DIVISION 9: FINISHES

SECTION 09 67 23.13

RESINOUS FLOORING AND COATINGS

3/16" Industrial Sand DB RC with PA Cap and HP Top

PART 1 GENERAL

1.1 SUMMARY

A. Description: 3/16" Double Broadcast Industrial Sand System with 100%-solids Urethane Cement, 100%-solids Polyaspartic, and a High-Performance Polyurethane Top Coat.

1.2 RELATED SECTIONS INCLUDE

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

B. Other Related Sections
1. Section 03 30 00: Cast-in-Place Concrete.
2. Section 03 39 00: Concrete Curing.
3. Section 07 95 00: Expansion Control.

1.3 REFERENCE STANDARDS (MUST USE CURRENT VERSIONS ONLY)

A. ASTM C1583: Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)

B. ASTM F710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

C. ICRI Guide 310.2R Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

D. RFCI Recommended Work Practices for the Removal of Resilient Floor Coverings

1.4 SUBMITTALS

A. Product Data: Submit Manufacturer's data sheets and supporting information for each product and process specified including:
1. Approved Applicator
2. Completed Jobsite Checklists and Reports (kretus.com/pre-and-post-job-checklists)
3. Certificate of compliance (quality control document for the goods specified herein)
4. Technical Data Sheets (kretus.com/technical-data-sheets)
5. Safety Data Sheets (kretus.com/safety-data-sheets)
6. Installation Guides (kretus.com/installation-guides)
7. Maintenance and Cleaning Guide (kretus.com/project-planning)
8. Warranty Information

B. Samples: A 12-inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system as described in section 1.1A.

C. Test reports of cured products showing VOC Emission compliance with USGBC LEED Version 4, performed according to California Dept. of Public Health CDPH/EHLB/Standard Method V1.2.

1.5 VERIFIED SAMPLES WITH MOCKUPS

A. Must be minimum of 50 SF unless otherwise specified by Manufacturer or Architect.

B. Must employ same materials, tools, and prep methods to be used in project installation.

C. Product direct to concrete adhesion needs to be verified per ASTM C1583. The results must be greater than 200 psi with concrete failure before proceeding with the installation. Manufacturer reserves the right to request additional mockup and adhesion pull test.

1.6 QUALITY ASSURANCE

A. Materials used must be manufactured, approved, and distributed by KRETUS® (info@kretus.com, 714-694-2061, kretus.com). No other parties shall be allowed without written approval.

B. Manufacturer shall have a minimum of 15 years' experience in the production, sales, technical, and installation of material submitted as part of this specification.

C. Manufacturer shall provide a trained installation professional with knowledge of each product listed herein or any material that has been specified or provided.

D. Manufacturer-trained professional Applicator. Approved Applicator named must be capable of handling application of similar nature in all phases: surface preparation, application of the product, finishing procedure, safety, and work ethic, and no less than five years' experience with similar projects and complexity.

E. A recorded (meeting minute submitted) pre-installation conference held between Applicator, General Contractor, Facility Owner, Manufacturer or Manufacturer Representatives, Designer, Architect, and any responsible parties discussed and reviewed for clarification of this specification and any supporting documents relating to this specification or the project itself.

F. If concrete slabs have history of existing floor failures, identify cause of failure. Identifying the cause(s) may require core samples be taken to and analyzed by a qualified laboratory. Manufacturer must be consulted for core extraction procedures and results.

1.7 WARRANTY

A. Manufacturer shall provide its standard materials warranty.

B. Approved Applicator shall furnish warranty for workmanship.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping
   1. All components of the system shall be delivered to the site free of damage and in the original Manufacturer's packaging, not tampered with, and clearly marked with product type and batch number.
   2. All product safety data sheets, bill of lading, and any dangerous goods declaration documents must be included with product and project documents.

B. Storage and Protection
   1. The jobsite shall provide a storage location of all components. The area shall be between 60°F and 80°F, dry, out of direct sunlight and inclement weather, free of obstruction, and clearly marked.
   2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the EH&S, department of health, or responsible party.

C. Waste Disposal: There shall be adequate disposal on jobsite for non-hazardous waste generated during installation of the system.

D. Handling
1. All Safety Data Sheets shall be adhered to at all times.
2. No untrained personnel shall touch, relocate, or use the materials without proper training or supervision.
3. No congregating, eating, smoking, or drinking of any kind allowed on or near the materials. All materials are to be treated as dangerous substances without firsthand knowledge.

1.9 FIELD CONDITIONS

A. Site Requirements
1. Application may proceed while air, material, and substrate temperatures are between 40°F and 90°F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The ambient relative humidity in the specific location of the application shall be less than 85% and the surface temperature shall be at least 5°F above the dew point.
3. Approved Applicator shall ensure that adequate ventilation is available for the work area.
4. Approved Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
5. Approved Applicator shall provide its own power or any necessary equipment to get the job done correctly and in a timely manner.
6. Job area shall be free of other trades during and, for a period of 24 hours, after installation.

B. Safety Requirements
1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
2. "No Smoking" signs shall be posted at the entrances to the work area.
3. The Facility Owner shall be responsible for the removal of foodstuffs from the work area.
4. Non-related personnel in the work area shall be kept to a minimum.

C. Existing Concrete Substrate
1. Measure compressive strength according to ASTM C805. Acceptable results: ≥ 3,000 psi.
2. Measure pH according to Test Method ASTM F710. Acceptable Results: 8-14.
3. If contamination is present or suspected, test and evaluate slab. Acceptable methods include, but are not limited to, petrographic examination according to ASTM C856 and solvent extraction to analyze compounds that may affect coating's ability to bond.
4. The Facility Owner, Engineer, and/or General Contractor must be notified and advised of potential additional costs of testing to meet Manufacturer specifications.

D. Moisture Testing shall be conducted as follows:
1. Perform anhydrous calcium chloride test, ASTM F1869-98. Application will proceed only when the MVER (moisture vapor emission rates) is less than or equal to 15 lbs./1,000 SF/24 hrs.
2. Perform RH (relative humidity) test using in situ probes, ASTM F2170. Application will proceed only when the RH level is less than or equal to 99%.
3. If vapor emission exceeds the Manufacturer's specified RH or MVER requirements, the Facility Owner, Engineer, and/or General Contractor must be notified of potential additional costs to lower moisture values to meet Manufacturer's specifications.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. KRETUS® Inc., 1055 W. Struck Ave, CA 92867 (info@kretus.com, 714.694.2061, kretus.com).

2.2 MATERIALS REQUIRED

A. Color(s) to be determined by Architect

B. Top coat texture to be determined by KRETUS® Technical Representative and based on system requirements. Recommended textures include
   1. KRETUS® ANTI-SLIP BEAD 100

C. FIRST AND SECOND BASE COATS
   1. KRETUS® URETHANE POLYMER CONCRETE RC is a low odor, 100%-solids, 3-component system that can be adapted to meet changes in weather and climate. Based on recommended application temperatures, the Approved Applicator may select from the following components with no adverse effect on physical and mechanical properties of the coating when fully cured:
      a. EZ: 60-90°F, <80% RH
      b. AP: 40-80°F, <70% RH
      c. FC: 40-80°F, <45% RH
   2. Color: Urethane Polymer Concrete Colorant

D. BROADCAST
   1. 30-mesh clean, kiln-dried industrial sand

E. CAP COAT
   1. KRETUS® POLYASPARTIC 92 LOW ODOR is a 100%-solids, 2-component system that can be adapted to meet changes in weather and climate. Based on recommended application temperatures, the Approved Applicator may select from the following components with no adverse effect on physical and mechanical properties of the coating when fully cured:
      a. EZ: <80°F, <55% RH
      b. FAST: <80°F, <35% RH
   2. Color: Poly Colorant

F. TOP COAT
   1. KRETUS® POLYURETHANE HP GLOSS is a 95%-solids, 2-component system.
      a. Recommended Application Temperature: 60-90°F, 40-70% RH
   2. Color: Poly Colorant
   3. Texture: See 2.2B

2.3 PRODUCT REQUIREMENTS

A. FIRST AND SECOND BASE COAT WITH BROADCAST

PROPERTIES	TEST METHOD	TYPICAL VALUES
Adhesion Strength	ASTM D4541	>500 psi, concrete failure
Compressive Strength	ASTM C579	7,000 psi
Flame Spread/ Critical Flux	ASTM E648	Class 1
Flame Spread/ Rate of Burning	ASTM D635	Self-extinguishing
Flexural Modulus of Elasticity	ASTM C580	3.5 x 106 psi
Flexural Strength	ASTM C580	2,700 psi
Hardness (Shore D)	ASTM D2240	80
Impact Resistance	ASTM D2794	>160 in-lbs.
Indoor Air Quality	CA 01350	Compliant

Linear Shrinkage	ASTM C531	0.20%
Microbial Resistance	ASTM G21	Passes, 0 growth
Moisture Vapor Permeance	ASTM E96	0.15 perms
Tensile Strength	ASTM C307	2,000 psi
Thermal Coefficient of Linear Expansion	ASTM C531	2.0 x 10-5 in/in/°F
Thermal Shock Resistance	ASTM C484	50 cycles, no cracking
Water Absorption	ASTM C413	<0.10%

B. CAP COAT

PROPERTIES	TEST METHOD	TYPICAL VALUES
Abrasion Resistance	ASTM D4060	17 mg loss
Abrasion Resistance with Anti-Slip	ASTM D4060	10 mg loss
Coefficient of Friction - Dry	ASTM D2047	0.7
Coefficient of Friction - Wet	ASTM D2047	0.6
Flame Spread/ Critical Flux	ASTM E648	Class 1
Flame Spread/ Rate of Burning	ASTM D635	Self-extinguishing
Flexibility/ Mandrel Bend	ASTM D522	Passes 1/8-in.
Gloss, 60°	ASTM D523	90
Hardness (König Hardness)	ASTM D4366	150
Impact Resistance	ASTM D2794	120 in-lbs.
Indoor Air Quality	CA 01350	Compliant
Microbial Resistance	ASTM G21	Passes, 0 growth
Tensile Elongation at Break	ASTM D2370	5%
Tensile Strength	ASTM D2370	6,000 psi
UV Resistance	ASTM D4587	High (Level 3)
Water Absorption	ASTM D570	<0.05
Yellowing Resistance	ASTM G154	< 3.0 ΔE, gray (color tested for visible changes)

C. TOP COAT

PROPERTIES	TEST METHOD	TYPICAL VALUES
Abrasion Resistance	ASTM D4060	10 mg loss
Abrasion Resistance with Anti-Slip	ASTM D4060	4 mg loss
Coefficient of Friction - Dry	ASTM D2047	0.7
Coefficient of Friction - Wet	ASTM D2047	0.6
Flame Spread/ Critical Flux	ASTM E648	Class 1
Flame Spread/ Rate of Burning	ASTM D635	Self-extinguishing
Flexibility/ Mandrel Bend	ASTM D522	Passes 1/8-in.
Gloss, 60°	ASTM D523	80+
Hardness (König Hardness)	ASTM D4366	170
Impact Resistance	ASTM D2794	120 in-lbs.
Indoor Air Quality	CA 01350	Compliant
Microbial Resistance	ASTM G21	Passes, 0 growth
Tensile Elongation at Break	ASTM D2370	8%
Tensile Strength	ASTM D2370	6,500 psi
UV Resistance	ASTM D4587	Mid to High (Level 2)
Water Absorption	ASTM D570	<0.05
Yellowing Resistance	ASTM G154	< 3.0 ΔE, gray (color tested for visible changes)

2.4 RELATED MATERIALS

A. Repair Materials: Use these products to repair surface imperfections before installation.
   1. Shallow fill/patching (<1/4" deep)
      a. KRETUS® Top Shelf® Epoxy
      b. KRETUS® Urethane Polymer Concrete SL
   2. Deep fill/patching (>1/4" deep)
      a. KRETUS® TOP SHELF® EPOXY EZ PATCH
      b. Combine 64 oz of KRETUS® TOP SHELF® EPOXY Part A, 32 oz KRETUS® TOP SHELF® EPOXY Part B, and 40-50 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.
      c. Combine standard 41-lb. kit of KRETUS® URETHANE POLYMER CONCRETE SL with 25-30 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.
      d. Combine standard 56-lb. kit of KRETUS® URETHANE POLYMER CONCRETE MF with 10-15 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.

B. Joint and Crack Fill Materials: Use these materials after installation.
   1. Saw Cut Contraction/Construction Joint Filler and Crack Filler
      a. KRETUS® POLY JOINT FILLER (indoor only)
      b. KRETUS® TOP SHELF® EPOXY EZ PATCH
      c. Combine 64 oz of KRETUS® TOP SHELF® EPOXY Part A, 32 oz KRETUS® TOP SHELF® EPOXY Part B, and 40-50 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.
      d. Combine standard 41-lb. kit of KRETUS® URETHANE POLYMER CONCRETE SL with 25-30 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.
      e. Combine standard 56-lb. kit of KRETUS® URETHANE POLYMER CONCRETE MF with 10-15 lbs. of 30-mesh Manufacturer-approved clean, kiln-dried sand.
   2. Color to match adjacent finished surfaces.

C. Prime Coat: Required when concrete is very porous, in poor condition, or when outgassing is suspected or prevalent.
   1. KRETUS® URETHANE POLYMER CONCRETE RC
      a. Apply with 5-7 WFT-mil blade and 3/8” non-shed nap roller. (Yields 330-450 sf per 18-lb kit)

D. Application Tools
   1. **Frame & Clamp for Easy Squeegee™ blades:** Jon-Don Part # SQ-MR78256-EA, Midwest Rake Easy Squeegee™ Frame & Clamp 26"
      a. **flat flexible blade:** Jon-Don Part # SQ-MR79851-EA, Midwest Rake Easy Squeegee™ Blade, 26" Flat/Flexible M0 D65
      b. **flat rigid blade:** Jon-Don Part # SQ-MR79854-EA, Midwest Rake Easy Squeegee™ Blade, 26" Flat/Stiff M0 D65
      c. **5-7 WFT-mil blade:** Jon-Don Part # SQ-MR79857-EA, Midwest Rake Easy Squeegee™ Blade, 26" Scalloped M5-7 D65
      d. **8-12 WFT-mil blade:** Jon-Don Part # SQ-MR79860-EA, Midwest Rake Easy Squeegee™ Blade, 26" Scalloped M8-12 D65
   2. **3/8" non-shed nap roller:** Jon-Don Part # RC-WOR64218-EA, Pro/Doo-Z Roller Cover, 18", 3/8" nap

E. All other materials must be manufactured by or approved for use by KRETUS® (info@kretus.com, 714-694-2061, kretus.com).

PART 3 EXECUTION

3.1 EXAMINATION

A. Coordinate with adjacent trades to ease construction process.

B. Verify project site conditions under Section 01 00 00.

C. Before starting installation, correct all unsatisfactory conditions.

3.2 SURFACE PREPARATION

A. Prevent damage to substrate during preparation.

B. Mechanically prepare concrete to ICRI CSP 3. Required CSP may vary based on the condition of concrete. Always adhere to International Concrete Repair Institute's current standards.

C. Shotblast with mobile steel shot and dust recycling machine using a 50/50 blend of 290/330 shot. Remove steel shots with MAG-Broom and remove any leftover dust, debris, and loose particles using a dust collector vacuum with wand adapter. If using a small 110V shot-blaster, this step may need to be repeated several times by cross-blasting.

D. Edge Grinding: Grind all edges using an adjustable speed grinder to ensure all edges are clear of paints, sealers, and contaminants. Do not grind at high speed, as this may smooth out pores of the concrete and does not allow system to properly adhere to substrate.

E. Cleaning and Dust Removal: Wear shoe covers. Remove all leftover dust and any loose particles by using dust collector. Completely remove all existing coatings, oil, water, adhesives, dust, debris, and other substances that may impede system's adhesion.

3.3 MIXING

A. Follow Manufacturer's printed instructions. Careful measurements and thorough mixing are essential for a proper cure.

B. Review KRETUS® Mixing Station Guide for general handling, storage, and preparation procedures.

3.4 APPLICATION

A. General
   1. Follow Manufacturer's printed instructions.
   2. Materials shall be applied in 4 distinct steps:
      a. FIRST BASE COAT WITH BROADCAST
      b. SECOND BASE COAT WITH BROADCAST
      c. CAP COAT
      d. TOP COAT
   3. It is essential to read through and understand all Manufacturer application guidelines and methods and the proper use of the application equipment.
   4. Immediately prior to the application of any part of the system, the surface prepared shall be clean, dry, free of any contaminations, and any remaining dust or loose particles shall be removed using a vacuum.
   5. The handling, mixing, and addition of components shall be performed in a safe manner to achieve the desired results in accordance with experiences of the materials and working condition.
   6. The system shall follow the contour of the substrate unless the Architect has specified pitching or other leveling work.
   7. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. FIRST BASE COAT WITH BROADCAST
   1. Mix coating according to Manufacturer instructions.

2. Apply coating with 8-12 WFT-mil blade and 3/8" non-shed nap roller.
   a. Yields 190-280 SF per 18-lb. standard kit.
3. Before broadcast: If using coating with fast-cure hardener, wait 5 min. With other hardeners, wait 10-15 min.
4. Broadcast color quartz to refusal.
   a. Yields 0.25-0.50 lb./SF.
5. When dry, sand uneven surfaces. Remove all dust, debris, and any loose particles.

C. SECOND BASE COAT WITH BROADCAST
1. Mix coating according to Manufacturer instructions.
2. Apply coating with flat rigid blade and 3/8" non-shed nap roller.
   a. Yields 150-200 SF per 18-lb. standard kit.
3. Before broadcast: If using coating with fast-cure hardener, wait 5 min. With other hardeners, wait 10-15 min.
4. Broadcast color quartz to refusal.
   a. Yields 0.25-0.50 lb./SF.
5. When dry, sand uneven surfaces. Remove all dust, debris, and any loose particles.

D. CAP COAT
1. Mix coating according to Manufacturer instructions.
2. Apply coating with flat rigid blade and 3/8" non-shed nap roller.
   a. Yields 230-300 SF per 2-gal standard kit.

E. TOP COAT
1. Mix coating according to Manufacturer instructions.
2. Apply coating using dip-and-roll method with 3/8" non-shed nap roller.
   a. Yields 575-625 SF per 1.25-gal standard kit.

F. Integral Cove Base (only if specified):
1. Unless otherwise indicated or scheduled, provide integral cove base at 4" or 6" high by 1/8" thick with a 3/4" radius.
2. Follow Manufacturer application guidelines. Provide cove base cap strip if specified.

3.5 JOINT CUTTING, PREPARATION, AND FILLING

A. Coatings tend to pull away from free edges, termination points (anywhere concrete ends), joints, cracks, gutters, drains. Anchor joints may need to be added 6" from termination points. Joints and cracks may need to be expanded to 2x the width and 1x the depth. Edges around drains and gutters may need a deeper slope.

B. Honor all existing joints. Locate original joint locations and sawcut through coating into the original joint. Saw blade must penetrate to the depth of the original joint or 2" deep, whichever is smaller. Prefill joints greater than 2" deep.

C. Ensure sawcut joint is completely free of dust/debris/laitance.

D. Avoid trapping air when installing joint filler: Fill joint from bottom to top. Slightly overfill to a crowned profile. After sufficient cure, shave excess filler. Filler profile should be flush with floor surface when dry. If filler profile is low/concave, remove top 1/2" of filler and re-apply.

3.6 FIELD QUALITY CONTROL

A. The following tests and reporting shall be conducted by the Approved Applicator:
1. condition of the area being installed
2. temperature: date & time, air temperature, concrete surface temperatures, dew point
3. product installed & coverage rates
4. batch number of all materials

5. project report shall be submitted upon completion of the work

B. Adhesion tests of primer coat to the concrete per ASTM C1583 must show substrate failure with a minimal pull of 200 psi.

C. Replica of the system as installed must be provided to Manufacturer for approval and warranty.

D. Facility Owner reserves the right to invoke material testing procedures at any time and any number of times during the application process.

E. Facility Owner may engage service of an independent testing laboratory to sample materials being used on the jobsite. Samples of material may be taken, identified, and certified in the presence of the Approved Applicator.

3.7 CURING, PROTECTION, AND CLEANING

A. Cure flooring material in compliance with Manufacturer's instructions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Protection: After completion of application and clean up, do not allow heavy traffic on coated surfaces for a period of 24 hours at 75°F. Typical resinous floor coatings will take 7-14 days to fully cure.

C. Cleaning: Perform detail cleaning at floor termination to leave cleanable surface for subsequent work of other sections. Remove any materials or spillage from site. Clean any uncured areas with suitable solvent. Dispose of any temporary floor covering and leftover materials in accordance with federal, local, and building requirements.

END OF SECTION