Preparing Activity: NAVFAC Superseding
UFGS-09 67 23.16 (August 2010)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 09 67 23.16

FUEL RESISTIVE RESINOUS FLOORING, 5-COAT SYSTEM
02/21

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NOTE: This guide specification covers the requirements for a five-coat, epoxy mortar flooring system with reflective urethane topcoats, slip resistance, and joint work.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
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NOTE: This guide specification contains tailoring options for Army, Navy, and NASA projects. Where an Editor's Note states a paragraph is tailored for a Service or project type, the content of the paragraph, or a portion of the paragraph, is suited specifically to be included only for that Service or project type.
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NOTE: The designer must not alter the products or processes specified herein without thorough knowledge of the need for the changes and the implications of those changes. Use of alternate coating systems must be justified by evaluating

lifecycle costs using 50 year life as a baseline.
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NOTE: The epoxy mortar flooring system is appropriate for use in: aircraft maintenance hangars, equipment maintenance shops, jet engine test cells, and all other industrial floors where resistance to impact, abrasion, and fuel is required. Benefits: Tolerates high Moisture Vapor Emission (MVE) rates, produces a level surface over coarse concrete, high impact resistance, good chemical resistance, and may provide a suitable topcoat base for more than 10 years service. Can be rejuvenated by replacing urethane topcoats, and non-skid, only. Approximate service life: Urethane topcoating with non-skid grit at three or more years. The flooring system is neither conductive nor Electro-Static Dissipative (ESD), however, either formulation is easily designed upon request. This specification is not for use in overcoating existing sound coating systems.
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NOTE: Prior to the flooring systems installation, a concrete condition assessment in accordance with the Naval Facilities Engineering Service Center's (NFESC) Users Guide (UG)-2036-SHR is highly recommended. The condition assessment is designed to identify problem floors and eliminate premature flooring failures produced by: 1) Coating concrete with low surface strength, 2) coating concrete with high surface contamination levels (such as oils, fuels, fats, and waxes), and 3) coating concrete with a high Moisture Vapor Emission (MVE) rate. The thin film flooring system is suitable for application to: A) "Smooth" or "Coarse" concrete surface textures, B) concrete with a MVE rate no more than 254 micrograms moisture per second, square meter 4.5 pounds moisture per 24 hours, 1000 square feet (ASTM F1869), C) concrete with surface strength greater than 1.34 MPa 200 psi (ASTM D4541), and D) concrete with fuel/oil contamination to a depth no more than 6.25 mm 1/4 inch.
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NOTE: If a concrete floor has a Moisture Vapor Emission (MVE) rate more than 254 micrograms moisture per second, square meter 4.5 pounds moisture per 24 hours, 1000 square feet (ASTM F1869), apply a layered Moisture Reducing System (MRS) prior to the epoxy mortar flooring system application. Use MRS compatible with the submitted flooring system and approved / warranted by the epoxy mortar flooring system manufacturer. Apply the MRS to shot blasted concrete and reduce the MVE rate to less than 254 micrograms moisture per

second, square meter 4.5 pounds moisture per 24 hours, 1000 square feet. MRSs can employ combinations of concrete sealers, specific epoxies, and moisture insensitive grouts, with or without mesh.
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NOTE: Include Section 03 01 00 REHABILITATION OF CONCRETE for minor spalls and surface deterioration repair to depths less than three inches. Specify epoxy mortar for repairs to depths no more than 50 mm 2 inches. Specify epoxy concrete for repairs to depths from 25 to 75 mm 1 to 3 inches. Saw cut repairs to depths greater than 25 mm 1 inch to a rectangular geometry. Finish repairs to resemble surrounding concrete using a stainless steel trowel.

Include Section 32 01 29.61 PARTIAL DEPTH PATCHING of RIGID PAVING for repair of large spalls and severe deterioration to depths from 75 to 150 mm 3 to 6 inches. Specify Portland Cement Concrete (PCC) with less than 0.45 water-cement ratio, light steel trowel finish, and cure using plastic coated burlap. Use rectangular geometry for repairs with saw cut edges to a nominal repair depth of 150 mm 6 inches. Cure PCC repair for approximately 30 days prior to the application of the flooring system. Do not cure repairs using liquid membrane-forming compounds.

For repairs to spalls and severely distressed concrete to depths greater than 150 mm 6 inches, seek material guidance from Section 03 30 00 CAST-IN-PLACE CONCRETE and procedural guidance from the American Concrete and Pavement Association (ACPA) Guideline TB-002.02P "Concrete Paving Technology - Guidelines for Full Depth Repair." Fill repair base with a minimum of 50 mm 2 inches of clean, non-reactive concrete sand over a suitable vapor retarder (0.25 mm 10 mils polyethylene sheeting). Finish repairs by light steel trowel and cured using plastic coated burlap. Cure repairs for approximately 30 days, or more, prior to the the flooring system application. Do not cure repairs using liquid membrane-forming compounds.

Scarify level any curled or settled slab ends with joint surfaces displaying more than 3.2 mm 1/8 inch difference in vertical height. Resulting surfaces must contain a height difference no more than 1.5 mm 1/16 inch and a surface texture equal to ICRI-310.2R CSP 4.
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NOTE: Include Section 03 30 00 CAST-IN-PLACE CONCRETE for new concrete slab construction. Employ measures to control the base, subbase, and subgrade

moisture Moisture Vapor Emission (MVE) rates to total no more than 169.0 micrograms moisture per second, square meter 3.0 pounds moisture per 24 hours, 1000 square feet when measured on the slab's surface (ASTM F1869). Improper MVE controls have produced numerous premature coating failures. In addition to appropriate subbase drainage, specify a minimum of 50 mm 2 inches of clean, non-reactive concrete sand over no less than 0.25 mm 10 mils of polyethylene sheeting (ASTM D4397) with sealed lap joints. Specify concrete mix to be free of accelerators containing calcium chloride and other sources of chloride ion contamination. Specify two passes of a light power troweled finish and cure using plastic coated burlap or equal method. Do not cure concrete using liquid membrane-forming compounds. Do not specify surface hardeners or dry shake finish (Section 09 97 23 METALLIC TYPE CONDUCTIVE/SPARK RESISTANT CONCRETE FLOOR FINISH). Approximately 60 days following the concrete pour and prior to the flooring system installation, test concrete for the MVE rate and confirm rate is no more than 254 micrograms moisture per second, square meter 4.5 pounds moisture per 24 hours, 1000 square feet (ASTM F1869). Consult ACI 224.3R "Joints in Concrete Construction," ACI 302.1R "Guide for Concrete Floor and Slab Construction," ACI 360R "Design of Slabs on Grade," and other appropriate construction guidance.

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NOTE: Where tile is to be removed prior to the flooring system application, test both tile and mastic for the presence of asbestos. If asbestos is detected, include Section 02 82 00 ASBESTOS REMEDIATION for removal and disposal.

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NOTE: If flooring system is to be applied to warehouse floors with heavy forklift traffic, a semi-flexible joint sealant is required in lieu of the specified flexible sealant. Use a semi-flexible epoxy sealant with approximately 90 percent elongation. Do not use semi-flexible sealants in areas exposed to exterior temperatures.

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NOTE: Include Section 01 45 00 01 45 00.00 40 QUALITY CONTROL, as applicable.

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NOTE: Include Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. This section defines fugitive dust, generated waste, hazardous materials, hazardous substance, hazardous waste, solid waste,

construction and demolition (CD) debris, and liquid waste, and contains documentation for dangerous waste profile, waste information sheet, waste identification document, waste generation record, landfill disposal form, and hazardous material reporting.
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PART 1 GENERAL

1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C679	(2015; R 2022) Standard Test Method for Tack-Free Time of Elastomeric Sealants
ASTM D412	(2016; R 2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM D1308	(2002; R 2013) Effect of Household Chemicals on Clear and Pigmented Organic Finishes
ASTM D2240	(2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D3925	(2002; R 2015) Sampling Liquid Paints and Related Pigmented Coatings

ASTM D4541	(2022) Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D6237	(2019) Standard Guide for Painting Inspectors (Concrete and Masonry Substrates)
ASTM E11	(2022) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)

ICRI 310.2R	(2013) Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9001	(2015) Quality Management Systems-Requirements

MASTER PAINTERS INSTITUTE (MPI)

MPI 208	(2020) Floor Coating, Thick Film, Primer, for Aircraft Maintenance Facilities
MPI 209	(2020) Floor Coating, Thick Film, Epoxy Mortar, For Aircraft Maintenance Facilities
MPI 210	(2020) Floor Coating, Thick Film, Grout Coat, For Aircraft Maintenance Facilities
MPI 212	(2018) Floor Coating, Thin Film, for Aircraft Maintenance Facilities

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC QP 5	(2022) Standard Procedure for Evaluating the Qualifications of Coating and Lining Inspection Companies
SSPC QP 8	(2015) Standard Procedure for Evaluating the Qualifications of Contracting Firms that Install Polymer Coatings, Surfacings, Linings or FRP Composites on Concrete and Other Cementitious Substrates
SSPC QS 1	(2015) Standard Procedure for Evaluating a Contractor's Advanced Quality Management System
SSPC-TU 2/NACE 6G197	(1997) Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134	Respiratory Protection

29 CFR 1910.1000	Air Contaminants
29 CFR 1926.59	Hazard Communication

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.
****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Joint Sealant; G[, [_____]]

Epoxy Mortar Flooring System; G[, [_____]]

White Aluminum Oxide Non-Skid Grit; G[, [_____]]

SD-05, Design Data

Environmental Control System

SD-06 Test Reports

Joint Sealant Test Report; G[, [_____]]

Primer Coat; G[, [_____]]

Epoxy Mortar Coat; G[, [_____]]

Grout Coat; G[, [_____]]

Urethane Topcoat; G[, [_____]]

White Aluminum Oxide Non-Skid Grit; G[, [_____]]

Patch Test Demonstration; G[, [_____]]

Daily Inspection Report; G[, [_____]]

Adhesion Testing; G[, [_____]]

SD-07 Certificates

Coating Work Plan; G[, [_____]]

Qualifications of Coating Contractors; G[, [_____]]

Joint Sealant Certificates; G[, [_____]]

Epoxy Mortar Flooring System Certificates; G[, [_____]]

Qualifications of Certified Industrial Hygienist (CIH)

Qualifications of Certified Protective Coatings Specialist (PCS)

Qualifications of Coating Inspection Company

Qualifications of QC Specialist Coating Inspector

Warranty; G[, [_____]]

SD-08 Manufacturer's Instructions

Joint Sealant Manufacturer's Instructions; G[, [_____]]

Epoxy Mortar Flooring System Manufacturer's Instructions; G[, [_____]]

Water-Based Alkaline Degreaser; G[, [_____]]

SD-11 Closeout Submittals

Inspection Logbook; G[, [_____]]

1.3 QUALITY ASSURANCE

1.3.1 Qualifications of Certified Protective Coatings Specialist (PCS)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third-party PCS. Submit documentation that the specialist is certified by SSPC: The Society for Protective Coatings (SSPC) as a PCS, including certification number and date of certification/recertification. If the PCS is employed by the same coating inspection company to which the coating inspector is employed, this does not violate the independent third-party requirements. The PCS must remain certified during the entire project, and the Contracting Officer must be notified of any change in certification status within 10 days of the change. The PCS must not be the designated coating inspector.

1.3.2 Coating Work Plan

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NOTE: For maintenance painting, add requirement for pre-work determination of the existing surface condition. If paint removal is specified in another Section include this evaluation such that the paint removal operation does not create excessive profile.

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a. Include coating Work Plan in Quality Control Plan.

b. Provide procedures for reviewing Contract Documents immediately after award to identify errors, omissions, and discrepancies so that any such issues can be resolved prior to project planning and development of detailed procedures.

c. Provide procedures for verification of key processes during Initial Phase to ensure that Contract requirements can be met. Key processes must include surface preparation, coating application and curing, inspection, and documentation, and any other process that might adversely impact orderly progression of work.

d. Provide procedures for all phases of coating operations, including planned work, rework, repair, inspection, and documentation. Address mobilization and setup, surface preparation, coating application, coating initial cure, tracking and correction of non-compliant work, and demobilization. Coordinate work processes with health and safety plans and confined space entry plans. For each process, provide procedures that include appropriate work instructions, material and equipment requirements, personnel qualifications, controls, and process verification procedures. Provide procedures for inspecting work to verify and document compliance with Contract requirements, including inspection forms and checklists, and acceptance and rejection criteria.

e. [Provide procedures for determining the existing surface profile under paint, and procedures for ensuring that the profile is not increased beyond the maximum profile specified herein.][_____]

f. Provide procedures for correcting non-compliant work. Detailed procedures are required in advance to avoid delays in meeting overcoat windows as well as to avoid delays in production. Provide procedures for repairing defects in the coating film, such as runs, drips, sags,

holidays, overspray, as well as how to correct coating thickness non-compliance, any other areas of repair or rework that might be adversely affected by delays in preparing and approving new procedures.

g. If a procedure is based on a proposed or approved request for deviation, the deviation must be referenced. Changes to procedures must be noted by submittal number and date approved, clearly delineating old requirements and new requirements, so that the records provide a continuous log of requirements and procedures.

1.3.3 Design Data

1.3.3.1 Environmental Control System

Submit design details of the proposed environmental control system to include ventilation, humidity control, and temperature regulation. Provide calculations for humidity control during separate surface preparation and coating application procedures, ventilation requirements during coating application, and maximum allowable coating application rates to coincide with ventilation. Include basis of design data on local conditions. Provide equipment layout sketches and procedures showing function of each piece of equipment and fail-safe measures. A Certified Industrial Hygienist must approve calculations, work procedures and personal protective equipment.

1.3.4 Test Reports

1.3.4.1 Joint Sealant Test Report

Submit test results that confirm sealant complies with Table Ia requirements. Samples must have been tested within the last three years.

1.3.4.2 Daily Inspection Report

Submit one copy of the daily inspection report to the Contracting Officer within 24 hours of the date recorded.

1.3.5 Certificates

1.3.5.1 Qualifications of Certified Industrial Hygienist (CIH)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party CIH. Submit documentation that hygienist is certified by the American Board of Industrial Hygiene in comprehensive practice, including certification number and date of certification/recertification. Provide evidence of experience with hazards involved in industrial coating application work.

1.3.5.2 Qualifications of Certified Protective Coatings Specialist (PCS)

Submit name, address, telephone number, FAX number, and e-mail address of the independent third-party PCS. Submit documentation that specialist is certified by SSPC: The Society for Protective Coatings (SSPC) as a PCS, including certification number and date of certification/recertification. If the PCS is employed by the same coating inspection company to which the coating inspector is employed, this does not violate the independent third-party requirements. The PCS must remain certified during the entire project, and the Contracting Officer must be notified of any change in certification status within 10 days of the change. The PCS must not be

the designated coating inspector.

1.3.5.3 Qualifications of Coating Inspection Company

Submit documentation that the coating inspection company performing all coating inspection functions is certified by SSPC to the requirements of SSPC QP 5 prior to Contract award. The approved coating inspection company must remain and not be changed through completion of the Contract. The coating inspection company must remain so certified for the duration of the project. If a coating inspection company's certification expires, the firm will not be allowed to perform any inspection functions, and all surface preparation and coating application work must stop, until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered. Notify the Contracting Officer of any change in coating inspection company certification status. Notify the Contracting Officer of all scheduled and unannounced on-site inspections from SSPC and furnish a copy of all inspection reports.

1.3.5.4 Qualifications of QC Specialist Coating Inspector

Submit documentation that each coating inspector is employed, and qualified to SSPC QP 5, Level II, by the selected coating inspection company. Each inspector must remain employed by the coating inspection company while performing any coating inspection functions. In addition to the handwritten records, the inspector must employ an electronic reporting program with functionality as outlined in Table II. The Administrator must be the designated Government Representative for the project.

1.3.5.5 Qualifications of Coating Contractors

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NOTE: Solicitations requiring certification for prequalification should point out the existence and location of the certification requirement on the PROJECT INFORMATION FORM. This requirement must be included in the solicitation documents for the "prior to Contract award" requirement to be enforceable. Certification is a special responsibility requirement pursuant to FAR 9.104-2 Special Standards. This is analogous to requiring bidders to have a specified level of experience or expertise and GAO has sustained these types of special requirements.

****

All Contractors that perform surface preparation or coating application must be certified to SSPC QP 8 and should also be SSPC QS 1 certified prior to Contract award and must remain certified while accomplishing any surface preparation or coating application. The painting Contractors must remain so certified for the duration of the project. If a Contractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered. Notify the Contracting Officer of any change in Contractor certification status. Notify the Contracting Officer of all scheduled and unannounced on-site audits from SSPC and furnish a copy of all audit reports.

[For OCONUS, non-US territories where documentation is provided that

certified SSPC QP 8 with or without SSPC QS 1 Contractors did not bid and are not available, all Contractors that perform surface preparation or coating application must be certified to ISO 9001 prior to Contract award, and must remain certified while accomplishing any surface preparation or coating application. If a Contractor's certification expires, the firm will not be allowed to perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered. Notify the Contracting Officer of any change in Contractor certification status. Notify the Contracting Officer of all scheduled and unannounced on-site inspections from the ISO certifying organization and furnish a copy of all inspection reports.

][Minimum requirements for the installation Contractor are as follows: Completed three or more jobs within the past two years applying the specified materials to concrete surfaces in which the total area exceeds 18 587 square meters 200,000 square feet. Submit documentation listing location of work, point of contact at job site, total square footage of applied materials, listing of both materials and equipment used, and validation from coating manufacturer documenting quality of materials purchased per job for work totaling 18,587 square meters 200,000 square feet within the past two years. In addition to the above requirements, installation Contractor must be certified by the material manufacturer(s) to install the submitted coatings and sealant. Submit copy of certificates.

]1.3.5.6 Joint Sealant Certificates

Submit literature documenting the sealant's past performance in automotive or aircraft maintenance shops. Minimum requirements are two or more maintenance shops with joint work totaling 3048 linear meters 10,000 linear feet whereby the sealant has performed for two years with less than one percent combined sealant failures and defects. Include from sealant manufacturer a list of shop locations, total linear feet of sealant applied per shop, shop point of contact, date sealant was applied, and the name of the installed sealant material.

1.3.5.7 Epoxy Mortar Flooring System Certificates

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NOTE: Use bracketed option when MPI certified products cannot be obtained.
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Provide manufacturer's certification of conformance to Contract requirements.

[Submit literature documenting the coating system's past performance in aircraft maintenance shops and over floors with high Moisture Vapor Emission (MVE) rates. Minimum requirements are two or more aircraft maintenance shops totaling 3160 square meters 34,000 square feet where the coating system has performed for two years with less than 0.05 percent combined premature coating failures, material defects and surface discoloration; no more than 0.03 percent discoloration from aviation chemicals, tire plasticizers, and UV exposure. Provide a minimum of two additional case histories where successful installation occurred on floor slabs with no less than 254 micrograms moisture per second, square meter 4.5 pounds moisture per 24 hours, 1000 square feet. Include from flooring manufacturer a list of shop locations, total coated area per shop, shop

point of contact, date coating system was applied, successful installation to concrete with high MVE, and the names of the installed coating materials.

]1.3.6 Product Data

1.3.6.1 Joint Sealant Manufacturer's Instructions

Submit manufacturer's printed instructions to include detailed application procedures, minimum and maximum application temperatures, and curing procedures. In accordance with 29 CFR 1926.59, include Safety Data Sheets (SDS) for the sealant to be used at the job site.

1.3.6.2 Epoxy Mortar Flooring System Manufacturer's Instructions

Submit manufacturer's printed instructions to include detailed mixing, minimum and maximum application temperatures, acceptable atmospheric and interior climatic conditions, application procedures, curing procedures, and procedures for flooring system maintenance cleaning. Provide explicit instructions detailing surface preparation, recoat windows and remedial actions in case recoat windows are missed, and, if applicable, solvent-wiping between coats with acceptable types and grades of solvents. In accordance with 29 CFR 1926.59, include SDSs for the coatings to be used at the job site.

1.3.6.3 Water-Based Alkaline Degreaser

Submit manufacturer's printed instructions to include detailed mixing, dilution rate, application procedures, and rinsing procedures. In accordance with 29 CFR 1926.59, include SDSs for the water-based alkaline degreaser to be used at the job site.

1.4 DELIVERY, STORAGE, AND HANDLING

Store coatings and sealant in spaces with temperatures from 5 to 24 degrees C 40 to 75 degrees F. Inspect materials on site for damage prior to use. Return to manufacturer any packaged materials in dented, rusty, or leaking containers. Return to manufacturer materials with an expired shelf life for testing, and if compliant, reissuing of shelf life extension.

1.5 COATING HAZARDS

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NOTE: Include either Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS or prepare instructions detailing each safety element for use with this section.
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Ensure that employees are trained in all safety plan aspects. Follow the coating manufacturer's written safety precautions throughout mixing, application, and curing of coatings. Comply with respiratory protection requirements in 29 CFR 1910.134 and safe levels of airborne contaminants in 29 CFR 1910.1000.

1.6 JOB SITE REFERENCES

Make available to the Contracting Officer at least one copy each of

ASTM D4541, ASTM D6237, SSPC-TU 2/NACE 6G197, and ICRI 310.2R, including replica standards ICRI 310.2R-CSP 1 through CSP 9, at the job site.

1.7 PATCH TEST DEMONSTRATION

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NOTE: Patch test demonstration is a very important part of the submittal process. While it is unusual to require a test patch prior to the submitted materials' approval, this flooring system is unusual in that it is required to perform significant tasks for a long time. Proof of Contractor claims, especially under conditions to be encountered in the specific project, is considered necessary.

If customer is not satisfied with the non-skid grit level, adjustments to the specification can be made. Grit coarser than No. 60 aluminum oxide is not recommended. On architectural floors, non-skid grit broadcast rates can range from none to approximately half the specified level. To confirm grit broadcast is acceptable, walk on cured patch test under both dry and wet conditions. Water can be used to simulate the wet condition.

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Prior to the submitted flooring system's approval, apply the complete flooring system to a 3 meter by 3 meter10 foot by 10 foot square concrete section as prepared in accordance with PART 3 EXECUTION. Within this area, perform three adhesion tests using procedures as detailed in the paragraph ADHESION TESTING. If adhesion testing produces cohesive failures within the concrete, no less than 1 mm 40 mils concrete removed over 95 percent of each pull-off coupon,or adhesion more than 2.75 MPa 400 psi, patch test adhesion is acceptable. If concrete surface preparation was insufficient, apply an additional coating system patch to properly prepared concrete followed by the above adhesion testing. If adhesion results are unacceptable for both the topcoat and the coatings below the grout coat, submit a new coating system manufactured by a different coating vendor. Apply new coating system to a patch and subject this patch to the above requirements for adhesion prior to approval. If customer is not satisfied with the non-skid grit application, adjustments to the specifications can be made. Grit coarser than No. 60 aluminum oxide is not recommended. Immediately following "passing" adhesion results, remove urethane topcoats and grout coat by sanding, repair patch test holes using epoxy mortar, and place a "Key-In Termination" adjacent to patch test perimeter. Perform coarse scarification or pneumatic scabbling as required to remove patch tests failing to meet adhesion requirements.

1.8 WARRANTY

Warranty materials and workmanship for a minimum of one year following completion of flooring and sealant application. The following terms and conditions form a part of the warranty: If the applied coating system develops blisters (chemical), checks, softening, or lifting within one year following application, rework each area at Contractor's expense. The following conditions are excluded from the warranty: A) Concrete cracking, flooring system mirrors cracks in concrete, B) cosmetic imperfections due to scratching and gouging, C) application to metallic concrete finishes

(Section 09 97 23 METALLIC TYPE CONDUCTIVE/SPARK RESISTANT CONCRETE FLOOR FINISH), and D) application to concrete with a MVE rate greater than 282 micrograms moisture per second, square meter 5.0 pounds moisture per 24 hours, 1000 square feet. If the coating system's adhesion is in question, perform one adhesion test per 9.3 square meters 100 square feet as described in the paragraph ADHESION TESTING. To satisfy the warranty, adhesion testing must produce cohesive failures within the concrete, concrete removal over 95 percent of each pull-off coupon, or adhesion no less than 2.8 MPa 400 psi. Each area failing to meet adhesion requirements requires two additional adhesion tests to confirm results. Within the warranty period, remove to sound material and rework all areas unable to meet adhesion requirements. There must be zero percent sealant failures within one year. Within the warranty period, remove and rework all sealant material that has chemically attacked surfaces or lifting from joint walls. Topcoat cracking over sealant is excluded from warranty.

PART 2 PRODUCTS

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NOTE: The specified materials are not appropriate for use in primary chemical containment, secondary chemical containment, or on floors subjected to spills from concentrated acids, bases, and organic solvents. Consult with the Naval Facilities Engineering and Expeditionary Warefare Center's (NAVFAC EXWC) Paints and Coatings Center of Expertise for alternative coating systems to suit specific Navy needs. The system must be provided by a single manufacturer or have proven compatibility.

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NOTE: Tables Ia and II are presented at the end of PART 3 EXECUTION.

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2.1 JOINT SEALANT

Formulate the joint sealant to exhibit the properties as listed in Table Ia.

2.2 EPOXY MORTAR FLOORING SYSTEM

A five-coat flooring system consisting of primer, epoxy mortar, grout coat, and two urethane topcoats. Apply the system at a nominal thickness of 6.25 mm 1/4 inch and contain an aluminum oxide non-skid grit broadcast. Additional requirements for primer coat, epoxy mortar, grout coat, and urethane top coat are contained in the following sub-paragraphs.

2.2.1 Primer Coat

In addition to the epoxy mortar flooring system requirements, use MPI 208 primer coat.

2.2.2 Epoxy Mortar Coat

In addition to the epoxy mortar flooring system requirements, use MPI 209 epoxy mortar coat compatible with MPI 208, MPI 210, and MPI 212.

2.2.3 Grout Coat

In addition to the epoxy mortar flooring system requirements, use MPI 210 grout coat compatible with MPI 208, MPI 209, and MPI 212.

2.2.4 Urethane Topcoat

In addition to the epoxy mortar flooring system requirements, use MPI 212 topcoat compatible with MPI 208, MPI 209, and MPI 210.

2.3 WHITE ALUMINUM OXIDE NON-SKID GRIT

Size No. 60, dust-free (washed and dry), minimum 99 percent pure, having the following sieve analysis when tested using a 1000 gram 2.2 pound sample (ASTM E11):

Sieve No. 40	100 percent passing
Sieve No. 50	15-30 percent retained
Sieve No. 60	70-85 percent retained
Sieve No. 70	0-15 percent retained

PART 3 EXECUTION

3.1 COATING SAMPLE COLLECTION

The Contracting Officer and QC Manager must witness all material sampling. Notify the Contracting Officer a minimum of three days in advance of sampling. Obtain liquid samples of each component (e.g., primer, intermediate, grout coat, topcoat) by random selection from sealed containers and in accordance with ASTM D3925. Samples may be either individual cans of liquid material or 1.0 liter 1.0 quart quantities of properly mixed, extracted, and sealed liquid material. Label samples by designated name, specification number, batch number, project Contract number, sample date, intended use, and quantity involved. When the applied epoxy mortar system has met the requirements defined in the paragraph ADHESION TESTING, return coating samples to the installation contractor for proper disposal.

[3.2 TILE AND TILE ADHESIVE REMOVAL

****
NOTE: Delete this Article if concrete is not tiled.
****

Remove 100 percent of tile employing one or more of the following techniques: chipping, scraping, sanding, scarification, high-pressure water, and various hand tools. Remove 100 percent of the tile adhesive using solvents and power scrubbing. Remove residual contamination using hot potable water under a minimum of 27.6 MPa 4,000 psi. Resulting surfaces must appear clean and display the gray color of concrete.

]3.3 JOINT MATERIAL REMOVAL, RE-SAW CUTTING, CRACK CHASING

****
NOTE: Hairline cracks having no more than 3.2 mm

1/8 inch width are typically not repaired. However, cracks greater than 3.2 mm 1/8 inch width can be chased to a minimum depth of 12.5 mm 1/2 inch and sealed using the procedures and materials specified for joints. Cracks more than 18.75 mm 3/4 inch width can be repaired using either epoxy mortar or epoxy concrete. Sealed cracks will assist in protecting the subbase against chemical migration.
****

Remove 100 percent of the existing material in all joints including material bonded to joint walls and base. Rigid material may require saw cutting equipment to remove. Joints may be widened up to 3.2 mm 1/8 inch when re-saw cutting. Hairline cracks having no more than 3.2 mm 1/8 inch width are typically not repaired. Cracks greater than 3.2 mm 1/8 inch width can be chased to a minimum depth of 12.5 mm 1/2 inch and sealed using the procedures and materials specified for joints. Cracks more than 18.75 mm 3/4 inch width can be repaired using either epoxy mortar or epoxy concrete. Chase concrete cracks identified for repair and open to a minimum depth of 12.5 mm 1/2 inch below crack surface resulting in crack(s) with smooth vertical walls.

3.4 DEGREASING

On both previously coated and uncoated concrete, degrease entire floor by scrubbing using a hot potable water solution, 49 to 77 degrees C 120 to 170 degrees F, and a concentrated water-based alkaline degreaser. Perform two complete degreasing cycles on the entire floor surface. Allow solution to soak into surfaces prior to scrubbing and remove using hot potable water under a minimum of 27.6 MPa 4,000 psi. Rinsing must be complete when the rinse water appears clear. If the industrial detergent is not biodegradable, collect all rinse water and dispose of as hazardous waste. Squeegees and shop vacuums may be used to collect pooling rinse water. Fans may be used to aid drying of floor surfaces.

[3.5 COATING SYSTEM REMOVAL

****
NOTE: Delete this Article if concrete is uncoated.
****

Remove 100 percent of the existing coating system employing one or more of the following techniques: shot blasting, chipping, scraping, sanding, scarification, high pressure water blasting, and various hand tools. Impact tools such as scabblers may be used to remove unsound epoxy mortar flooring systems. In general, a coating system cannot be completely removed by shot blasting and, to attain 100 percent coating removal, requires a combination of the above techniques.

]3.6 SURFACE PREPARATION

Shot blast entire floor to produce a level of coarseness equal to ICRI 310.2R CSP 3. Overlap each shot blasting pass by 6.25 to 12.5 mm 1/4 to 1/2 inch. Add new shot to shot blasting equipment prior to blasting. Prepare concrete surfaces inaccessible to shot blasting, perimeter wall bases and under secured equipment, using a diamond disk grinding or light scarification to produce a level of coarseness equal to ICRI 310.2R CSP 2, ICRI 310.2R CSP 4, respectively. Resulting surfaces must appear clean and contain the appropriate surface coarseness level. If the resulting

cleanliness level cannot be determined, place numerous drops of water on surfaces that appear contaminated. If the water drops soak into concrete, the surfaces are hydrocarbon contamination free (oils, grease, skydrol). If the water drops bead up and do not flatten out, surfaces require additional degreasing as detailed in the Article DEGREASING. Shot blasting coarse concrete or broom finished concrete can produce a coarseness level equal to ICRI 310.2R CSP 5: employ a best-effort attempt to minimize over-shot-blasting of coarse concrete. If coarse concrete is encountered, shot blasting to a level of coarseness equal to ICRI 310.2R CSP 5 is acceptable: however, extremely coarse concrete can require resurfacing prior to the flooring system's installation. Sweep, vacuum, and run a high powered magnet over all surfaces to be coated, including joints.

3.6.1 Concrete Masonry Units (CMU) Surface Preparation

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NOTE: Delete paragraph if epoxy mortar is not to be applied to the CMU wall bases.

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Remove 100 percent of coatings 100 mm 4 inches up the base of CMU walls adjacent the flooring space, and prepare surface by power grinding to a resulting level of coarseness equal to ICRI 310.2R CSP 2. If oils/grease are present, degrease in accordance with the Article DEGREASING.

3.7 COVE STRIP INSTALLATION

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NOTE: Delete paragraph if epoxy mortar is not to be applied to the CMU wall bases.

****

Install a continuous cove strip at a nominal height of 100 mm 4 inches up each CMU perimeter wall base. Install a solvent-resistant cove strip using a solvent-resistant adhesive.

3.8 KEY-IN TERMINATIONS

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NOTE: If the epoxy mortar flooring system is to be applied up the CMU wall bases, a Key-In termination is not required adjacent these walls.

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Place the "Key-In" termination as detailed in SSPC-TU 2/NACE 6G197 Figure 8 at transition surfaces, directly below doorways, and adjacent walls, floor drains, drain grates (interior side), and all other obstructions embedded into the floor slab. The Key-In termination must contain one vertical wall at a depth from 9.4 to 15.6 mm 3/8 to 5/8 inch and, leading down to the resulting vertical depth, a sloped surface from 37.5 to 50 mm 1-1/2 to 2 inches. A hand held concrete saw can be used to cut the correct vertical depth followed by power tool grinding to create a sloped surface. Remove concrete dust by vacuuming.

3.9 CRACK REPAIRS

Use the "Elastomeric Underlayer Crack-Bridging Design" as detailed in SSPC-TU 2/NACE 6G197 Figure 7 over the surface of epoxy mortar filled

cracks.

3.9.1 Install Bondbreaker

Install bondbreaker, either solvent-resistant bondbreaker tape or a 3.2 to 6.25 mm 1/8 to 1/4 inch No. 20-No. 40 mesh silica sand layer, to the base of previously chased cracks identified for repair. For cracks without a rigid base, install suitably sized fiberboard to a depth of 12.5 mm 1/2 inch below floor level and with bondbreaker over exposed fiberboard. Install bondbreaker to cover the crack's horizontal base and continuously span the entire crack length. Bondbreaker application prevents epoxy mortar from penetrating deep into cracks. Use bondbreaker tape no more than 150 microns 6 mils thick. In this application, the use of backer rod is prohibited.

3.9.2 Repair Cracks

Using the specified materials, prime interior crack walls and apply epoxy mortar directly into wet primer. Finish epoxy mortar level with floor and without feathered edges. When cured, remove mortar imperfections by sanding flush with adjacent concrete. Apply solvent-resistant tape parallel to each side of the mortar filled crack(s) at a minimum inner width of 100 mm 4 inches between tape. A 100 mm 4 inch inner tape width is generally suitable for cracks less than 12.5 mm 1/2 inch wide whereas cracks more than 12.5 mm 1/2 inch wide can require an inner tape width of 150 mm 6 inches. Apply 1 mm 1/24 inch of the specified sealant, in one coat, directly over filled crack(s) and spread flush with inner tape edges: a stiff bristled paintbrush can be used to spread the sealant. Use a Wet Film Thickness (WFT) gage to confirm sealant application is between 875 to 1125 microns 35 to 40 mils wet. Remove tape and allow sealant to cure a minimum of 24 hours prior to the epoxy mortar flooring system application. Sealant application above 1250 microns 50 mils dry will require removal and reapplication.

3.10 PRE-APPLICATION TESTING FOR CONTAMINATION

Spot check surfaces for oil/grease contamination using the water break test. At a rate of 5 tests per 95 square meters 1000 square feet place one to two water drops onto surfaces and observe for beading. Test all other surfaces that show visible signs of potential contamination. Perform additional degreasing to surfaces displaying water beading in accordance with Article DEGREASING.

****

NOTE: At this point in the installation sequence, minor spalls and surface deterioration to depths less than 75 mm 3 inches can be repaired. Use epoxy mortar for repairs to depths no more than 50 mm 2 inches. Use epoxy concrete for repairs to depths from 25 to 75 mm 1 to 3 inches. Contain repairs to depths greater than 25 mm 1 inch in a rectangular geometry with saw cut edges. Finish repairs to resemble surrounding concrete using a stainless steel trowel. Include Section 03 01 00 REHABILITATION OF CONCRETE if concrete repairs if this nature are required.

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3.11 COATING APPLICATION

Prior to the flooring system application, vacuum flooring space and mark all joints.

3.11.1 Isolation (Expansion) and Construction Joint Treatment

Install into each isolation (expansion) and construction joint, a continuous length of round polyethylene backer rod flush with the floor's surface and under 30 percent compression.

3.11.2 Contraction Joint Treatment

Apply primer and epoxy mortar directly into all contraction joints. This quantity is in addition to the specified 6.25 mm 1/4 inch epoxy mortar thickness. This step may be performed either prior to, or during, the full epoxy mortar application.

3.11.3 Primer Application

Apply MPI 208 epoxy primer to flooring space at a minimum of 250 microns 10.0 mils wet. Do not prime previously installed patch test.

3.11.4 Epoxy Mortar Application

Apply MPI 209 epoxy mortar at 6.25 mm 1/4 inch directly into wet primer using a screed box or equal equipment. Finish open areas using a power trowel with stainless steel blades. Perimeter edges and adjacent equipment footings may require finishing by stainless steel hand trowel. Directly above areas with Key-In terminations and at a distance from 25 to 37.5 mm 1 to 1-1/2 inches away from the mortar's outer edge, slope the mortar down and flush with the concrete's surface. Terminate the resulting angle flush with the Key-In termination vertical cut. Apply epoxy mortar flush with previously installed patch test. Do not apply epoxy mortar onto patch test surface. When sufficiently cured, sand entire mortar surface. Resulting surface must appear level, contain uniform thickness, and be free of surface imperfections including trowel marks.

3.11.5 Primer Application to CMU Walls

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NOTE: Delete paragraph if epoxy mortar is not to be applied to CMU wall bases.

****

When the epoxy mortar has sufficiently cured, prime approximately 100 mm 4 inches up base of CMU walls to cove strip and 50 mm 2 inches adjacent the wall's base using the specified primer.

3.11.6 Epoxy Mortar Application to CMU Walls

****

NOTE: Delete paragraph if epoxy mortar is not to be applied to CMU wall bases.

****

Apply MPI 209 epoxy mortar directly into wet primer at 4.5 mm to 6.25 mm 3/16 to 1/4 inch. Use a cove trowel to create a rounded transition

between floor surfaces and perimeter wall bases. When sufficiently cured, sand the base and 100 mm 4 inches up perimeter walls. Resulting finish must contain a rounded transition of uniform thickness between flooring surfaces and CMU walls. When sufficiently cured, sand mortar surfaces. Resulting surface must be free of surface imperfections including trowel marks.

3.11.7 Grout Coat Application

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NOTE: Select a grout coat color identical to the selected topcoat color, either white or ultra-light gray. Ultra-light gray is preferred to white.

****

Sweep and vacuum up residual dust from epoxy mortar sanding. Apply MPI 210 grout coat to epoxy mortar at a minimum of 250 microns 10 mils wet. Apply grout coat to previously install patch test. Where wall bases are used, extend coating up CMU wall. If the cured grout coat feels oily/greasy, an amine blush has occurred which requires removal. Consult the coating manufacturer to recommend an appropriate blush removal procedure. Epoxy amines can blush during cool temperatures with high humidity.

3.11.8 Grout Coat Sanding

Sand grout coat using 100 grit or finer sandpaper to a dull appearance with visible scratches. Resulting surface must appear 100 percent absent of gloss with zero shiny spots. Lightly sand perimeter edges and around equipment footings.

3.11.9 Saw Cutting and Sealing Joints

Use the "Conventional Sealed Joint" as detailed in Figure 1 of SSPC-TU 2/NACE 6G197 to seal each contraction and expansion joint. Take care to reduce contamination from saw cutting equipment and foot traffic. Limit floor access to essential Contractor personnel. When performing joint work, including saw cutting, suggest placing clean rolled cardboard adjacent joint surfaces to reduce coating system contamination.

3.11.9.1 Saw Cut Contraction Joints

Place saw cuts directly in the middle of each contraction joint 6.25 mm 1/4 inch wide, placed to a minimum depth of 31.2 mm 1-1/4 inches, and span the joint's entire length.

3.11.9.2 Saw Cut Isolation (Expansion) and Construction Joints

Place saw cuts to the isolation (expansion) and construction joint's original width and to a minimum depth of 31.2 mm 1-1/4 inches. Completely remove the epoxy mortar across the joint's width and further remove the previously installed backer rod.

3.11.9.3 Install Backer Rod

Install a continuous length of round, closed-cell polyethylene backer rod into each saw cut. For 12.5, 9.4 and 6.25 mm 1/2, 3/8 and 1/4 inch wide saw cuts, place backer rod to a depth of 9.4 mm 3/8 inch below the grout coat's surface the highest point on the backer rod. For expansion joint

saw cuts greater than or equal to 18.8 mm 3/4 inch wide, place backer rod to a depth of 15.6 mm 5/8 inch below the grout coat's surface. Fit backer rod tight between joint walls under 30 percent compression and place using a backer rod tool. Remove and reinstall all backer rod that is the incorrect size or at the incorrect depth. Following backer rod installation, apply painter's tape to surfaces adjacent joints to protect from sealant.

3.11.9.4 Joint Sealant Application

Apply sealant directly into joints using a bulk-caulking gun. At room temperature, the resulting sealant application must exhibit a concave recess between 3.2 to 1.0 mm 1/8 to 1/24 inch below the grout coat's surface. Remove and reapply cured sealant remaining either flush or greater. Following sealant application, remove painter's tape and sealant drips on grout coat. Prior to topcoating, cure sealant a minimum of 24 hours.

3.11.10 Application of Topcoats

Apply two coats of MPI 212 urethane topcoat. Broadcast No. 60, white, aluminum oxide non-skid grit into the second urethane topcoat.

3.11.10.1 Non-Skid Grit Broadcast

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NOTE: Aircraft hangars servicing light aircraft with weight less than 18,140 kg 40,000 pounds may require a higher non-skid grit loading. The additional grit will assist in towing aircraft under wet conditions; however, the additional grit will decrease coating aesthetics. Up to 450 grams 1.0 pounds per 9.3 square meters 100 square feet of additional non-skid grit can be required.

On either warehouse or architectural floors, considerably less non-skid grit may be appropriate. Broadcast rates can range from none to less than 450 grams 1.0 pound per 93 square meters 1000 square feet.

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Broadcast non-skid grit at a rate of 680 grams 1.0 pound per 9.3 square meters 100 square feet into the second urethane topcoat and backroll. Map floor into 55.8 square meters 600 square foot sections where 4080 grams 9.0 pounds of non-skid grit is pre-weighed, placed into clean buckets and used in its entirety per marked 55.8 square meter 600 square foot section.

3.11.10.2 Grout Coat Cleaning

Inspect floor for shiny grease spots and, if detected, spot degrease using manufacturer approved solvent(s) with clean, lint-free rags. Sweep and vacuum up all residual dirt and dust. Solvent wipe all surfaces using solvent(s) and procedures as recommended by manufacturer of epoxy mortar flooring system.

3.11.10.3 First Topcoat

Apply a full coat of urethane topcoat at a spreading rate from 62.5 to 80 microns 2.5 to 3.2 mils Dry Film Thickness (DFT). Stripe coat perimeter

edges and around equipment footings. Monitor and record a minimum of one Wet Film Thickness (WFT) reading per 55.8 square meters 600 square foot section of floor surface. Sealant is to be lightly coated.

3.11.10.4 Second Topcoat

Apply a second coat of urethane topcoat at a spreading rate from 62.5 to 80 microns 2.5 to 3.2 mils DFT. Stripe coat perimeter edges and around equipment footings. Monitor and record a minimum of one WFT reading per 55.8 square meters 600 square foot section of floor surface prior to broadcasting non-skid grit. When the correct WFT has been applied per 55.8 square meters 600 square feet of area, immediately and evenly broadcast non-skid grit into the second urethane topcoat and backroll in two directions. Test the adhesion of the epoxy mortar flooring system in accordance with the paragraph ADHESION TESTING.

3.11.10.5 Walkway Stripes and Grounding Rod Markings

Place the walkway stripe and grounding rod marker, if applicable, according to Government drawings. When the second topcoat is within its recoat window, apply a walkway stripe of the red/orange urethane topcoat at 75 microns 3.0 mils DFT. Lightly broadcast non-skid grit into the wet walkway stripe. Use solvent-resistant tape to protect the floor coating against stripe coat bleed. A thin clear coat of either epoxy or urethane may be required to prevent stripe coat bleed prior to the full application of the colored stripe coat. Completely hide the topcoat color with the red/orange stripe, in one coat. If insufficient hiding occurs, apply one additional walkway stripe coat. Apply grounding rod markings using similar procedures, urethane topcoat, and colors and size according to Government drawings.

3.12 CURING

Installed materials must cure and display performance equal to manufacturer's product literature. Remove and reapply improperly cured material.

3.13 FIELD QUALITY CONTROL

3.13.1 Coating Inspector

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NOTE: Insert directly into Section 01 45 00 01 45 00.00 40 QUALITY CONTROL, as applicable, requirement for SSPC QP5 Level II Coating Inspector.

A) Modify Section 01 45 00 01 45 00.00 40 QUALITY CONTROL to include SSPC QP5 Level II Coating Inspector as follows:

1. In the Submittals Article, add submittal requirement "SD-07 Certificates," add "SSPC QP5 Level II Coating Inspector; G" and add the following paragraph below the addition of "SSPC QP5 Level II Coating Inspector; G."

2. Add the following to the table in the paragraph "QC Specialists Duties and Qualification:" under the heading "Qualification/Experience in Area

of Responsibility," add "SSPC QP5 Level II Coating Inspector;" under the heading "Area of Responsibility," add "Surface preparation, flooring system installation, field tests, and field inspection;" and under the heading "Frequency" add "Full-time during surface preparation, flooring system installation, field tests, and field inspection."

3. Use SSPC QP5 Level II Coating Inspector on all flooring projects or, as a minimum, on flooring projects with greater than 232.25 square meters 2,500 square feet.

B) Modify Section 01 45 00 QUALITY CONTROL to include SSPC QP5 Level II Coating Inspector as follows:

Add SSPC QP5 Level II Coating Inspector to paragraph CQC PERSONNEL and its associated Experience Matrix. The SSPC QP5 Level II Coating Inspector must be directly employed by the prime Contractor. Use the following for the Qualifications column:

The SSPC QP5 Level II Coating Inspector will act as QC Specialist.

****

Consider the Coating Inspector a QC Specialist, working for the QC Manager, and be qualified in accordance with Section 01 45 00 01 45 00.00 40 QUALITY CONTROL. The Coating Inspector must be present during all field tests, surface preparation, flooring application, initial cure of the flooring system, and during all flooring repair work. The Coating Inspector must provide all tools/equipment necessary to perform field tests and inspection. The Coating Inspector is responsible for field tests and specified level of inspection.

3.13.2 Inspection

Document weather conditions, job site occurrences, and report conditions and occurrences potentially detrimental to the flooring system. The listed inspection requirements are in addition to the QC inspection and reporting requirements defined in Section 01 45 00 01 45 00.00 40 QUALITY CONTROL. The Coating Inspector must prepare a project reference sheet outlining all requirements, tests, test methods, and evaluation criteria, and hold regular meetings with Contractor personnel, including shot blasting operators and applicators, to review requirements/evaluation criteria for upcoming work prior to execution. At the start of coating operations and every hour following until daily work is complete, record air temperature, substrate temperature, and relative humidity. Following each coat application, inspect surfaces for improperly cured material, blisters, inadequate or excessive coating thickness, and other defects. Document each inspection, test, non-compliant area, and location of each non-compliant area. List evaluation method, evaluation criteria, areas requiring rework, and all other pertinent observations.

3.13.2.1 Daily Inspection Report

Submit to the Contracting Officer one copy of the daily inspection report completed each day when performing work under this Section. Use Appendix X1 "Inspection Checklist" of ASTM D6237 to monitor daily activity and to assist in preparing the daily inspection report. Note each non-compliant issue and each issue identified for rework in accordance with the QC documentation procedures in Section 01 45 00 01 45 00.00 40 QUALITY CONTROL. Use of forms containing entry blocks for all required data is encouraged. The data must be legible and presented in a professional format. Submit report within 24 hours of the report date.

3.13.2.2 Inspection Logbook

Maintain a continuous record of all activity related to this Section on a daily basis. A computer / software package as outlined in Table II is preferred to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information including photo documentation where appropriate. The designated Government Representative for the project is assigned the highest level Administrator privileges and only the Administrator must be able to modify reports. In areas where photography is not allowed the computer must come with verification that the camera / photo capability has been removed.

Alternatively, a continuous record of all activity related to this Section must be maintained in an Inspection Logbook on a daily basis. The logbook must be hard or spiral bound with consecutively numbered pages, and must be used to record all information provided in the Daily Inspection Reports, as well as other pertinent observations and information. Submit the original Inspection Logbook to the Contracting Officer upon completion of the of the project and prior to final payment.

3.13.2.3 Inspection Equipment

Use equipment in good condition, operational within its design range, and calibrated as required by the specified standard for each device.

3.13.3 Adhesion Testing

Perform a minimum of three modified adhesion tests (ASTM D4541) on the topcoat no less than forty-eight hours following application. Select three random flooring locations spaced a minimum of 6 meters 20 feet between each location. Vertically core completely through the epoxy mortar flooring system and a minimum of 9.4 mm 3/8 inch into concrete using a suitable drill fitted with a 25 mm 1 inch diameter core bit. Throughout coring, employ a best effort attempt to avoid fracturing and overheating both the mortar system and concrete: improper coring can affect adhesion results. Adhere directly to each cored surface's center a 18.75 mm 3/4 inch diameter pull-off coupon. Lightly sand test area flooring surface prior to attaching pull-off coupons containing a grit-blasted anchor profile. When pull-off coupon adhesive has sufficiently cured, test adhesion and evaluate results. If testing produces cohesive failures within the concrete, no less than 1 mm 40 mils concrete removed over 95 percent of each pull-off coupon, or adhesion more than 2.75 MPa 400 psi mortar system's adhesion is acceptable. If the above requirements are not satisfied, then perform one adhesion test per 9.3 square meters 100 square feet using the above procedures. Two additional tests will confirm results for each non-compliant area. Remove and rework all areas unable to meet adhesion requirements to sound

material. Fill core holes using primer, sand-filled epoxy mortar, grout coat, and urethane topcoats. Finish resulting repairs flush with adjacent coatings, displaying an equivalent appearance.

3.14 FINAL CLEANUP

Following work completion, remove debris, equipment, and materials from site. Remove temporary connections to Government or Contractor furnished water and electrical services. Restore existing facilities in and around the work areas to their original condition.

TABLE I	
MATERIAL REQUIREMENTS	
Table Ia - Sealant	
Test	Minimum Requirement (maximum where indicated)
Sealant System (two-pack: self-leveling)	Polysulfide (Manganese Cure; MnO2) or Urethane
Percent Volume Solids	100 percent
Chemical Resistance to JP-8 plus 100 Fuel at 21 degrees C (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Chemical Resistance to Motor Oils at 21 degrees C (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Chemical Resistance to Skydrols at 21 degrees C (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Hardness (ASTM D2240: Shore A)	20
Tensile Strength (ASTM D412) (or ASTM D638)	1.0 MPa
Percent Elongation (ASTM D412) (or ASTM D638)	500 percent
Tack Free at 18.3 degrees C (ASTM C679)	12 hours maximum
Adhesion to Sand Filled Epoxy Polyamine	0.96 MPa
Adhesion to Urethane Topcoats (paintable sealant)	0.96 MPa
NOTES: (1) Immerse and test a minimum of three - 50 by 12.5 by 12.5 mm section of cured sealant.	

TABLE I	
MATERIAL REQUIREMENTS	
Table Ia - Sealant	
Test	Minimum Requirement (maximum where indicated)
Sealant System (two-pack: self-leveling)	Polysulfide (Manganese Cure; MnO2) or Urethane
Percent Volume Solids	100 percent
Chemical Resistance to JP-8 plus 100 Fuel at 70 degrees F (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Chemical Resistance to Motor Oils at 70 degrees F (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Chemical Resistance to Skydrols at 70 degrees F (ASTM D1308) (see note 1)	48 hours immersion: 2.0 percent (max) weight increase, 5.0 percent (max) volume increase, 2.0 percent (max) weight loss
Hardness (ASTM D2240: Shore A)	20
Tensile Strength (ASTM D412) (or ASTM D638)	150 psi
Percent Elongation (ASTM D412) (or ASTM D638)	500 percent
Tack Free at 65 degrees F (ASTM C679)	12 hours maximum
Adhesion to Sand Filled Epoxy Polyamine	140 psi
Adhesion to Urethane Topcoats (paintable sealant)	140 psi
NOTES: (1) Immerse and test a minimum three - 2 by 1/2 by 1/2 inch section of cured sealant.	

TABLE II
Reporting Program Requirements QA/QC
Administrative Controls:
Administrators must be able to turn on and off unique access to specific jobs and Contracts.
Administrators must be able to remotely enable and disable access for users.
All enabled users must view the same active report in real time. There must be no opportunity for multiple versions of the same report to exist.
Administrators must be able to setup unique approval processes for each project and promote or remove unique people from this process at any time.
Administrators must be able to associate Contract specific documents and specification limits quickly and easily.
Administrators must be able to associate PDS, SDS, blueprints, scope of work and Contracts uniquely to each job.
Objectivity Controls:
Data Entry fields must be by multi-selectable choices, numeric keypads, pickers and skip logic to ensure repeatable data entry in a way that makes running analytics and metrics easy and objective.
The program / hardware package must be able to communicate with inspection devices that provide (batch) data export capability such as Elcometer and Defelsko gages.
The program / hardware package must automatically time, date and GPS stamp all reports without input or interference from the inspector.
Real Time Syncing:
Forms must be available for approved associates to view at all times.
Retrievable storage must be provided for all job related reports and documents for a minimum time of 5 years from completion of the job or project. Archiving of the documents after 5 years will be the responsibility of the Government.
Document Library:
All reports must be in searchable and annotatable PDF format.
The Administrator must be able to upload and annotate job specific reports in real time. Examples include but not limited to Safety Data Sheets, Product Data Sheets and Blueprints.

TABLE II
Annotations and modifications must be locked and associated with the document. Only the Administrator has rights to modify or delete annotations or allow modifications to the document library especially all related inspection reports.
Customization:
The program must be capable of being customized to specific jobs, Contracts or specifications.

-- End of Section --