Class 1
10. ISO 11998, Class 2 abrasion resistance, Class 3 for monochrome colors 9011, 9018, 9020
11. Without biocides.
12. Tinted to the desired finish color.
13. Basis of Design: "KEIM Optil", KEIM Mineral Coatings of America, Inc.

## 2.3 EQUIPMENT

A. Tools:

1. Concrete Cleaner: Apply by natural bristle façade brush, rinse off with clean water.
2. Silicate Primer: Apply by brush, roller, or airless spray.
3. Silicate Coating, Base and Top Coats: Apply by natural bristle façade brush, professional roller, or professional airless spray equipment and back-roll as required for even distribution.

## 2.4 FINISHES

- A. Concrete Cleaner: Leave surface clean from removed particles.

- B. Silicate Primer: Apply evenly to saturation removing drips, runs, and puddles.
- C. Silicate Coating, Base and Top Coats:
  - 1. Apply in full coverage evenly distributed coats to a smooth mineral matte finish without lap lines, voids, "holidays", or drips. Compare manufacturer-verified mock up consumption data with application consumption data to ensure enough product is applied.
  - 2. Maintain a wet edge to prevent sight lines and textural differences.
  - 3. Apply enough product to prevent shading and textural differences that contribute to striping, especially with the base coat. Applying inadequate amount of product requires corner to corner recoating.
  - 4. When rolling product, roll off in same direction across façade to prevent shading differences that affect appearance of color.
  - 5. When spraying product:
    - a. Do not strain silicate coatings.
    - b. Remove paint filters from spray gun and spray pump.
    - c. Use only new hoses. Used hoses may contain paint thinners or solvents.
    - d. Paint thinners and cleaning solvents are not compatible with silicate coatings.
    - e. Clear gun and spray equipment with warm soapy water and rinse well with clean water to remove residual paint thinners and solvents.
    - f. Never use tips with smaller orifices than recommended. Smaller tips clog and prevent proper coating application. Improper application voids warranty and shortens longevity of the coatings.
    - g. Prevent overspray drift or misting onto glass objects.
  - 6. When working from scaffolding, work as a team moving across façade maximum eight (8) vertical feet per applicator to ensure complete coverage and wet edge left to right and top to bottom of each section.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions: Confirm by examination the areas and conditions under which the work is to be applied for compliance with manufacturer's instructions. Do not proceed with the work until unsatisfactory conditions have been corrected.
  - 1. Verify substrate is secure, sound, dry, and absorbent, and free of dirt, grease, salts, oil-based paints, release agents, curing agents, and other bond breakers.
  - 2. Verify substrate has no pretreatments or priming materials applied unless such conditions are approved by manufacturer.
  - 3. Verify surfaces or materials to be coated are fully cured to manufacturer recommendations.
  - 4. Confirm coating surfaces are less than 40 percent relative humidity as measured by a masonry moisture meter prior to application of silicate coatings.
  - 5. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Applicator.

### 3.2 PREPARATION

- A. Protection:

1. Lay ground cloths and take measures as necessary to protect surfaces subject to contact by products specified by this Section.
2. Silicate paint coatings and dilution may etch or bond to glass, metal, and concrete.

### 3.3 APPLICATION

- A. Conform to reviewed product data, manufacturer's written instructions, and provisions of the Contract Documents.
- B. Plan the work properly.
  1. Maintain temperature during and after application. Substrate and ambient air temperature must be between 41 °F (5 °C) and 86 °F (30 °C).
  2. Work to logical stopping points (corners, seams, architectural features, etc.).
  3. Apply silicate coatings as directed by 2.4 FINISHES.
  4. Obtain manufacturer's written instructions for application outside of the above parameters.
- C. Silicate Primer:
  1. Apply full wet coats undiluted.
  2. Highly absorbent substrates require two coats.
  3. Allow substrate to cure minimum 6 hours before applying sol silicate paint.
- D. Concrete Cleaner:
  1. Dampen substrate with water. When dry to touch, proceed with concrete cleaner.
  2. Dilute 1:5 with clean water (1 part concrete cleaner to 5 parts clean water).
  3. Apply generously to substrate from bottom working to the top. Reaction is immediate.
  4. Allow substrate to completely dry.
- E. Silicate Coating:
  1. Base Coat:
    - a. Do not dilute. Stir well by hand or 600-800 RPM mixing equipment.
    - b. Apply base coat of undiluted silicate coating.
    - c. Allow minimum 6 hours drying time.
  2. Top Coat:
    - a. Do not dilute. Stir well by hand or 600-800 RPM mixing equipment.
    - b. Apply top coat of undiluted silicate coating.
    - c. Prevent contact with coated surfaces minimum 24 hours after application.
  3. Touch Up:
    - a. Some colors touch up well, some do not. Always perform a test and allow the touch up to cure minimum 12 hours before evaluation. Colors become lighter upon drying.
    - b. For colors that do not touch up well, expect corner to corner recoating for acceptable results.
    - c. When touching up or recoating, use the same tools and techniques for best results.
    - d. Articulate the application confining the recoating to the borders of the repair.



### 3.4 CLEANING

- A. Clean tools, spills, and accidental drips immediately with plenty of water.
- B. Leave applications clean and premises free from residue and debris from work of this Section.

END OF SECTION