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Guide Specification

SECTION 09 67 23

RESINOUS FLOORING

(Tennant Metallic HPS)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. High-solids, decorative flooring system with uv-resistant epoxies, metallic pigments, and light-stable, chemically resistant, gloss, urethane topcoat applied over interior concrete floors.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 – Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

A. ASTM International (ASTM) (www.astm.org):
   1. ASTM C 413 – Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
   2. ASTM D 635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
   3. ASTM D 695 – Standard Test Method for Compressive Properties of Rigid Plastics.
   4. ASTM D 2047 – Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
   5. ASTM D 2240 – Standard Test Method for Rubber Property—Durometer Hardness.
   6. ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
   7. ASTM D 2370 – Standard Test Method for Tensile Properties of Organic Coatings.
   8. ASTM D 3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
   9. ASTM D 4060 – Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
   10. ASTM D 4366 – Standard Test Methods for Hardness of Organic Coatings by Pendulum Damping Tests.

11. ASTM D 4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
12. ASTM D 7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
13. ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
14. ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
15. ASTM G 154 – Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials.

B. National Floor Safety Institute (NFSI) (www.nfsi.org):
1. ANSI/NFSI B101.1 – Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials.

1.4 PREAPPLICATION MEETINGS

A. Convene preapplication meeting 2 weeks before start of application of flooring system.

B. Require attendance of parties directly affecting work of this Section, including Contractor, Architect, applicator, and manufacturer's representative.

C. Review materials, moisture testing of concrete, protection of in-place conditions, surface preparation, application, protection, and coordination with other work.

1.5 SUBMITTALS

A. In accordance with Division 01.

B. Product Data: Submit manufacturer's product data, including surface preparation and application instructions.

C. Samples:
1. Colorants Added to Materials: Submit manufacturer's samples of colorants.
2. Flooring Surface: Submit manufacturer's samples of flooring surface showing texture and sheen.

D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.

E. Manufacturer's Project References: Submit manufacturer's list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems furnished.

F. Applicator's Project References: Submit applicator's list of successfully completed resinous flooring system projects, including project name and location, name of architect, and type and quantity of flooring systems applied. Applicator is required to demonstrate successful completion of over 1,000,000 square feet of installations within the last 10 years.

G. Care and Maintenance Instructions: Submit manufacturer's care and maintenance instructions, including cleaning instructions.

H. Warranty Documentation: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer regularly engaged, for a minimum of 10 years, in the manufacturing of resinous flooring systems of similar type to that specified.

B. Applicator's Qualifications:
   1. Applicator regularly engaged, for a minimum of 10 years, in application of resinous flooring systems of similar type to that specified. Applicator needs to be authorized or certified by the material manufacturer (Tennant Company) for a minimum of 10 years.
   2. Employ persons trained for application of resinous flooring systems.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and batch number.

B. Storage and Handling Requirements:
   1. Store and handle materials in accordance with manufacturer's instructions.
   2. Keep materials in manufacturer's original, unopened containers and packaging until application.
   3. Store materials in clean, dry area indoors between 65 and 90 degrees F (18 and 32 degrees C).
   4. Store materials out of direct sunlight.
   5. Keep materials from freezing.
   6. Protect materials during storage, handling, and application to prevent contamination or damage.

1.8 AMBIENT CONDITIONS

A. Apply flooring system under the following ambient conditions:
   1. Ambient, Concrete Floor, and Material Temperatures: Between 65 and 90 degrees F (18 and 32 degrees C).
   2. Relative Humidity: Maximum 80 percent.
   3. Dew Point: Floor temperature more than 5 degrees over dew point.

B. Do not apply flooring system under ambient conditions outside manufacturer's limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Tennant Company, 701 North Lilac Drive, Minneapolis, Minnesota 55422. 800-553-8033. www.tennantco.com. info@tennantco.com.

B. Substitutions: Permitted in accordance with Division 01.

C. Single Source: Provide materials from single manufacturer.

2.2 RESINOUS FLOORING SYSTEM

A. Resinous Flooring System: "Tennant Metallic HPS".
   1. Description: High-solids flooring system with epoxy primer and light-stable, chemically resistant, gloss, urethane topcoat applied over interior concrete floors.

B. System Components:
   1. Primer: "Eco-MPE" epoxy.
      a. Application Thickness: 3 to 5 wet/dry mils.
      b. Color: Manufacturer's colorants selected by Architect.
   2. Base Coat: Pigmented "Eco-URE" epoxy.
      a. Application Thickness: 8-10 wet/dry mils.
      b. Color: Manufacturer's colorants selected by Architect.
   3. Metallic Coat: Pigmented "Eco-URE" epoxy.
      a. Application Thickness: 16 to 20 wet/dry mils.
      b. Color: Manufacturer's colorants selected by Architect.
   4. Topcoat: "Eco-HPS 100" light-stable gloss urethane.
      a. Application Thickness: 3.2 wet/dry mils.
      b. Color: Clear

C. Nominal System Thickness: 35 mils.

D. System Properties:
   1. VOC Content, ASTM D 3960, Mixed A+B: 0.06 lbs per gal (7 g/L).
   2. Abrasion Resistance, ASTM D 4060, CS-17 wheel, 1,000-g load, 1,000 revolutions, "Eco-HPS": 18 mg loss.
   3. Adhesion to Concrete:
      a. ASTM D 4541: 450 psi (3.10 MPa), concrete failed.
      b. ASTM D 7234: 732 psi (4.48 MPa), concrete failed.
   4. Coefficient of Friction, ASTM D 2047: 0.61.
   5. Wet Static Coefficient of Friction, BOT 3000, ANSI/NFSI B101.1: 0.99.
   6. Compressive Strength, Epoxy, ASTM D 695: 13,500 psi (93.079 MPa).
   7. Flammability, ASTM D 635: 182 mm/min.
   8. Resistance to Yellowing, measured using ASTM D 2244, 1,000 hours UV exposure in QUV, ASTM G 154: Less than 10 increase of yellow units (CIE Lab Δb) if pigmented topcoat.
   9. Tensile Strength, ASTM D 2370: 6,250 psi (43.09 MPa).
   10. Elongation, ASTM D 2370: 6 percent.
   11. Hardness, Konig Test, 3 mil/0.08 mm film, topcoat resin, ASTM D 4366: 171.3.
   12. Shore D Hardness, Epoxy, ASTM D 2240:
      a. 0 Seconds: 80 to 85.
      b. 15 Seconds: 75 to 80.
   13. Water Absorption, 24-Hour Immersion, ASTM C 413: 0.2 percent weight increase.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine concrete surface to receive flooring system.

B. Verify concrete is structurally sound.

C. Moisture Testing of Concrete: Perform at least one of the following two tests to determine moisture in concrete.
   1. Calcium Chloride Test:
      a. Measure moisture vapor emission rate of concrete in accordance with ASTM F 1869.
      b. Application of flooring system can start only if test results are below 3 pounds per 1,000 square feet (1.5 kg/92.9 m^2) over a 24-hour period.
      c. If test results are above limits, notify Architect and flooring system manufacturer.
   2. In-Situ Probe Test:
      a. Measure relative humidity in concrete in accordance with ASTM F 2170.
      b. Application of flooring system can start only if test results are below 75 percent relative internal concrete humidity.
      c. If test results are above limits, notify Architect and flooring system manufacturer.

D. Notify Architect of conditions that would adversely affect application or subsequent use.

E. Do not begin surface preparation or application until unacceptable conditions are corrected.

3.2 PREPARATION

A. Protection of In-Place Conditions: Protect adjacent surfaces and adjoining walls from contact with flooring system materials.

B. Surface Preparation:
   1. Prepare concrete surface in accordance with manufacturer's instructions.
   2. Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, sealers, silicones, and other surface contaminants which could adversely affect application of flooring system.
   3. Patch depressions, divots, and cracks in concrete in accordance with manufacturer's instructions.
   4. Mechanically remove loose, delaminated, and damaged concrete and repair in accordance with manufacturer's instructions.
   5. Joints: Fill joints in accordance with manufacturer's instructions.

3.3 APPLICATION

A. Apply flooring system in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Ensure concrete is dry, clean, and prepared in accordance with manufacturer's instructions.

C. Allow concrete to cure a minimum of 30 days before applying flooring system.

D. Mixing:
   1. Mix material components together in accordance with manufacturer's instructions.

2. Mix only enough material that can be applied within working time.
3. Add and mix colorants with materials in accordance with manufacturer's instructions to achieve uniform color.

E. Apply flooring system materials to obtain consistent mil thickness and smooth, uniform appearance and texture.

F. Primer:
1. Apply primer in accordance with manufacturer's instructions.
2. Apply primer to prepared concrete to ensure proper adhesion of flooring system.

G. Base Coat:
1. Apply base coat in accordance with manufacturer's instructions.
2. Apply base coat over primer.
3. Mechanically abrade base coat by sanding in accordance with manufacturer's instructions before applying topcoat.

H. Metallic Coat:
1. Apply metallic coat in accordance with manufacturer's instructions.
2. Apply metallic coat over primer.
3. Mechanically abrade metallic coat by sanding in accordance with manufacturer's instructions before applying topcoat.

I. Topcoat:
1. Apply topcoat in accordance with manufacturer's instructions.
2. Apply topcoat over metallic coat.
3. Apply topcoat to match approved samples submitted in accordance with the Submittals Article of this Section.

3.4 PROTECTION

A. Allow flooring system to dry in accordance with manufacturer's instructions before opening to traffic.

B. Allow flooring system to dry a minimum of 1 week before cleaning by mechanical means.

C. Protect completed flooring system from damage during construction.

END OF SECTION