SECTION 09 67 23

RESINOUS FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for all resinous flooring work as indicated on the Drawings and as specified herein.

1.02 REFERENCE STANDARDS

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.
   1. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method; 2007.
   2. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes; 2001 (Reapproved 2012).
   3. ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes; 2002 (Reapproved 2012).
   4. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine; 2011.
   5. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
   6. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
   7. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2014.
   8. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
   9. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2010.
   10. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between - 30 C and 30 C with a Vitreous Silica Dilatometer; 2008e1.
   11. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2010.
   12. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
   13. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.
   14. Mil-D-3134
   15. American Concrete Institute (ACI) standards, latest editions
       a. ACI 503 - Adhesives for concrete
   16. New York City Building Code

1.03 SUBMITTALS

A. Manufacturer's Data
   1. Printed preparation and application instructions for each type and class of material required.
   2. Manufacturer's certification showing material compliance with specified requirements.

B. Manufacturer's printed maintenance instructions.

C. Samples
   1. Samples for Initial Selection: For each type and color of exposed finish required.

2. Samples showing range of selected colors and texture variation for approval prior to commencement of work. Samples are to be in a “step-back” format with each layer shown.

D. Quality Assurance
   1. Material Test Reports: For each resinous flooring component.
   2. Certification that work will be supervised by manufacturer of materials
   3. Core Sampling
   4. Certification of Substrate Acceptability
   5. Mockups of floor and base

E. Warranty:
   1. Written 2-year Warranty covering materials and workmanship, signed by Manufacturer and applicator.

F. Low Emitting Materials Compliance Submittals:
   1. Provide documentation for the resinous flooring to be used indicating that the resinous flooring complies with low V.O.C. requirements as stated in Specification Section G01600.

1.04 QUALITY ASSURANCE

A. Certify that the work will be performed with qualified supervision by manufacturer of materials, or by a firm specializing in application of material specified, and acceptable to manufacturer and the Authority.

B. Core Sampling: At the direction of the Authority and at locations designated by the Authority, take 1 core sample per 1000 sq. ft. (92.9 sq. m) of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring and correct deficiencies.

C. Substrate Acceptability
   1. Submit a certified statement issued by the manufacturer of the resinous flooring materials and countersigned by the installer, attesting that all areas and surfaces designated to receive resin matrix flooring have been inspected and found satisfactory for the reception of flooring, and are not in conflict with the manufacturers requirements. Application of resinous flooring will be construed as acceptance of surfaces.

D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Apply full-thickness mockups on 48-inch square floor area selected by Architect.
   2. Include 48-inch length of integral cove base.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's unopened containers, with trade name, type, grade and other data. Store materials indoors in clean and dry location with temperature between 60o and 90oF.

B. Damaged containers unsuitable for use will be rejected.

1.06 FIELD CONDITIONS

A. Follow the resinous flooring manufacturer’s recommendations for concrete slab curing materials and methods as well as any other recommendations for concrete slab construction.

1.07 WARRANTY

A. A. Written 2-year Warranty covering materials and workmanship, signed by Manufacturer and applicator. The warranty shall cover, but not be limited to, delamination and wear through.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Crossfield (Dex-O-Tex), Roselle Park, NJ (Decor-Floor)
C. Stonhard, Maple Shade, NJ (Stonshield SLT)
D. General Polymers, Cincinnati, OH (Ceramic Carpet 400)
E. Selby-Ucrete, Cleveland, OH (Selbatwede 41)
F. Dur-A-Flex, East Hartford, CT (Dur-A-Quartz)
G. Delta Polymers, North Bayshore, NY (Polycrete MP)
H. Applied Flooring Micor, Milwaukee, WI (Floorlife DF)
I. PalmaLite, Inc. Bloomfield, NJ (PaliKrom)
   1. NOTE: Materials and system described below are as manufactured and applied by PalmaLite, Inc.: PaliKrom epoxy (105 mils) with Palma UV Top Coat for UV Stability. Other acceptable manufacturers shall provide similar systems.

2.02 MATERIALS

A. System Characteristics:
   1. Color and Pattern: As selected by Architect from manufacturer's full range
   2. Wearing Surface: Manufacturer's standard orange-peel texture.
   3. Integral Cove Base: 4 inches (100 mm)
   4. Overall System Thickness: 1/8 inch

B. System Materials
   1. Epoxy: 100% clear solids, combination 2 parts resin, 1 part hardener.
   2. Colored Ceramic Quartz: Angular, translucent, with ceramic coating for color and texture.
   3. Silica Sands: 20-40/140 mesh.

C. Mechanical Properties.

1.	Compressive Strength	ASTM C579 ASTM D695	11,000 PSI 12,000 PSI
2.	Tensile Strength	ASTM C307 ASTM D638	1,600 PSI 1,160 PSI
3.	Flexural Strength	ASTM C580 ASTM D790	4,000 PSI 2,900 PSI
4.	Modules of Elasticity	ASTM C580	1.0x106 lbs./in.2
5.	Water Absorption	ASTM C413 ASTM D570	<0.4% <0.3%
6.	Thermal Coefficient of Expansion	ASTM D696	1.9X105 in./in./°F.
7.	Shore "D" Durometer Hardness	ASTM D2240	Minimum 65
8.	Taber Abrasion	ASTM D1044	Avg. loss in weight 0.05 gr.
9.	Taberwear1000G Load 1000G Load	H-22 Wheel CS-17 Wheel	Abrasive Wear Index 30 Abrasive Wear Index 590
10.	Resistance to Impact	MIL-D-3134	No chipping,

			cracking
11.	Indentation	MIL-D-3134	No cracking
12.	Bond Strength	ASTM D4541	>400 psi
		ACI 503	>300 psi substrate fails

D. Mechanical properties of cured PalmaLite Palikrom polyurethane finish coat(s):

1.	Taber Index	1000G Load	CA-17 Wheel Abrasive Wear Index 22
2.	Tensile Strength	Instron Tester	5,000 PSI
3.	Elongation (%)	Instron Tester	135
4.	Impact Resistance	Gardner Labs Impact (Direct)	Passes 160 in. lbs.
5.	Flash Point	Seta Flash Closed Cup	80oF.
6.	Coefficient of Friction	0.6 dry	ASTM D2047

E. NOTE: ADA guideline require a coefficient of friction of no less than 0.6

F. Solvent Resistance: Cured PalmaLite PaliKrom with polyurethane finish coat shall resist the following reagents for a period of 7 days.

G. Inorganic Acids - 10% Hydrochloric, 10% Sulfuric, 35% Sulfuric, 10% Phosphoric, 50% Phosphoric, 2% Chromic, 2% Nitric, Organic Acids - 10% Lactic, 10% Citric, Oleic, Maleis; Alkalis - 10% Sodium Hydroxide; 50% Sodium Hydroxide, Salts - 20% Sodium Chloride, 20% Calcium Chloride, 20% Ferric Chloride, 10% Trisodium Phosphate; Solvents - Gasoline, Hexane, JP-4, Brake Fluid, Xylol, Toluol, Carbon Tetrachloride, Ethylene Glycol, Glycerol, Turpentine; Miscellaneous - Freon, Sour Crude Oil.

H. Cured PalmaLite PaliKrom with polyurethane finish coat shall resist the following reagents against spill and splash minimum 24 hours. Organic Acids - 5% Acetic, 10% Acetic; Alkalis - 10% Ammonium Hydrochloride, 50% Ammonium Hydroxide, Ammonia; Solvents - Trichlorethylene, Methyl Alcohol, Ethyl Alcohol, Acetone, Methyl Ethyl Ketone, Ethyl Acetate; Miscellaneous - Water at 160oF, Urine.

I. UV Stability shall be provided by applying a UV stabile top coat as per manufacturer's recommended product line.

J. System components shall comply with the V.O.C. requirements as stated in Specification Section G01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrate and other required conditions and accept as satisfactory before commencing application.

3.02 GENERAL

A. Install resinous flooring in strict according with the Manufacturer's recommendations

B. Do not commence preparation and application until all other trades performing work in the area of work under this section have completed their work.

C. Substrate temperature shall be between 60oF and 90oF or as required by the manufacturer before, during, and until application has cured.

D. Maintain proper ventilation, permanent lighting and permanent heating during application and curing.

E. Prohibit smoking or the use of spark or flame devices in all mixing and application areas.

F. Provide protective gloves, shoes, goggles, and respirator when mixing and during applications.

3.03 CONCRETE SLAB CONDITION AND PREPARATION

A. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

B. Prepare concrete slabs to receive resinous flooring in accordance with ASTM C811.

C. Determine that slab is structurally sound, repair cracks, holes, pits with approved materials. Grind and fill concrete surface as required to meet tolerances specified by the resinous flooring manufacturer. Mechanically scarify concrete substrate by sandblasting, acid etching, grinding or portable shot blast cleaning system as may be required by the manufacturer to provide a proper surface or to remove curing compounds or other surface contaminants that would interfere with proper bond of system.

   The resinous flooring manufacturer and installer shall confirm in writing to the Contractor with a copy to the Authority's representative that the moisture content of the concrete slab is acceptable for application of the resinous flooring system and that the substrate is ready to receive the resinous flooring.

D. Sweep surfaces to remove loose particles, dust.

E. Remove grease, oil, sealers, mastics, paint, and all other contaminants using means recommended by flooring manufacturer.

F. Sawcut around drains, cleanouts, obstructions and all termination points.

G. Clean out cracks and joints; allow to dry, then tape over joints and cracks wider than 1/16" with 4" fiberglass tape and coat with epoxy/140 silica sand mix. Sprinkle colored ceramic quartz over bridging. Do not fill or cover expansion joints.

H. Fill hairline cracks without taping.

I. Tape at termination points and adjacent surfaces not to be coated with masking tape before applying body-coats, cove base, broadcast coat, topcoats and finish coats. Remove tape before applications dry.

J. Substrates for this work generally are depressed 1/4" lower than adjacent slabs; provide acceptable filler to align surface of resinous flooring with adjacent finish flooring.

K. Install metal edge strips in continuous lengths at edges of resinous flooring and bases, unless otherwise shown. Anchor strips solidly to substrate with stainless steel screws.

3.04 MASONRY CONDITION AND PREPARATION

A. Prepare masonry wall surfaces intended to receive resinous flooring as directed by the resinous flooring manufacturer.

B. Repair all cracks, holes and pits with approved material.

C. Confirm that the moisture content of the concrete slab is acceptable to the resinous flooring manufacturer and installer.

D. Brush surfaces to remove loose particles, dust.

E. Remove grease, oil, sealers, mastics, paint, and all other contaminants using means recommended by flooring manufacturer.

F. Clean out cracks and joints; allow to dry, then tape over joints and cracks wider than 1/16" with 4" fiberglass tape and coat with epoxy/140 silica sand mix. Sprinkle colored ceramic quartz over bridging. Do not fill or cover expansion joints.

G. Fill hairline cracks without taping.

H. Tape at termination points and adjacent surfaces not to be coated with masking tape before applying body-coats, cove base, broadcast coat, topcoats and finish coats. Remove tape before applications dry.

3.05 APPLICATION

A. Mix and apply each component of resinous flooring system in compliance with manufacturer's printed instructions to obtain an uninterrupted, uniform, monolithic surface.

B. System Thickness: 105 mils
   1. Body Coats
      a. Apply tape.
      b. Mix 1 gallon resin with 1/2 gallon body coat hardener for 2 minutes. Add 2 quarts 20-40 silica sand and 1 quart 140 silica sand. Mix until sands are evenly distributed.
      c. Pour mix onto surface in small quantities; stir contents just prior to pouring to prevent settling.
      d. Trowel immediately with flat or 1/8" V-shaped notched trowel, spreading material evenly.
      e. After mix self-levels, evenly broadcast 20-40 silica sand so particles fall as vertically as possible into wet epoxy; avoid dropping handfuls. Saturate area until it appears to be uniformly dry. Repeat within a few minutes to cover wet or shiny appearing areas. Do not walk on surfaces after broadcasting.
      f. Remove tape, close area to traffic, and allow system to dry.
   2. Broadcast Coat
      a. Mix colored ceramic quartz.
      b. Apply tape.
      c. Mix 1 gallon resin and 1/2 gallon body coat hardener. Add 2 quarts of mixed colored ceramic quartz and 1 quart 140 silica sand. Mix until contents are evenly distributed.
      d. Pour mix onto surface in small quantities; stir contents just prior to pouring to prevent settling.
      e. Trowel immediately with flat or 1/8" V-shaped notched trowel spreading material evenly. Wet into cove, if base has been applied.
      f. After mix self-levels, evenly broadcast colored ceramic quartz so particles fall as vertically as possible into wet epoxy; avoid dropping handfuls. Saturate area until it appears to be uniformly dry. Repeat within a few minutes to cover wet or shiny appearing areas. Do not walk on surface after broadcasting. Remove tape, close to traffic and allow system to dry.
      g. Remove excess quartz with stiff bristle broom.
      h. Stone surface lightly with 24 grit carborundum stone. Sweep, vacuum, and retape in preparation for topcoats.
   3. Cove Base
      a. Apply cove base mix to surfaces at locations shown to form cove base with height as indicated on Drawings, following Manufacturer's printed instructions and details covering taping, mixing, priming, troweling, sanding, and top coating.
   4. Standard Slip-Resistant Finish
      a. <u>Clear Epoxy Topcoats:</u>
         1) Mix 2 parts resin to 1 part topcoat hardener for 2 minutes.
         2) Tightly squeegee first topcoat to an even surface.
         3) After first topcoat dries, apply second topcoat.
         4) Tightly squeegee and roll immediately with 1/4" mohair nap roller to avoid streaking.
      b. <u>Clear Polyurethane Finish Coat:</u>
         1) Follow same procedure as for 4.a, 1), 2) and 3). Apply polyurethane topcoat with short-nap roller.

3.06 CLEANING

A. After completion of floor system, remove all excess materials and debris from work area.

3.07 PROTECTION

A. Close floor system work area to all traffic for 24 hours. Protect as recommended by system manufacturer.

B. Protect flooring from direct sunlight during the curing process.

END OF SECTION