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Construction Specification Manual

Salt River Project

Technical Specification Index – June 2025

Division 9

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SECTION 09 05 62

PREINSTALLATION TESTING FOR FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following preinstallation tests to be performed on all concrete surfaces scheduled to receive adhered, non-breathable, or wood floor finishes:
 - 1. Testing for alkalinity.
 - 2. Testing for moisture vapor emission rate.
 - 3. Determination of substrate relative humidity.
 - 4. Determination of substrate water absorption (porosity).
- B. Perform preinstallation tests on concrete floor slabs placed below, on, and above grade, including suspended floor slabs.
- C. Related Requirements:
 - 1. Division 01 Section "Construction Progress Documentation" for incorporation of concrete drying time and preinstallation testing time into Contractor's Construction Schedule.
 - 2. Division 09 Section "Moisture Vapor Emission and Alkalinity Control" for topically-applied vapor reduction coating and underlayment system.

1.2 REFERENCES

- A. ASTM F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- B. ASTM F1869 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- C. ASTM F2170 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- D. ASTM F3191 Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring.

1.3 DEFINITIONS

- A. MVE: Moisture vapor emission.
- B. MVER: Moisture vapor emission rate.

1.4 COORDINATION

- A. Coordinate testing with installation of floor coverings. Ensure flooring installation complies with MVE control system manufacturer's warranty requirements.

1.5 SCHEDULING

- A. Perform initial tests only after allowing concrete to dry for a minimum of 90 days.
 - 1. Ninety-day duration shall commence upon completion of curing of concrete, or upon removal of any subsequent standing water – whichever occurs last.
 - 2. Provide separate line items in construction schedule to reflect the minimum 90-day drying period and the time necessary to perform the preinstallation testing.
- B. Schedule testing not less than two nor more than three weeks prior to scheduled flooring installation.
- C. Comply with requirements in Division 01 Section "Construction Progress Documentation" for inclusion of concrete drying and preinstallation testing line items in Contractor's Construction Schedule.

1.6 PREINSTALLATION MEETINGS

- A. Pretesting Conference: Conduct conference at Project site.
 - 1. Conduct conference with attendance and participation of the following:
 - a. Owner.
 - b. Architect.
 - c. Contractor.
 - d. Flooring Installer(s).
 - e. Flooring manufacturer's representative.
 - f. Testing agency representative.
 - 2. Review concrete substrate requirements for conditions affecting performance of flooring, including flooring manufacturer's recommendations regarding moisture, relative humidity and alkalinity tolerances and limits.
 - 3. Review proposed locations and frequency of moisture, relative humidity and alkalinity tests.
 - 4. Review testing agency's proposed methodology for performance of testing, and project conditions necessary to be implemented by Contractor in order to ensure optimum conditions under which tests should be performed.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- B. Minutes of Pretesting Conference.
- C. Test Reports: From Testing Agency for pre-installation tests results.
- D. Data Loggers:
 - 1. Provide manufactures spread sheet for concrete relative humidity readings at a single location per grade level.
 - 2. Provide interior temperature and humidity data logger for room conditions at one location per floor.

1.8 CLOSEOUT SUBMITTALS

- A. Record Documents: Showing locations of substrate moisture, relative humidity and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.9 QUALITY ASSURANCE

- A. Testing Agency Representative's Qualifications: An International Concrete Repair Institute Certified Concrete Moisture Testing Technician, Grade 1.

1.10 FIELD CONDITIONS

- A. Do not perform tests until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Areas of the building in which tests will be performed shall be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels shall be established and the HVAC system balanced for minimum 48 hours prior to and during test period.

PART 2 - PRODUCTS

2.1 TESTING MATERIALS

- A. pH Meter, meeting requirements of ASTM F710:
 - 1. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products by one of the following:
 - a. AMT Alkalinity-pH meter as manufactured by American Moisture Test, Inc., (866) 670-9700.
 - b. Vaprecision Testing Systems – Concrete slab surface pH testing kit. (800) 449-6194.
 - c. Microessentials Lab – pH Test Kit. (718) 338-3618.

- B. Calcium Chloride Testing Kits, ASTM F1869.
 - 1. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products by one of the following:
 - a. American Moisture Test, Inc.
 - b. Vaprecision Testing Systems.
 - c. Full Spectrum Flooring.
- C. Concrete Relative Humidity Meter: Meeting requirements of ASTM F2170.
 - 1. Acceptable Manufacturers: Subject to compliance with requirements herein, provide products by one of the following:
 - a. American Moisture Test, Inc. (866) 670-9700.
 - b. Wagner Meters (800) 634-9961.
 - c. Tramex LTD (970) 488 1898.
 - d. Vaisala (781) 933-4500.
- D. Interior Temperature and Humidity Monitoring: Data logger system capable of documenting interior building conditions during testing periods up to 72 hours using a printable chart format.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of floor coverings will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for performance of preinstallation testing and comply with requirements specified.
- B. Proceed with testing only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with ASTM F710.
- B. Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair or compromise testing procedure and test results with a diamond-tooled grinder. Grind an area of at least 20 by 20-inches in the area each moisture test is to be placed.
 - 1. Tests sites shall be cleaned not less than 24 hours prior to the placement of test kits.
- C. Broom and vacuum clean substrates to be covered immediately before installing test kits.

3.3 PREINSTALLATION TESTING, GENERAL

- A. Testing shall be performed by qualified personnel of the Testing Agency.
- B. Install a data logger to record temperature and humidity during entire testing process at a minimum of one data logger per floor level.
- C. Test Report Documentation:
 - 1. Provide a diagrammatic floor plan of the building indicating each test site location. Designate each test site by a unique number or letter identifier.
 - 2. Test Report Form: Use form included at the end of this Section, or substantially similar form furnished by Testing Agency and approved by the Architect.
- D. Test reports shall include the following minimum information, in tabular form:
 - 1. General Information:
 - a. Name of Project.
 - b. Name of Testing Agency.
 - c. Name and title of Testing Agency Representative.
 - d. Test site identifier, correlated to identifier on floor plan, and on concrete surface near test placement.
 - e. Location of each test, by Room number designation on Drawings.
 - 2. Concrete Alkalinity Tests: Record pH level of concrete surface at test site.
 - 3. Calcium Chloride Tests:
 - a. Date and time of preparation of the test sites.
 - b. Weight of moisture kits, and date and time kits were set in place.
 - c. Date and time moisture kits were gathered, and post-weight of kit.
 - d. Elapsed time of test duration.
 - e. Total weight gain of each test kit.
 - f. Moisture vapor emission rate (MVER).
 - 4. Relative Humidity Tests:
 - a. Date and time RH test sleeves were set in place.
 - b. Depth of hole in inches, from top of slab.
 - c. Date and time relative humidity and temperature of ambient conditions were documented.
 - d. Date and time relative humidity and temperature of concrete were documented.
 - e. Make, model, and last calibration date of the instrument used to make the measurements.
 - 5. Substrate Water Absorption (Porosity) Tests:
 - a. Record whether the amount of time required for the substrate to completely absorb the deposited water is less than, equal to, or greater than the established threshold limit.

3.4 QUANTIFYING ALKALINITY LEVEL

- A. Substrate Alkalinity Testing: Perform pre-installation alkalinity testing of the concrete slab in accordance with ASTM F710 at all floor levels.
- B. At each substrate relative humidity test site perform alkalinity test as follows:
 - 1. Place several drops of distilled or de-ionized water or liquid recommend by tester manufacturer onto concrete surface to form a puddle approximately 1 inch in diameter.
 - 2. Allow the water to set for approximately 60 seconds.
 - 3. Expose calibrated meter tip or pH strip into liquid and allow meter to calculate pH result for 15 seconds in accordance with manufactures recommendations.
- C. Record and report results to the nearest hundredth.

3.5 SUBSTRATE MOISTURE VAPOR EMISSION TESTING

- A. General: Perform pre-installation moisture testing of the concrete slab by calcium chloride test in accordance with ASTM F1869 prior to the application of flooring products.
- B. Determine the change in weight of moisture-absorbing anhydrous calcium chloride and represent the amount of moisture transmitting out of the concrete slab area.
 - 1. Express the value in pounds as the equivalent weight of water that is emitted from a 1,000 square foot concrete slab surface area in a 24 hour period of time.
- C. Conduct tests by making three (3) site visits as follows:
 - 1. Site Visit No. 1 (Day 1):
 - a. Locate and prepare test sites for:
 - 1) ASTM F1869 tests (minimum 20 inches by 20 inches)
 - b. Remove contaminants and mechanically prepare test sites.
 - c. Install data logger system to monitor interior temperature and relative humidity
 - 2. Site Visit No. 2 (minimum 24 hours after preparation of test sites):
 - a. Pre-weigh test kits (maximum 20 minutes prior to setting). Scale shall report weight to 0.1 grams. Record weight and start time.
 - b. Set moisture test kits in place and cover with dome.
 - c. Verify operation of data logger system.
 - d. Record ambient indoor temperature and relative humidity.
 - 3. Site Visit No. 3 (60 to 72 hours after test kits are set in place):
 - a. Post-weigh test kits (maximum 20 minutes after removing). Scale shall report weight to 0.1 grams. Record weight and end time.
 - b. Remove data logger system.
 - c. Record ambient indoor temperature and relative humidity.

- D. Testing Frequency: Provide 4 tests for the first 1,000 square feet of floor area plus one 1 additional test for each 500 square feet thereafter.
 - 1. Locate tests in various parts of the floor area including the center of the floor and sites of potential moisture such as the perimeter of the floor, joints, or cracks.

3.6 SUBSTRATE RELATIVE HUMIDITY TESTING

- A. General: Perform pre-installation relative humidity testing of the concrete slab by in situ probe test, prior to the application of flooring products in accordance with ASTM F2170 at all floor levels.
- B. Conduct tests by making 2 site visits over the course of 4 calendar days as follows:
 - 1. Site Visit No. 1:
 - a. Locate and drill holes. (Approximately 15 mm in diameter to a depth of 40 percent of the slab thickness. For slabs on grade allowed to dry from top only and a depth of 20 percent of slab thickness. For suspended slabs allow to dry from both top and bottom (decks not on metal pan or metal deck). Hole diameter shall not exceed outside diameter of the insert able test sleeve by more than 0.04 inch. Drilling operation must be dry.
 - b. Vacuum holes to remove dust and debris.
 - c. Insert a hole liner, or sleeve, to the full depth of test hole, ensuring that the liner is capped or plugged at the end protruding from the concrete surface.
 - d. Record temperature and relative humidity in hole.
 - e. Record ambient indoor air temperature and relative humidity.
 - f. Connect pre-programmed data logger unit to record readings at one RH test location per grade level. Unit shall provide readings every hour for 72 hours total.
 - 2. Site Visit No. 2 (72 hours after probe placement):
 - a. Remove sleeve cap.
 - b. Connect probe and digital meter.
 - c. Read and record temperature and relative humidity in concrete at the test site.
 - d. Record alkalinity of slab surface in vicinity of test site.
 - e. Record temperature and relative humidity in hole.
 - f. Record ambient indoor temperature and relative humidity.
 - g. Disconnect data logger unit and retrieve test results.
- C. Testing Frequency: Provide 4 tests for the first 1,000 square feet of floor area plus one 1 additional test for each 500 square feet thereafter.
 - 1. Perform tests concurrently with, and in close proximity to, calcium chloride tests.
- D. Mark each test location directly on concrete surface using a black marker and identify on diagrammatic floor plans.

3.7 SUBSTRATE WATER ABSORPTION

- A. General: Perform pre-installation water absorption (porosity) testing of the concrete slab in accordance with ASTM F3191 at all floor levels.
 - 1. Prepare substrate surface in same manner as planned or as required for each specific floor covering material installation.
 - 2. After the substrate surface has been prepared place a single drop of potable water, approximately 0.05 mL, on the substrate surface using a pipette, water dropper, straw, etc.
 - 3. Allow the water to set for 60 seconds unless otherwise required by flooring manufacturer, adhesive manufacturer, primer manufacturer, or underlayment manufacturer's written instructions.
- B. Record whether the amount of time required for the substrate to completely absorb the deposited water is less than, equal to, or greater than the established threshold limit.
- C. Testing Frequency: Perform three tests for the first 2000 sq. ft. (186 sq. M) and at least one additional test for each additional 3000 sq. ft. (279 sq. M), selecting test locations to provide information about substrate water absorption.
 - 1. The number of tests listed herein represents the minimum to be conducted, but the total number of tests conducted shall not be less than one per room.

3.8 TEST REPORTS

- A. Record test results on the Test Results Reporting Form included at the end of this Section. All test results shall be recorded. Incomplete forms or missing information will be grounds for rejection of the test, and retesting shall be performed at Contractor's expense.
- B. Test Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of test sites.
 - 5. Test site number, corresponding to number on diagrammatic floor plan.
 - 6. Names of individuals performing tests.
 - 7. Description of the test method.
 - 8. Complete test data.
 - 9. Test results and an interpretation of test results.
 - 10. Comments or professional opinion on whether tested Work complies with the Contract Document requirements.
 - 11. Name and signature of testing agency representative.
 - 12. Recommendations on retesting and reinspecting.

- C. Acceptable test results for all flooring products:
 - 1. MVER: Less than 3.0 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
 - 2. Relative Humidity: Maximum 75% RH.
 - 3. Surface Alkalinity: pH levels greater than 7.0, and less than 8.5.
 - 4. Manufacturer's tolerances may vary. Notify Owner and Architect in writing if reported results are at variance with requirements of floor covering manufacturer, adhesive manufacturer, or patching/underlayment manufacturer.
- D. Submit a certified written report of each test to Architect, with copy to Contractor. Interpret tests and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 1. Provide test results in format shown at end of this Section.

3.9 REPAIR AND PROTECTION

- A. General: On completion of testing, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas so that they are as invisible as possible.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for testing services.

3.10 ATTACHMENTS

- A. Flooring Preinstallation Testing Report Form.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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PREINSTALLATION TESTING FOR FLOOR FINISHES

TEST RESULTS REPORTING FORM

Project Name: _____								
Tests Performed By (Company): _____								
Name: _____			Title: _____					
Test Location #: _____			Plan Room #: _____					
ASTM F1869 - Calcium Chloride Test								
Prep of Test Site (date & time): _____								
Start of Test			Conclusion of Test			Elapsed Time	Weight Gain	MVER Value
Date	Time	Weight	Date	Time	Weight			
Indoor Air Temp.:			Indoor Air Temp.:					
Relative Humidity:			Relative Humidity:					
ASTM F3191 - Water Absorption			☐	≤ 1 Minute (Porous)		☐	> 1 Minute (Non-Porous)	
ASTM F2170 - Relative Humidity Test								
Holes Drilled and Sleeves Set in Place		RH in Concrete Hole	Temp. in Concrete Hole	Ambient Air Temp.	Ambient Air RH	Temperature and RH Recorded		ASTM F710 pH Test
Date	Time					Date	Time	
Depth of Hole, in inches: _____		Make / Model of Instrument: _____						
		Date Last Calibrated: _____						
Remarks and Observations:								

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SECTION 09 05 63

MOISTURE VAPOR EMISSION AND ALKALINITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Water vapor reduction system on new and existing concrete slabs where necessary to obtain a minimum moisture vapor emissions rate of 75 percent maximum for moisture sensitive flooring schedule to receive adhered, non-breathable, or other moisture-sensitive flooring.
2. Water vapor reduction system and cementitious underlayment on existing concrete slabs to receive adhered, non-breathable, or other moisture-sensitive flooring.

1.2 UNIT PRICES

A. Unit Price: Work of this section is affected by unit prices specified in Section 01 22 00:

1. Unit Price No. #1: Topical moisture vapor emission and alkalinity control of concrete floor slabs in areas scheduled to receive adhered, non-breathable, or other moisture-sensitive flooring.
2. Unit Price No. #2: Topical moisture vapor emission and alkalinity control of concrete floor slabs, followed by a barrier topping of hydraulic cement underlayment as specified in Section 03 54 16, in areas scheduled to receive adhered, non-breathable, or other moisture-sensitive flooring.

1.3 DEFINITIONS

- A. MVE: Moisture vapor emission.
- B. MVER: Moisture vapor emission rate.

1.4 COORDINATION

- A. Coordinate testing agency to test concrete slabs no sooner than one week or more than 5 weeks prior to scheduled flooring installation.
1. Apply treatment to areas with moisture vapor emission or relative humidity rates which exceed floor covering manufacturer's written limits, as determined by ASTM F 1869 and ASTM F 2170 testing.
- B. Coordinate testing with installation of floor coverings. Ensure flooring installation complies with MVE control system manufacturer's warranty requirements.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at site. Review methods and procedures related to installation including, but not limited to, the following:
 - 1. Review substrate conditions, moisture and pH test results, manufacturer's installation instructions, and warranty requirements.
 - 2. Document proceedings, including required corrective measures.

1.6 ACTION SUBMITTALS

- A. Product Data: Technical data for each type of product used in moisture vapor emission (MVE) control system.

1.7 INFORMATIONAL SUBMITTALS

- A. Product Schedule: Submit schedule for identifying each floor area to receive moisture vapor emission and alkalinity control system. Use same room label and numbering designations indicated on Drawings.
 - 1. Distinguish between those areas required to receive cementitious surfacing over moisture vapor emission and alkalinity control system and those areas where not required.
- B. Qualification Data: Submit data for Installer and Testing Agency.
- C. Product Test Reports:
 - 1. Submit test reports performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
 - 2. Preinstallation Moisture Vapor Field Test Reports: For each area scheduled to receive adhered, non-breathable, or other moisture-sensitive flooring products, submit test result reports for vapor and moisture testing and alkalinity and adhesion testing for existing concrete substrates.
- D. Preconstruction Test Reports: Submit test reports for alkalinity, calcium chloride, and relative humidity of concrete slabs for each area receiving floor covering.
- E. Warranty: Submit for warranty for vapor emission control coating system and certificate of underwriter's coverage of manufacturer's warranty.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Entity having minimum five years documented experience in the manufacturer of MVE control system and who employs factory trained personnel available for consultation and site inspection.
 - 1. The water vapor emission reduction system must be specifically formulated and marketed for water vapor emission reduction and alkalinity control without change of system design for a minimum period of 10 years.

- B. Installer Qualifications: Entity having minimum 5 years documented experience in the installation of MVE control systems who is an authorized representative and is trained and approved by manufacturer.
- C. Testing Agency Qualifications: Moisture and pH testing shall be performed by an International Concrete Repair Institute (ICRI), Certified Concrete Slab Moisture Testing Technician – Grade 1.
- D. Preinstallation Testing Service: At least 90 days after placement of concrete and prior to floor covering installation, engage a qualified independent testing agency to perform the following tests on floor areas to receive moisture vapor emission and alkalinity control system:
 - 1. Calcium chloride testing per ASTM F 1869.
 - 2. Relative humidity testing per ASTM F 2170.
 - 3. Alkalinity testing per ASTM F 710.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Comply with MVE control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
 - 1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 degrees F (18 degrees C) and not more than 85 degrees F (29.4 degrees C) at least 48 hours before use.
 - 2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE control system manufacturer, but not less than 65 degrees F (18 degrees C) or more than 85 degrees F (29.4 degrees C) and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 3. Install MVE control systems where concrete surface temperatures will remain a minimum of 5 degrees F (3 degrees C) higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

1.11 WARRANTY

- A. System Warranty: Written warranty signed by manufacturer in which the manufacturer agrees to repair or replace components of treatment system, hydraulic cementitious underlayment, floor covering materials, including primer and adhesives, and installation labor for same period resulting from moisture vapor emission related failure that fail in materials or workmanship within specified warranty period.
 - 1. Moisture Vapor Emissions Reduction Rate: Warranty shall warrant the reduction of moisture vapor emissions from a maximum of 25 pounds per 1000 sq. ft./24 hours to no more than 3 pounds per 1000 sq. ft./24 hours determined by the Calcium Chloride Test Method ASTM F1869 and 100% RH using the Relative Humidity Method ASTM F2170.
 - a. System will not fail due to a manufacturing defect and shall prevent flooring damage and bond failure caused by vapor emissions from concrete substrate.
 - 2. Total System Warranty includes the use of a manufacturer's products listed as a total system.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. MVE Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
 - 1. MVER: Maximum 25 lb of water/1000 sq. ft. (11.34 kg of water/92.9 sq. m) when tested according to ASTM F 1869.
 - 2. Relative Humidity: Maximum 90 percent when tested according to ASTM F 2170 using in situ probes.
- B. Water-Vapor Transmission: Through MVE control system, maximum 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E 96/E 96M.
- C. Tensile Bond Strength: For MVE-control system, greater than 200 psi (1.38 MPa) with failure in the concrete according to ASTM D7234.
- D. Surface Alkalinity: ASTM 710, pH between 7.0 and 8.5.

2.2 CONTROL SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products manufactured by one of the following:
 - 1. MVE Barrier Treatment:
 - a. Ardex Engineered Cements, Inc.; MC ULTRA Moisture Control System.
 - b. BASF; MasterTop VB 240FS.

- c. Custom Building Products, Tech MVC Moisture Vapor and Alkalinity Barrier.
 - d. Laticrete SuperCap; Moisture Vapor Control.
 - e. Maxxon; Aquafin Vaportight Coat series.
- B. System Description: Multicomponent or single component, fluid applied penetrants or coatings intended to seal or stabilize internal humidity by restricting excessive moisture and pH (alkalinity), and to mechanically regulate permeability and suppress the volume of moisture reaching concrete surfaces, for compliance with subsequent floor covering manufacturer's written limitations.
- 1. Determine application methods by site conditions, presence of subslab vapor barriers for slabs on grade, concrete mix design and contaminants, age of concrete substrate, results of ASTM F1869 calcium chloride testing, if required, and finish floor covering manufacturer's recommendations.
- C. MVE and Alkalinity Control System: ASTM F 3010 qualified two component, fluid applied penetrants or coatings intended to seal or stabilize internal humidity by restricting excessive moisture and pH (alkalinity), and to mechanically regulate permeability and suppress the volume of moisture reaching concrete surfaces, for compliance with subsequent floor covering manufacturer's written limitations.
- 1. Physical Properties:
 - a. Water Vapor Transmission: ASTM E 96; Minimum 94% reduction under laboratory conditions
 - b. Alkali Resistance: ASTM D 1308; Pass, up to pH of 14
 - c. Adhesion Strength: ASTM D 4541; 500 psi (100% Concrete Adhesive Failure)
 - d. Relative Humidity: Resists up to 100% Relative Humidity as measured by ASTM F 2170.
 - 2. Substrate Primer: Provide MVE control system manufacturer's concrete substrate primer if required for system indicated by substrate conditions.
 - 3. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE control system manufacturer's primer to ensure adhesion of products to MVE control system.
- D. Accessories:
- 1. Patching and Leveling Material: Moisture, mildew, and alkali resistant portland cement product recommended in writing by MVE control system manufacturer and with minimum of 3000 psi (20.68-MPa) compressive strength after 28 days when tested according to ASTM C 109/C 109M.
 - 2. Crack Filling Material: Resin based material recommended in writing by MVE control system manufacturer for sealing concrete substrate crack repair.
 - 3. Hydraulic Cement Underlayment: Refer to Section 03 54 16. Portland cement based, self-leveling compound applied to areas receiving resilient or wood flooring. Cement must bond with subsequent floor coverings and adhesives.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content, installation tolerances, and conditions affecting performance of the work.
- B. Prepare written report listing conditions detrimental to performance.
- C. Proceed with installation after correcting unsatisfactory conditions. Commencement of installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Preinstallation Testing: Refer to Section 09 05 62 "Preinstallation Testing for Flooring."
- B. Concrete Substrates: Prepare and clean substrates according to MVE control system manufacturer's written instructions to ensure adhesion of system to concrete.
 - 1. Remove coatings and substances incompatible with MVE control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE control system manufacturer. Do not use solvents.
 - 2. When required by manufacturer, provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - 3. After shot blasting, repair damaged and deteriorated concrete according to MVE control system manufacturer's written instructions.
 - 4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
 - 5. Fill surface depressions and irregularities with patching and leveling material.
 - 6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack filling material.
 - 7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE control system manufacturer after surface preparation, but not less than 24 hours.
 - 8. Remove dirt, debris, or existing sealant from cracks and joints. Treat dynamic joints with coating by applying a layer into the joint to completely coat walls of the cavity. After curing, fill joint with backer rod while leaving joint top open for sealant treatment.
 - 9. Prior to installation of MVE control systems, broom sweep and vacuum prepared concrete.
- C. Protect walls, floor openings, electrical openings, door frames, and obstructions during installation.

3.3 INSTALLATION

- A. Apply MVE and alkalinity control system in accordance with ASTM F 3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
 - 1. Install primers as required to comply with manufacturer's written instructions.
- B. Apply system, including component coats if any, in thickness recommended in writing by MVE control system manufacturer for MVER indicated by preinstallation testing.
- C. Cure MVE control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.
- D. After curing, examine MVE control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.
- F. MVE Cementitious Underlayment: Apply cementitious surfacing over cured membrane in areas to receive adhered carpet and moisture sensitive flooring to facilitate adhesive bond.
 - 1. Apply at minimum thickness of 1/8 inch (3 mm).

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform installation inspections.
- B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE control system is installed without deficiencies.
 - 1. Verify surface preparation meets requirements.
 - 2. Verify component coats and complete MVE control system film thickness complies with manufacturer's written instructions.
 - 3. Verify MVE control system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.
- C. MVE control system will be considered defective if it does not pass inspections.

3.5 PROTECTION

- A. Protect MVE control system from damage, wear, dirt, dust, and contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE control system manufacturer.
- B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or compromise the MVE control system membrane.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 21 16

GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Gypsum board shaft wall assemblies.
 - a. Metal framing and accessories.
 - b. Gypsum board products and accessories.

1.2 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined.

1.3 ACTION SUBMITTALS

- A. Product Data: For each component of gypsum board shaft wall assembly.
- B. Shop Drawings: Submit full scale drawings indicating special or unusual conditions relating to the shaft wall system specified not addressed in manufacturer's product data.

1.4 INFORMATIONAL SUBMITTALS

- A. Calculations: Submit calculations verifying steel partition stud minimum base metal thickness and depth compliance with Code and ASTM C645 for height, load, and deflection.
- B. Product Certificates: Certification signed by manufacturers of gypsum board and framing assembly components to certify products comply with specified requirements.
- C. Product Test Reports: Submitted from independent testing indicating and interpreting test results relative to compliance of shaft wall systems with acoustical, fire resistance and structural performance requirements.
- D. Research/Evaluation Reports: For firestop tracks, post installed anchors, and power actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Stack panels flat and support on risers on a flat platform to prevent sagging.
- C. Handle panels to prevent damage to edges, ends and surfaces. Do not bend or damage metal corner beads, trim, track, and studs.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with gypsum shaftliner board manufacturer's written instructions.
- B. Do not install finish panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance Characteristics: Engineer shaft wall systems to withstand lateral design loadings, positive and negative air pressure, of 5.0 psf. for maximum heights of partitions required with deflection not to exceed L/240 of wall height.
 - 1. For elevator hoistways, comply with the following pressures:

Elevator Velocity - Ft./Min.	1 or 2 Elevators Per Shaft	3 or More Elevators Per Shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf
1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf
- B. Fire Resistance Ratings: Fire resistive rated assemblies identical to those indicated by reference in GA 600 or to UL design designations, including those incorporating elevator door others framing, whose fire resistance has been determined by ASTM E 119 by an independent testing agency.

- C. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency and to achieve a minimum STC Rating that corresponds to the partition type scheduled on the Drawings.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire Resistance Rating: As indicated on Drawings.
- B. STC Rating: As indicated on Drawings.
- C. Shaft Wall Systems: Assembly consisting of gypsum shaft wall boards inserted between U- or J-shaped metal floor and ceiling tracks; with specially shaped studs engaged in tracks and fitted between shaftliner boards; and gypsum boards on finished side or sides applied to studs in number of layers, thickness, and arrangement indicated.
 - 1. Studs: I, CH, double-E, or CT profile for repetitive members, corner and end members, and fire resistance rated assembly indicated.
 - a. Depth: As indicated, 2-1/2 inches minimum.
 - b. Minimum Base Metal Thickness: As required to meet performance requirements, 0.018 inch (formerly "25 gage"), minimum.
 - 2. Firestop Tracks: Provide firestop track at head of shaft wall on each floor level.
 - 3. Room Side Finish: One or two layer(s) of 5/8-inch thick gypsum board as indicated on room side.
 - 4. Shaft Side Finish: One layer of 5/8 inch of gypsum where finish is indicated on shaft side.
 - 5. Cavity Insulation: Sound attenuation blankets in thickness required to meet indicated STC ratings.
- D. Gypsum Shaftliner Board:
 - 1. Type X: ASTM C 1396/C 1396M; fire resistive liner panels with paper faces, 1 inch (25.4 mm) thick, with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) American Gypsum; Shaft Liner Gypsum Wallboard.
 - 2) CertainTeed Corp.; ProRoc Shaftliner.
 - 3) Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; ToughRock Fireguard Shaftliner.
 - 4) National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner.
 - 5) USG Corporation; Sheetrock Brand Gypsum Liner Panel.
 - b. Thickness: 1 inch (25 mm).
 - c. Long Edges: Double bevel.
 - 2. Moisture and Mold Resistant Type X: ASTM C 1396/C 1396M; fire resistive liner panels with ASTM D 3273 mold resistance score of 10 as rated according to ASTM D 3274, 1 inch (25.4 mm) thick, and with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

GYPSUM BOARD SHAFT WALL ASSEMBLIES

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- 1) American Gypsum Company; M-Glass Shaft Liner with mold and Moisture Resistance.
 - 2) CertainTeed Corp.; GlasRoc Shaft Liner Type X.
 - 3) Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; Dens-Glass Ultra Shaftliner.
 - 4) National Gypsum Company; Gold Bond Brand EXP Extended Exposure Shaftliner.
 - 5) USG Corporation; Sheetrock Glass-Mat Liner Panels.
 - b. Thickness: 1 inch (25 mm).
 - c. Long Edges: Double bevel.
 - d. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
3. Moisture and Mold Resistant, Fiberglass Mat Faced: ASTM C 1658/C 1658M; fire resistive liner panels with ASTM D 3273 mold resistance score of 10 as rated according to ASTM D 3274, 1 inch (25.4 mm) thick, and with double beveled long edges.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) American Gypsum.
 - 2) Georgia-Pacific Gypsum LLC.
 - 3) USG Corporation.
- E. Non-Load-Bearing Steel Framing: Complying with ASTM C 645 requirements for metal unless otherwise indicated and complying with requirements for fire resistance rated assembly indicated.
 1. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot dip galvanized unless otherwise indicated.
- F. Studs: Standard profile for repetitive, corner, and end members:
 1. Depth: As indicated on Drawings.
 2. Minimum Base Metal Thickness: 0.030 inch (0.75 mm) (formerly "20 gage").
- G. Runner Tracks: J profile track with long edge length, but at least 2 inches (51 mm) long and matching studs in depth.
 1. Minimum Base Metal Thickness: 0.030 inch (0.75 mm) (formerly "20 gage").
- H. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire resistance rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fire Trak Corp.; Fire Trak System.
 - b. Grace Construction Products; FlameSafe FlowTrak System.
 - c. Metal-Lite, Inc.; The System.
 - d. Steel Network Inc. (The); VertiClip SLD Series.

- I. Elevator Hoistway Entrance Struts: J profile jamb strut with long leg length of 3 inches (76 mm), matching studs in depth, and not less than 0.033 inch (0.84 mm) thick.
- J. Finish Panels: Gypsum board as specified in Section 09 29 00.
- K. Sound Attenuation Blankets: As specified in Section 09 29 00 "Gypsum Board."

2.3 AUXILIARY MATERIALS:

- A. Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.
- B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.
 - 1. Control Expansion Joint:
 - a. Control Joint Trim: ASTM C1047, provide #93 Zinc Control Joint (ZNCJ) by Clark Dietrich.
 - b. Fire Rated Control Joint Backer: 0.0179 inch (25 gage) minimum thickness, ASTM A 653 hot dipped galvanized, ASTM C 645 flat steel strap backer plates with an affixed cured intumescent strip to maintain fire ratings behind control joints in fire rated partitions.
 - 1) Manufacturer: Subject to compliance with requirements, provide one of the following:
 - a) BlazeFrame CJB series (Control Joint Backer) by Clark Dietrich for horizontal and vertical control joints.
 - b) Fire Rated Control Joint for Horizontal and Vertical Joints: FAS-093X by Cemco.
 - c. Fire Stop Fire Rated Backer: 0.0296 inch (20 gage) minimum thickness, ASTM A 653 hot dipped galvanized, ASTM C 645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire rated partitions.
 - 1) Manufacturer: Subject to compliance with requirements, provide the following:
 - a) Horizontal and Vertical Joint behind Reveals: BlazeFrame FSB series (Flat Strap Backer) by Clark Dietrich.
 - 2. Reveal Molding: Vertical or horizontal recessed reveal fabricated from extruded aluminum.
 - a. Dimension: 1/2-inch wide x 5/8-inch deep (13 mm by 16 mm).
 - b. Basis of Design: Subject to compliance with requirements, provide DRM-625-50 by Fry Reglet.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
- D. Track Fasteners: Power driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

1. Expansion Anchors: Fabricated from corrosion resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.
 2. Power Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Reinforcing: Galvanized steel reinforcing strips with 0.033 inch (0.84 mm) minimum thickness of base metal (uncoated).
- F. Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, gunnable synthetic rubber sealant complying with requirements specified in Section 09 29 00.
- G. Gypsum Board Cants:
1. Gypsum Board Panels: Refer to Section 09 29 00, Type X, 1/2 inch or 5/8-inch (13 mm or 16 mm) panels.
 2. Adhesive: Laminating adhesive; refer to Section 09 29 00.
 3. Non-Load-Bearing Steel Framing: Refer to Section 09 22 16.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 07 81 16 "Spray-Applied Fire Protection."
- B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

GYPSUM BOARD SHAFT WALL ASSEMBLIES

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3.3 INSTALLATION

- A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire resistance rated assemblies indicated and manufacturer's written installation instructions.
- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.
- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
 - 1. Elevator Hoistway: At elevator hoistway entrance door frames, provide jamb struts on each side of door frame.
 - 2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.
- D. Penetrations: At penetrations in shaft wall, maintain fire resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.
- E. Isolate shaft wall system from transfer of structural loading to system, both horizontally and vertically and to prevent cracking of panels while maintaining continuity of fire rated construction. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Comply with details shown and with manufacturer's instructions.
 - 1. Seal gypsum board shaft walls at perimeter where shaft wall abuts other Work.
- F. Firestop Tracks: Where indicated, install to maintain continuity of fire resistance rated assembly indicated.
- G. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire resistance rating of gypsum board shaft wall assemblies.
- H. Sound Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
 - 1. Install acoustical sealant to withstand dislocation by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.
- I. Gypsum Board Cants: At projections into shaft exceeding 4 inches (102 mm), install gypsum board cants covering tops of projections.

1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft wall framing.
 2. Where non-load-bearing steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) o.c. and extend studs from the projection to shaft wall framing.
- J. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.4 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension and framing systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Metal backing plates for wall-mounted items and equipment.

B. Related Requirements:

1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing, and exterior non-load-bearing wall studs.
2. Section 05 50 00 "Metal Fabrications" for steel reinforcing used with partial height partitions.
3. Section 06 10 53 "Miscellaneous Rough Carpentry" for support loads imposed at wall-mounted and wall-hung items that require backing or blocking.
4. Section 07 84 43 "Joint Firestopping" for head-of-wall joint systems installed with non-load-bearing steel framing.
5. Section 09 21 16 "Gypsum Board Shaft Wall Assemblies" for non-load-bearing metal shaft-wall framing, gypsum panels, and other components of shaft-wall assemblies.

1.2 ACTION SUBMITTALS

- A. Product Data:** For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Span and Deflection Design Criteria:** Provide height to load deflection charts showing studs supplied conform to deflection limit scheduled and allowed per ASTM C 754.

1. Mark on chart(s) showing all major partitions scheduled conformance with criteria.
2. Submit manufacturer's certification of stud size, thickness, and spacing complying with performance requirements and selections made by Architect are correct for application shown.

- B. Product Certificates:** For each type of code-compliance certification for studs and tracks.

- C. Evaluation Reports: For embossed, high-strength steel studs and tracks, firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.
- B. Installer Qualifications: Firm and individuals with a minimum of 10 consecutive years' experience in the installation of specified products on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. ClarkDietrich.
 - c. MarinoWARE.
 - d. MBA Building Supplies.
 - e. Phillips Manufacturing Co.
 - f. SCAFCO Steel Stud Company.
 - g. Steel Construction Systems.
 - h. Telling Industries.
 - i. The Steel Network, Inc.
- B. Source Limitations: Obtain steel framing members for gypsum board assemblies from a single manufacturer acceptable to the gypsum board manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Performance Requirements: Provide metal framing assemblies that comply with manufacturer's load tables and the following design pressures and deflections:
 - 1. Typical Partitions: L/240 at 5 psf.
 - 2. Partitions Receiving Ceramic or Porcelain Tile Finishes: L/360 at 5 psf.
 - 3. Partitions Receiving Adhered Masonry, Stone Cladding, Large-Format Tile, Lath and Plaster, or Plaster Veneer: L/360 at 15 psf.
 - 4. Partitions Receiving Monitors, Televisions, or Heavy Audio/Visual Equipment: L/360 at 15 psf.

5. Where partition heights exceed stud manufacturer's recommended unbraced spans, and to resist deflection limits, provide one of the following:
 - a. Heavier stud gage, except at walls with STC ratings.
 - b. Closer stud spacing.
 - c. Deeper stud size (space permitting, as determined by Architect).
 - d. Above-ceiling bracing, anchored to structure above.
- B. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- C. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.3 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 2. Protective Coating: ASTM A 653/A 653M, G60 (Z180), or coating with equivalent corrosion resistance of ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
 1. Steel Studs and Tracks: Minimum steel tensile strength 33 KSI.
 - a. Minimum Base Metal Thickness: 0.0179 inches (0.45 mm) (25 gage) unless otherwise indicated or required to comply with span and deflection design criteria, before application of protective coating.
 - b. Depth and Spacing: As indicated on Drawings unless otherwise indicated or required to comply with span and deflection design criteria.
 2. Embossed / Dimpled Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks. Minimum steel tensile strength 50 KSI.
 - a. Minimum Base Metal Thickness: 0.0147 inches (0.373 mm) unless otherwise indicated or required to comply with span and deflection design criteria, before application of protective coating.
 - b. Depth: 3-5/8 inches (92.1 mm) unless otherwise indicated or required to comply with span and deflection design criteria.
- C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Deflection Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 2 inches (51-mm) minimum vertical movement unless otherwise indicated.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.; Deflex Clips.
 - 2) ClarkDietrich Building Systems, "Fast Top" clips, 0.064 inches (1.63 mm) thick, used in conjunction with 0.033 inch (0.8 mm) thick deep leg track.
 - 3) Marino / WARE WSC-DEFLEX Series slide clips, used in conjunction with 0.033 inch (0.8 mm) thick deep leg track.
 - 4) Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.
 2. Single Deep-Leg Track System: ASTM C645 top track with 4 inches (102 mm) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
 3. Double-Track System: ASTM C645 top outer tracks, inside track with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above and allowing 2 inches (51 mm) minimum vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Firestop Tracks: Provide the following as required to accommodate anticipated floor or roof structure deflection:
1. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 2 inches (51 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) CEMCO; California Expanded Metal Products Co.; FAS Track.
 - 2) MarinoWARE; FAS Track 1000.
 - 3) Perfect Wall, Inc.; The System Slotted Deflection Track.
 - 4) SCAFCO Steel Stud Company; SCAFCO Slotted Leg Track System.
 - 5) Steel Construction Systems; Steel-Con Slotted Leg Track System.
- E. Manufactured Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
1. Steel Sheet: ASTM A653/A653M and ASTM C645.
 - a. 0.068 inch (1.73 mm) and 0.053 inch (1.34 mm): Grade 50 with a minimum yield point of 50,000 psi (345 MPa).
 - b. 0.043 inch (1.09 mm) and 0.033 inch (0.84 mm): Grade 33 with a minimum yield point of 33,000 psi (228 MPa).

- c. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized, unless otherwise indicated.
- 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. ProX Headers as manufactured by Brady Construction Innovations, Inc.
 - b. RedHeader RO as manufactured by ClarkDietrich Building Systems.
- F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated and with Owner authorization.
 - 1. Minimum Base-Metal Thickness: 0.0428 inch (1.087 mm) (18 gage).
- G. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) (16 gage) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 1-1/2 inches (38 mm).
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm) (25 gage).
 - 2. Depth: 7/8 inch (22.2 mm).
- I. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
 - 1. Configuration: Asymmetrical or hat shaped, with face attached to single flange by a slotted leg (web) or attached to two flanges by slotted or expanded metal legs.
- J. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) (16 gage) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 3/4 inch (19 mm).
 - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm) (20 gage).
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- K. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.0179 inch (0.455 mm) (25 gage), and depth required to fit insulation thickness indicated.

2.4 SUSPENSION SYSTEMS

- A. Primary Suspension Members for Ceilings:
 - 1. General: Size and provide ceiling support components to comply with ASTM C754.

- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- C. Hanger Attachments to Concrete:
 - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 or AC308 as appropriate for the substrate.
 - a. Material: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
 - 2. Power-Actuated Anchors: Not Permitted.
- D. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- E. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- F. Rod Hangers: ASTM A 510 (ASTM A 510M), mild carbon steel.
 - 1. Diameter: 1/4-inch (6-mm).
 - 2. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
- G. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch (1.367 mm) (16 gage) and minimum 1/2-inch- (13-mm-) wide flanges.
 - 1. Depth: 2-1/2 inches (64 mm).
- H. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) (16 gage) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 - 2. Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm) (25 gage).
 - b. Depth: 1-5/8 inches (41 mm).
 - 3. Embossed Steel Studs and Tracks: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.0190 inch (0.483 mm).
 - b. Depth: 1-5/8 inches (41 mm).
 - 4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.0179 inch (0.455 mm) (25 gage).
 - 5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
 - a. Configuration: Asymmetrical or hat shaped.
- I. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock. Provide minimum 8-gage hanger wire if spacing exceeds 3 ft. by 3 ft, or 9 sq. ft. of ceiling area.

1. Single-Source Responsibility: To ensure compatibility and proper interface, all grid suspension system components shall be produced or supplied by a single manufacturer.
2. Main Beams: Double-web construction, minimum 0.0179 inch prior to protective coating (ASTM C645), and hot dipped galvanized per ASTM A653.
3. Primary Cross Tees: Double-web steel construction, minimum 0.0179 inch prior to protective coating (ASTM C645), and hot dipped galvanized (minimum G40) per ASTM A653.
4. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong Ceiling & Wall Solutions; Drywall Grid Systems.
 - b. Rockfon (Rockwool International); 640/660 Drywall Ceiling Suspension.
 - c. USG Corporation; Drywall Suspension System.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Floor Track Seal: Provide the following where indicated:
 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- C. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- D. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), non-perforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
 - b. Grabber Construction Products; Acoustical Sealant GSC.
 - c. Pecora Corporation; AC-20 FTR.
 - d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
 - e. USG Corporation; SHEETROCK Acoustical Sealant.
 2. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Spray-Applied Fire Protection Materials:
 - 1. Before spray-applied fire protection materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
 - 2. After spray-applied fire protection materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.
 - 1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
 - 2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
 - 3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
 - 4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.
- F. Installation Tolerances: Install each steel partition, soffit, and ceiling framing and furring members to comply with the following:
 - 1. Variation in Level, Plumb, and True to Line: Maximum 1/8 inch (3 mm) in 10 feet (1:960).
 - 2. Variation in Plane of Adjacent Fastening Surfaces: Not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
 - 3. Variation in Framing and Furring Spacing: Not more than 1/8 inch (3 mm).

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Construction: 16 inches (406 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.
 - 2. Multilayer Construction: 16 inches (406 mm) o.c., unless otherwise indicated or required to comply with span and deflection design criteria.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - a. Use deflection clip system, double track system, or proprietary deflection track at all locations except fire rated partitions.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend both jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 6. Minimum Base Metal Stud Thickness for Partitions Scheduled to Receive:
 - a. Paint or Wallcovering: Provide minimum thickness as follows:
 - 1) Non-Embossed Studs: 0.0269 inches (0.683 mm) (22 ga.) studs.
 - 2) Embossed Studs: 0.019 inches (0.483 mm) thick studs.
 - b. Tile Finish: Provide minimum thickness as follows:
 - 1) Non-Embossed Studs: 0.0296 inches (0.752 mm) (20 ga.) studs.
 - 2) Embossed Studs: 0.019 inches (0.483 mm) thick studs.
 - c. Cementitious Backer Units: Provide minimum thickness as follows:
 - 1) Non-Embossed Studs: 0.0296 inches (0.752 mm) (20 ga.) studs.
 - 2) Embossed Studs: 0.019 inches (0.483 mm) thick studs.
 - d. Bumper or Guard Rails: Provide minimum thickness as follows:
 - 1) Non-Embossed Studs: 0.0296 inches (0.752 mm) (20 ga.) studs.
 - 2) Embossed Studs: 0.019 inches (0.483 mm) thick studs.
 - e. Equipment: Where wall mounted equipment, woodwork, and casework items are indicated or elsewhere as shown on Drawings, provide minimum thickness as follows:
 - 1) Non-Embossed Studs: 0.0296 inches (0.752 mm) (20 ga.) studs.
 - 2) Embossed Studs: 0.019 inches (0.483 mm) thick studs.
 7. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 8. STC-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Direct Furring: Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 1. Hangers: 48 inches (1219 mm) o.c.
 2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
 3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

- E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- F. Installation Tolerances:
 - 1. Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
 - 2. Where sprinkler heads, diffusers, and speakers are arranged in alignment, variation from exact alignment shall not vary more than 1/2-inch (13-mm) either side of centerline through various element openings.

3.6 REINFORCEMENT FOR WALL-MOUNTED ITEMS

- A. See Section 06 10 53 "Miscellaneous Rough Carpentry" for the list of items requiring fire retardant treated plywood backing or solid wood blocking.
- B. Heavy-Duty Applications: Where wood blocking or plywood is not permitted by Authorities Having Jurisdiction, utilize one of the following:
 - 1. Galvanized steel plate not less than 0.0538-inch (1.367-mm) (16 gage) base-metal thickness by 4 inches (100 mm) wide.
 - 2. Minimum 3-5/8 inches (92.1 mm) un-punched wide flange cold-formed metal framing stud not less than 0.0538-inch (1.367-mm) (16 gage) base-metal thickness. Notch studs so that backing stud will be flush with exterior face of primary stud.
 - 3. Backing plates not provided with fixtures and equipment shall be long enough to span across a minimum of 3 studs unless otherwise indicated.

END OF SECTION

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SECTION 09 24 23

CEMENT STUCCO

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior vertical cement plasterwork (stucco).
 - 2. Horizontal cement plasterwork (stucco) for exterior soffits.
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support lath and cement plaster soffits.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.

1.4 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
 - a. Size: 100 sq. ft. (9 sq. m) in surface area.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 FIELD CONDITIONS

- A. Comply with ASTM C926 requirements.
- B. Exterior Plasterwork:
 - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
 - 2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
 - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.
- C. Warm Weather Requirements:
 - 1. Protect plaster against uneven and excessive evaporation, and from strong flows of dry air, both natural and artificial.
 - 2. Apply and cure plaster as required by climatic and job conditions to prevent dryout during cure period.
 - 3. Provide suitable coverings, moist curing, barriers to deflect sunlight and wind, or combinations of techniques as required.
- D. Protect contiguous work from soiling and moisture deterioration caused by plastering. Provide temporary covering and other provisions necessary to minimize harmful spattering of plaster on other work.

PART 2 - PRODUCTS

2.1 METAL LATH

- A. Expanded-Metal Lath: ASTM C847, cold-rolled carbon-steel sheet with ASTM A653/A653M, G60 (Z180), hot-dip galvanized-zinc coating.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
 - b. CEMCO.
 - c. Clark Dietrich.
 - d. MarinoWARE.
 - e. Phillips Manufacturing Co.
 - 2. Diamond-Mesh Lath: Flat 3.4 lb/sq. yd. (1.8 kg/sq. m).

2.2 ACCESSORIES

- A. General: Comply with ASTM C1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
 - b. CEMCO.
 - c. Clark Dietrich.
 - d. MarinoWARE.
 - e. Phillips Manufacturing Co.
 - 2. Casing Beads: Fabricated from zinc, square-edged style; with expanded flanges.
 - 3. Control Joints: Fabricated from zinc; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
 - 4. Expansion Joints: Fabricated from zinc; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
 - 5. Two-Piece Expansion Joints: Fabricated from zinc; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch (6 to 16 mm) wide; with perforated flanges.
 - 6. Soffit Vents: Fry Reglet, profile as selected by Architect.

2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in cement plaster.
- C. Fasteners for Attaching Metal Lath to Substrates: ASTM C1063.
- D. Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter unless otherwise indicated.

2.4 PLASTER MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I.
 - 1. Color for Finish Coats: White.
- B. Lime: ASTM C206, Type S; or ASTM C207, Type S.
- C. Sand Aggregate: ASTM C897.
 - 1. Color for Job-Mixed Finish Coats: White.

2.5 PLASTER MIXES

- A. General: Comply with ASTM C926 for applications indicated.
 - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Job-Mixed Finish-Coat Mixes:
 - 1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and 3/4 to 1-1/2 parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare smooth, solid substrates for plaster according to ASTM C926.

3.3 INSTALLING METAL LATH

- A. Metal Lath: Install according to ASTM C1063.
 - 1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
 - 2. Flat-Ceiling and Horizontal Framing: Install flat-diamond-mesh lath.

- a. Provide attachment at 4-inches on center along framing supports spaced no greater than 24-inches on center.
3. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.4 INSTALLING ACCESSORIES

- A. Install according to ASTM C1063 and at locations indicated on Drawings.
- B. Control Joints: Locate as approved by Architect for visual effect and as follows:
 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
 - b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).
 2. At distances between control joints of not greater than 12 feet (3.6 m) o.c.
 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 1-1/2:1.
 4. Where control joints occur in surface of construction directly behind plaster.
 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
 6. Wire tie control joints continuously to metal lath on both sides of joint.

3.5 PLASTER APPLICATION

- A. General: Comply with ASTM C926.
 1. Do not deviate more than plus or minus 1/4 inch in 10 feet (6 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10-foot (3-m) straightedge placed on surface.
 2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch (19-mm) total thickness, as follows:
 1. Portland cement mixes.
- C. Ceilings and Soffits; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork and having 3/4-inch (19-mm) total thickness for metal lath on concrete, as follows:
 1. Portland cement mixes.
- D. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.

- E. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

3.6 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.7 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Sound-attenuation blanket insulation.
4. Texture finishes.

B. Related Requirements:

1. Section 06 16 43 "Gypsum Sheathing" for gypsum sheathing for exterior walls.
2. Section 09 21 16 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
3. Section 09 22 16 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification:

1. Trim Accessories: Full size Sample in 12 inch (300 mm) long length for each trim accessory indicated.
2. Textured Finishes: Maximum 8-inch by 10-inch (200 mm by 250 mm) for each textured finish indicated and on same backing indicated for work.

1.3 DELIVERY, STORAGE AND HANDLING

- A.** Store materials inside under cover and keep dry and protected against weather, condensation, direct sunlight, construction traffic, and potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- A.** Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

1. Do not install interior gypsum panels and products until installation areas are enclosed and conditioned.

- B. Room Temperatures: Maintain minimum 40 degrees F (4 degrees C). For adhesive attachment and finishing of gypsum board, maintain minimum 50 degrees F (10 degrees C) for 48 hours before application and continuously after until dry. Do not exceed 95 degrees F (35 degrees C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.
- D. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide gypsum board products from one of the following:
 - 1. American Gypsum.
 - 2. CertainTeed Corporation.
 - 3. Continental Building Products, LLC.
 - 4. Georgia-Pacific Gypsum LLC.
 - 5. National Gypsum Company.
 - 6. USG Corporation.
- B. Source Limitations:
 - 1. Panel Products: Obtain each type of gypsum board and other panel products from single manufacturer.
 - 2. Finishing Materials: To the extent possible, obtain finishing materials from same manufacturer supplying gypsum board products. When not possible, obtain materials from manufacturer acceptable to gypsum board manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire Test Response Characteristics: For fire resistance rated assemblies that incorporate nonload bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.
- B. STC Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.3 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

- A. Gypsum Wallboard: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 - f. USG Corporation.
 - 2. Thickness: 5/8-inch (15.9 mm).
 - 3. Long Edges: Tapered and featured (rounded or beveled) for prefilling.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 - f. USG Corporation.
 - 2. Thickness: 5/8-inch (15.9 mm).
 - 3. Long Edges: Tapered.
- C. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 - f. USG Corporation.
 - 2. Thickness: 1/4-inch (6.4 mm).
 - 3. Long Edges: Tapered.

- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 - f. USG Corporation.
 2. Thickness: 1/2-inch (12.7 mm).
 3. Long Edges: Tapered.
- E. Mold Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture and mold resistant core and paper surfaces.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Continental Building Products, LLC.
 - d. Georgia-Pacific Gypsum LLC.
 - e. National Gypsum Company.
 2. Core: 5/8-inch (15.9 mm), Type X.
 3. Long Edges: Tapered.
 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- F. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. American Gypsum; 5/8" M-Bloc® AR Type X with Mold & Moisture Resistance.
 - b. CertainTeed Gypsum; CertainTeed Extreme Abuse Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology.
 - c. National Gypsum Company; Gold Bond® Hi-Abuse® XP® Gypsum Board.
 - d. PABCO Gypsum; PABCO ABUSE CURB®.
 2. Core: 5/8-inch (15.9 mm), Type X.
 3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
 5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 6. Long Edges: Tapered.
 7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

- G. Impact-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. American Gypsum; 5/8" M-Bloc® IR Type X with Mold & Moisture Resistance. 3233
 - b. CertainTeed Gypsum; CertainTeed Extreme Impact Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology. 3133
 - c. National Gypsum Company; Gold Bond® Hi-Impact® XP® Gypsum Board. 3133
 - d. PABCO Gypsum; PABCO® Impact Resistant. 2133
 2. Core: 5/8-inch (15.9 mm), Type X.
 3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
 4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
 5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
 6. Hard-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements according to test in Annex A1.
 7. Long Edges: Tapered.
 8. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TILE BACKING PANELS

- A. Glass Mat, Water Resistant Backing Board: ASTM C 1178/C 1178M, with standard edges.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
 2. Core: 5/8-inch (15.9 mm), Type X.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C1325 Type A, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. FinPan, Inc; Util-A-Crete Concrete Backer Board.
 - b. National Gypsum Company; PermaBase® Cement Board.
 - c. USG Corporation; DUROCK Cement Board.
 2. Thickness: 5/8 inch (15.9 mm).
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 ACOUSTICAL ACCESSORIES

- A. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corporation; NoiseReducer™.
 - b. Johns Manville; a Berkshire Hathaway company; Formaldehyde-free™ Unfaced thermal and acoustical batts.
 - c. Knauf Insulation; EcoBatt® Insulation.
 - d. Owens Corning; EcoTouch® Insulation.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
- B. Sound-Absorption Board: ASTM C612, flexible fiberglass board with black mat facing adhered to one surface, passing ASTM E136 for combustion characteristics.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Knauf Insulation; Black Acoustical Board Insulation.
 - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 - 4. Nominal Density: 3 lb/cu. ft. (48 kg/cu. m).
- C. Electrical J-Box Putty Pads: Preformed, moldable putty pads formulated to maintain the performance of acoustically rated wall assemblies by sealing penetrations including common electrical outlets boxes, phone outlet boxes, electrical switches, HVAC ducts, and plumbing connections.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ATS Acoustics; ATS Acoustics Putty Pads.
 - b. The Soundproofing Company Inc.; Acoustical Putty Pads.
 - c. QuietRock; QuietPutty.
- D. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
 - b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
 - c. QuietRock; QuietSeal Pro.
 - d. Specified Technologies, Inc.; SpecSeal Smoke 'N' Sound Sealant.
 - e. Tremco Incorporated; Tremco Acoustical Sealant.
 - f. USG Corporation; SHEETROCK Acoustical Sealant.
 - 2. Colors of Exposed Acoustical Joint Sealants: White.

2.7 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved Edge Cornerbead: With notched or flexible flanges.
 - 3. Expansion (Control) Joints:
 - a. Products: Subject to compliance with requirements, provide the following:
 - 1) ClarkDietrich; #93 Zinc Control Joint (ZNCJ).
 - 4. Fire-Rated Expansion (Control) Joints: Composite control joint with intumescent tape factory applied to back of control joint on one side.
 - a. Products: Subject to compliance with requirements, provide the following:
 - 1) ClarkDietrich; FAS-093X Fire Rated Control Joint.
- B. Extruded Aluminum Trim Accessories: Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5, of profiles and dimensions indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corporation.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - 2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
 - 3. Finish: Corrosion resistant primer compatible with joint compound and finish materials specified.
- C. Continuous Corner: Extruded Aluminum; continuous integral fin for surface contact with gypsum board; 7/8 inch (22 mm) wide, tapered to edge; punched with holes staggered to accept screw fastening. Prime with corrosion resistant primer.
 - 1. Basis of Design: Pittcon Softforms SO-HSE-90; Subject to compliance with requirements, provide basis of design or comparable by one of the following:
 - a. Fry Reglet Corporation.
 - b. Pittcon Industries.
 - c. Schluter.
- D. Fire-Rated Reveal Backer: 0.0359 inch (0.912 mm) thick, ASTM A653/A653M, hot-dip galvanized, ASTM C645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire-rated partitions.

1. Products: Subject to compliance with requirements, provide the following:
 - a. ClarkDietrich; BlazeFrame® "FSB" (Flat Strap Backer).

2.8 JOINT TREATMENT MATERIALS

A. Joint Treatment Materials: Comply with ASTM C 475/C 475M.

1. Joint Tape:
 - a. Interior Gypsum Board: Paper.
 - b. Tile Backing Panels: Recommended by panel manufacturer.
2. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 - a. Prefilling: At open joints rounded, and damaged surface areas, use setting type taping compound.
 - b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting type compound.
 - 1) Use setting type compound for installing paper faced metal trim accessories.
 - c. Fill Coat: For second coat, use drying type, all purpose compound.
 - d. Finish Coat: For third coat, use drying type, all purpose compound.
 - e. Skim Coat: For final coat of Level 4 finish (at all exposed surfaces), use drying type, all purpose compound
3. Joint Compound for Tile Backing Panels:
 - a. Glass Mat, Water Resistant Backing Panel: Recommended by backing panel manufacturer.
 - b. Cementitious Backer Units: Recommended by backer unit manufacturer.
 - c. Water Resistant Gypsum Backing Board: Use setting type taping compound and setting type, sandable topping compound.

2.9 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 1. Adhesives shall have a VOC content of 50 g/L or less.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

2.10 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.

- B. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. National Gypsum Company.
 - c. USG Corporation.
 - 2. Primer: Recommended by textured finish manufacturer.
 - 3. Texture: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow metal frames and support framing for compliance with requirements and conditions affecting performance of the work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation after correcting unsatisfactory conditions.

3.2 INSTALLATION OF ACOUSTICAL ACCESSORIES

- A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- B. Install electrical box putty pads after gypsum panels have been installed on one side of framing. Comply with manufacturer's instructions.
- C. Acoustical Sealant:
 - 1. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant.
 - 2. Install acoustical sealant at both faces of partitions at perimeters and through penetrations.
 - 3. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

3.3 INSTALLATION AND FINISHING PANELS, GENERAL

- A. Installation Standard: Comply with ASTM C840.

- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 inch to 3/8 inch (6.4 mm to 9.5 mm) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to nonload bearing partitions at structural abutments. Provide 1/4 inch to 1/2 inch (6.4 mm to 12.7 mm) wide spaces at locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies:
 - 1. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations.
 - 2. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.4 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
1. Wallboard Type: As indicated on Drawings.
 2. Type X: As indicated on Drawings and for fire-resistance rated assembly.
 3. Flexible Type: For laminating over existing textured finishes, when approved by Owner.
 4. Ceiling Type: As indicated on Drawings.
 5. Mold Resistant Type: As indicated on Drawings.
 6. Type C: As indicated on Drawings.
 7. Glass Mat Interior Type: As indicated on Drawings.
- B. Single Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire resistance rated assembly.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire resistance rated assembly.
 3. On Z shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
 5. On partitions/walls with thin set ceramic tile and similar rigid applied wall finishes install gypsum board:
 - a. In dry locations at toilet rooms and other areas, install tile backer board to comply with ASTM C 840.
 - b. In wet locations at showers, tubs, and similar areas, install tile backer board and treat joints according to manufacturer's written recommendations.
- C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints one framing member, 16 inches (400 mm) minimum, from parallel base layer joints, unless otherwise indicated or required by fire resistance rated assembly.
 2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face layer joints offset at least one stud or furring member with base layer joints unless otherwise indicated or required by fire resistance rated assembly. Stagger joints on opposite sides of partitions.
 3. On Z shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.5 INSTALLATION OF TILE BACKING PANELS

- A. Glass Mat, Water Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4 inch (6.4 mm) gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

3.6 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Maintain fire ratings of assemblies at control joints. Install control joints according to ASTM C840 and as follows:
 1. Partitions: Install control joints:
 - a. no greater than 30 feet (9 m) on center where a partition runs in an uninterrupted straight plane;
 - b. at both corners of openings in wall planes, above and below opening, where width of opening is 6 feet (1.8 m) or greater, or where ratio of width to height of wall area above or below opening exceeds 4:1;
 - c. at all spliced joints of vertical studs;
 - d. at other locations indicated on Drawings.
 2. Ceilings: Install control joints:
 - a. no greater than 30 feet (9 m) on center and with total area not to exceed 900 sq. ft. (81 sq. m);
 - b. where sections of "A", "L", "O", "U", "T" and "X" shaped ceiling areas or furr-down areas intersect;
 - c. at other locations indicated on Drawings.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. Bullnose Bead: Use where indicated on Drawings.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where edge trim can only be installed after gypsum board is installed.
 5. U-Bead: Use at exposed panel edges not intended to receive joint compound.
 6. Curved-Edge Cornerbead: Use at curved openings.

- D. Aluminum Trim: Maintain fire ratings of assemblies at aluminum trim. Install in locations indicated on Drawings.

3.7 FINISHING GYPSUM BOARD

- A. Gypsum Board Assemblies: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
 - 1. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 0: Prohibited except for temporary construction only. Do not use in areas where fire ratings or smoke control are required.
 - a. No taping, finishing, or accessories required.
 - 2. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - a. Joints: Tape set in joint compound.
 - b. Interior Angles: Tape set in joint compound.
 - c. Surface: Tool marks and ridges acceptable. Surface free of excess joint compound.
 - 3. Level 2: Where panels that are substrate for ceramic or porcelain tile or acoustical tile; garage, warehouses, and storage areas
 - a. Joints: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
 - b. Interior Angles: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
 - c. Accessories: Shall be covered to one separate coat of joint compound.
 - d. Fasteners: Shall be covered by one separate coat of joint compound.
 - e. Surface: Surface shall be free of excess joint compound. Tool marks and ridges acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
 - 4. Level 3: Mechanical Rooms, Electrical Rooms, and similar spaces.
 - a. Joints: Taped as in Level 2, then covered with one separate coat of joint compound.
 - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
 - c. Accessories: Shall be covered by two separate coats of joint compound.
 - d. Fasteners: Shall be covered by two separate coats of joint compound.
 - e. Surface: Joint compound shall be smooth and free of tool marks and ridges.

5. Level 4: Panel surfaces exposed to view unless otherwise indicated, including but not limited to light texture finishes, and flat paint.
 - a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
 - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
 - c. Accessories: Shall be covered by three separate coats of joint compound.
 - d. Fasteners: Shall be covered by three separate coats of joint compound.
 - e. Surface: Joint compound shall be smooth and free of tool marks and ridges.
6. Level 5: Provide At panel surfaces flooded with natural or artificial light, and panels scheduled to receive wallcovering, semi-gloss paint, or gloss paint finish, and elsewhere as indicated on Drawings.
 - a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
 - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
 - c. Accessories: Shall be covered by three separate coats of joint compound.
 - d. Fasteners: Shall be covered by three separate coats of joint compound.
 - e. Surface: A thin skin coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.

E. Glass Mat Faced Panels: Finish according to manufacturer's written instructions.

F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.8 TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 PARTITION IDENTIFICATION

- A. Wall Identification: Permanently label all fire-rated walls and smoke partition assemblies with the partition identification as defined below using lettering not less than 3 inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.

1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
2. Partition Identification Text: Apply the following according to partition ratings on Drawings, and as acceptable to authorities having jurisdiction:
 - a. SMOKE PARTITION – PROTECT ALL OPENINGS.
 - b. 1-HOUR SMOKE BARRIER – PROTECT ALL OPENINGS.
 - c. 1-HOUR FIRE PARTITION – PROTECT ALL OPENINGS.
 - d. 1-HOUR FIRE BARRIER – PROTECT ALL OPENINGS.
 - e. 2-HOUR FIRE WALL – PROTECT ALL OPENINGS.
 - f. 2-HOUR FIRE BARRIER – PROTECT ALL OPENINGS.
 - g. 3-HOUR FIRE WALL – PROTECT ALL OPENINGS.

3.10 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other nondrywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 30 00

TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Porcelain tile.
 - 2. Ceramic tile.
 - 3. Tile backing panels.
 - 4. Waterproof membrane.
 - 5. Crack isolation membrane.
 - 6. Metal edge strips.

1.2 DEFINITIONS

- A. Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1, ANSI A137.2, and ANSI A137.3 apply to the work.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, ANSI A108.17, and ANSI A108.19 which are contained in its Specifications for Installation of Ceramic Tile.
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.
- E. High Performance Tile Grout: Factory prepared grouting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.
- F. Improved Modified Dry Set Mortar (Thinset): Modified Dry Set Mortar with a minimum bond strength of 400 psi to impervious ceramic tile.
- G. Large Format Tile (LFT): Any tile material with a least horizontal dimension of 15 inches or more.
- H. Large and Heavy Tile (LHT): Any tile material weighing 5 lbs./sq. ft. or greater, or a tile with a least horizontal dimension of 15 inches or more.

- I. Modified Dry Set Mortar for Large and Heavy Tile (LHT): Also referenced as medium bed mortar, is a modified dry set mortar formulated to have a bond coat thickness between 3/32 inch (2.4 mm) and 1/2 inch (13 mm) after tile embedment and declared as an "LHT" setting material by the manufacturer based on these characteristics.
- J. Modified Dry Set Mortar (Thinset): A factory prepared setting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

- A. Product Data: Technical data for each type tile, mortar and grout, under tile membranes, and installation methods.
- B. Samples for Verification:
 - 1. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required.
 - 2. Size: Maximum 8 by 10 inches (200 by 250 mm) square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed work.
 - 3. Full size units of each type of trim and accessory.
 - 4. Metal edge strips in 6 inch (150 mm) lengths.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit data for Installer.
- B. Master Grade Certificates: Submit certificates for each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: Submit certificates for each type of product stating grade, kind, and identification mark.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile and Trim Units: Furnish quantity of full size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of mud walls, membranes, and large format tile.
- B. Mockups: Build mockups to verify selections and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Build a 4 foot square mockup of each type of floor tile installation where directed.
 2. Build 4 foot square mockup of each type of wall tile installation where directed.
 3. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.
- B. Maintain temperatures at 50 degrees F or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.
- C. Critical Lighting: Install tile after permanent lighting is installed for maximum opportunity to reduce undesirable shadows.
 1. Where permanent lighting cannot be installed prior to tile installation, provide temporary lighting mimicking permanent lighting effects prior to the installation of tile. In addition, use specialized installation techniques joints to minimize undesirable shadows.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 - 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
 - 2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following specified products from a single manufacturer:
 - 1. Metal edge strips and cove base.
 - 2. Waterproof membrane.
 - 3. Crack isolation membrane.
 - 4. Cementitious backer units.

2.2 PERFORMANCE REQUIREMENTS

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, referenced ANSI standards, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and specified requirements.
- C. Floor and Wall Surface for Large Heavy Tile: Finish floor and wall surfaces to specified tolerances, according to ASTM E 1155 (ASTM E 1155M), for randomly trafficked floor surface and wall surfaces receiving large format or heavy thin porcelain or ceramic tile, large format or heavy thin stone tile, and where very flat surface is required or recommended to accommodate large tiles:
 - 1. Specified Overall Values (SOV):
 - a. Flatness: F_F 50 (1/8 inch in 10 feet).
 - 2. Minimum Local Values (MLV):
 - a. Flatness: F_F 35 (1/4 inch in 10 feet).
 - 3. Longest Tile Side Dimension: ASTM E 1155 (ASTM E 1155M).

- a. Longest Side Tile Dimension, Up to 16 inches (400 mm): F_F 60 (1/8 inch in 10 feet).
 - 1) Grout Joint Width: 1/8 inch (3 mm).
 - b. Longest Side Tile Dimension, Greater than 16 inches to less than 36 inches (400 mm to 900 mm): F_F 60 (1/8 inch in 10 feet)
 - 1) Grout Joint Width: 1/8 inch (3 mm).
 - c. Longest Side Tile Dimension, 36 inches and over (900 mm): F_F 60 (1/8 inch in 10 feet).
 - 1) Grout Joint Width: 1/8 inch (3 mm) (1/8 inch in 10 feet).
 - d. Location: Floors scheduled to receive large format tile, large heavy tile, or stone, set in high performance mortar bed.
- D. Dynamic Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with values determined by testing identical products per ANSI A 326.3: Minimum 0.42 DCOF.
- E. Load Bearing Performance: For ceramic tile installed on walkway surfaces, provide installations rated for loadbearing performance level based on testing assemblies according to ASTM C 627 that are representative of those indicated:
- 1. Extra Heavy: Passes cycles 1 through 14.
 - 2. Heavy: Passes cycles 1 through 12.
 - 3. Moderate: Passes cycles 1 through 10.
 - 4. Light: Passes cycles 1 through 6.
- F. Accessibility Requirements: Comply with applicable requirements.
- 1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
 - 2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.3 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory mounted tile, provide back or edge mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back or edge mounted tile assemblies unless tile manufacturer specifies in writing that tile type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.4 TILE PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide tile products by the basis of design manufacturer indicated on the Drawings, or one of the following subject to approval by the Architect:
 1. Crossville Ceramics.
 2. Daltile.
 3. Interceramic.
 4. High Style Stone & Tile
 5. Pantheon Tile.
- B. Certification: Tile certified by the Porcelain Tile Certification Agency.
- C. Pressed Floor Tile: Through-body porcelain.
 1. Face Size: As indicated on Drawings.
 2. Face Size Variation: Rectified.
 3. Thickness: 3/8 inch (9.5 mm) unless otherwise indicated.
 4. Dynamic Coefficient of Friction: Not less than 0.42.
 5. Basis of Design: As indicated in Interior Finish Schedule on Drawings
- D. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
 1. Base Cap: Surface bullnose, module size same as adjoining flat tile.
 2. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
 3. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 4. External Corners: Schluter "Indec" for all ceramic tile outside corners.
 5. Internal Corners: Field butted square corners.
 6. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from 1/2 inches to 1/4 inch (12.7 to 6.4 mm) across nominal 4 inch (100 mm) dimension.
- E. Large Format Tile (LFT):
 1. Certification: Tile certified by the Porcelain Tile Certification Agency.
 2. Basis of Design Products: As indicated in Interior Finish Schedule on Drawings
 3. Face Size: As indicated in Interior Finish Schedule on Drawings.

4. Face Size Variation: Rectified.
5. Dynamic Coefficient of Friction: Not less than 0.42.
6. Grout Color: Selected by Architect.
7. Application: Floor and Wall.
8. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes selected from standard shapes.

2.5 TILE BACKING PANELS

- A. Gypsum Tile Backer Board: Glass Mat, Water Resistant Backing Board: ASTM C 1178/C 1178M, with standard edges.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
 2. Core: 5/8 inch (15.9 mm), Type X.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end to end butt joints.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C-Cure.
 - b. Custom Building Products.
 - c. Georgia-Pacific Gypsum LLC.
 - d. USG Corporation.
 2. Thickness:
 - a. 5/8 inch (16 mm) unless otherwise indicated.
 - b. Provide 1/4-inch (6 mm) thick sheets for backer board installations over solid substrates.
 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 WATERPROOF MEMBRANES

- A. Waterproof Membrane, Polyethylene Sheet Membrane and Vapor Retarder: Polyethylene faced on both sides with non-woven polypropylene fleece webbing; 0.008-inch (0.2-mm) nominal thickness, and complying with ANSI A118.10.
 1. Corners and Seals: Provide matching preformed inside corners, outside corners, preformed pipe seals, and preformed mixing valve seals.
 2. Basis of Design Product: KERDI as manufactured by Schluter Systems, L.P.

2.7 CRACK ISOLATION MEMBRANE

- A. Crack Isolation Membrane that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric Reinforced, Fluid Applied Membrane: System consisting of liquid latex rubber or elastomeric polymer and fabric reinforcement.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. H.B. Fuller Construction Products Inc. / TEC.
 - d. Laticrete International, LLC.
 - e. Mapei Corporation.
 - f. Summitville Tiles, Inc.

2.8 SETTING MATERIALS

- A. Modified Dry Set Mortar (Thinset): ANSI A118.4.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. Laticrete International, LLC.
 - d. Mapei Corporation.
 - e. Schluter Systems, L.P.
 - 2. Provide prepackaged, dry mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
- B. Improved Modified Dry Set Mortar (Thinset): ANSI A118.15.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. Laticrete International, LLC.
 - d. Mapei Corporation.
 - e. Schluter Systems, L.P.
 - 2. Provide prepackaged, dry mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.9 GROUT MATERIALS

- A. Sand Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. High Performance Tile Grout: ANSI A118.7.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Building Products.
 - b. H.B. Fuller Construction Products Inc. / TEC.
 - c. Laticrete International, LLC.
 - d. Mapei Corporation.
 - 2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
 - 3. Polymer Type: Styrene-butadiene rubber in liquid latex form for addition to prepackaged dry grout mix.
- C. Water Cleanable Epoxy Grout: ANSI A118.3.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CEG Series 100% Solids Epoxy Grout; Custom Building Products.
 - b. AccuColor EFX Epoxy Grout; H.B. Fuller Construction Products Inc. / TEC.
 - c. Spectralock Series; Laticrete Supercap, LLC.
 - d. Kerapoxy; Mapei Corporation.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 degrees F and 212 degrees F (60 degrees C and 100 degrees C), respectively, and certified by manufacturer for intended use.
 - 3. Use: Toilet rooms and food service areas (kitchens, pantries, similar).
- D. Grout for PregROUTed Tile Sheets: Same product used in factory to pregROUT tile sheets.
- E. Grout Color: As selected by Architect from manufacturer's complete line.

2.10 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex modified, portland cement based formulation provided or approved by manufacturer of tile setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless steel, ASTM A 666, 300 Series exposed edge material.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blanke Corporation.

- b. Ceramic Tool Company, Inc.
 - c. Schluter Systems, L.P.
- 2. Basis of Design Products:
 - a. Tile-to-Carpet Transitions: "Schiene" by Schluter Systems L.P.
 - b. Tile-to-Concrete Transitions: "Reno-Ramp-K" by Schluter Systems L.P.
 - c. Tile-to-VCT Transitions: "Reno-U" by Schluter Systems L.P.
 - d. Tile Edge: "Jolly" by Schluter Systems L.P.
 - e. Stair Nosing: "Trep-E" by Schluter Systems L.P.
- C. Shower Shelf: Wall shelf system consisting of 5/32 inch (4 mm) thick shelves for installation with tile on wall surfaces.
 - 1. Configuration and Size: 11-5/8 inches (295 mm) by 6-1/16 inches (154 mm) by 2-7/16 inches (62 mm) offset rectangle corner shelf.
 - 2. Material and Finish: Brushed stainless steel, Type 304.
 - 3. Basis of Design: SHELF-E Corner Shelf as manufactured by Schluter Systems.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- E. Floor Sealer: Manufacturer recommended product for sealing grout joints and that does not change color or appearance of grout.

2.11 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile setting materials, including curing compounds and substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Abrade and mechanically scarify existing concrete floor surfaces that received a steel trowel finish.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Remove coatings, including curing compounds, and other substances containing soap, wax, oil, or silicone and are incompatible with tile setting materials by using concrete grinder, drum sander, or polishing machine equipped with heavy duty wire brush.
- C. Provide concrete substrates for tile floors installed with dry set or latex portland cement mortars complying with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.
 1. Use trowelable leveling and patching compounds per tile setting material manufacturer's written instructions to fill cracks, holes, and depressions.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION

- A. Tile: Comply with TCNA Handbook for Ceramic, Glass, and Stone Tile Installation for TCNA installation methods specified in tile installation schedules.
- B. Comply with applicable requirements of the ANSI A118.3 Specifications for Installation of Ceramic Tile referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. Comply with procedures in the ANSI A118 series for tile installation standards for providing 95 percent mortar coverage:

- a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles 8 inches by 8 inches (200 mm by 200 mm) or larger.
 - c. Tile floors consisting of rib backed tiles.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Provide trim shapes where necessary to eliminate exposed tile edges.
- F. Where accent tile differs in thickness from field tile, vary setting bed thickness so tiles are flush.
- G. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- H. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 1. Ceramic Mosaic Tile: 1/8 inch (3.2 mm).
 2. Glazed Wall Tile: 1/8 inch (3.2 mm).
 3. Quarry Tile: 1/4 inch (6.4 mm).
 4. Porcelain Tile: 3/8 inch (9.5 mm)
- I. Place tile joints uniform in width, and of the minimum size recommended by tile manufacturer, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, and excess mortar or grout.
- J. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- K. Sound tile after setting. Replace hollow sounding units.
- L. Grouting: Allow tile to set for minimum of 48 hours prior to grouting.
 1. Grout tile joints.

2. Before grouting, tiles must be firmly set, paper and glue removed from face of mounted tiles, and spacers, strings, ropes, or pegs removed.
 3. Use caution when grouting to prevent damaging or scratching surface of installed tiles.
 4. Install grout with uniform color in accordance with manufacturer's recommendations and in accordance with ANSI 108.10. Pack joints full, free of pinholes, voids or low spots, before mortar takes initial set.
 5. Finish cushion edge tile even to depth of cushion. Finish square edge tile flush with surface.
- M. Expansion Joints: Provide expansion joints and other sealant filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installing tiles.
1. Install control and expansion joints in accordance with TCNA EJ171.
 2. Keep expansion and control joints free of adhesives and grout. Install backer rod and sealant in accordance with Section 07 92 00.
 3. Fill joint around plumbing fixtures and pipe penetrations with sanitary sealants in accordance with Section 07 92 00.
 4. Where joints occur in concrete substrates, locate joints in tile surfaces directly above.
 5. Install control joints where tile abuts restraining surfaces including perimeter walls, curbs, columns, wall corners, and directly over cold joints and control joints in structural surfaces.
 6. Install control joints where changes occur in tile backing materials.
 7. Install control joints in floors not exceeding 20 feet (6.1 m) on center. Rake or cut control joints through setting bed to supporting slab or structure.
- N. Metal Edge Strips: Install in accordance with manufacturer's instructions, at locations indicated and as follows:
1. Where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
 2. Where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
 3. Provide metal cove base where exposed edge of tile flooring abuts metal-clad wall panels at interior of walk-in coolers.
- O. Floor Sealer: Apply floor sealer to epoxy grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- ### 3.4 INSTALLATION OF TILE BACKING PANELS
- A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 INSTALLATION OF WATERPROOF MEMBRANE

- A. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.6 INSTALLATION OF CRACK ISOLATION MEMBRANE

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.7 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation.
 - 3. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned.
 - 4. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 5. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

3.8 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.9 FLOOR TILE INSTALLATION SCHEDULE

- A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCNA installation methods and ANSI A108 series of tile installation standards.
- B. Interior Floor Installations, Concrete Subfloor:
 - 1. Ceramic / Porcelain / Stone Tile Floor Installation – Restrooms on Concrete Slab-on-Grade: For interior floor installations of this designation, comply with the following:
 - a. Tile Type/Products: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA F115 (cementitious bond coat, with waterproof membrane bonded to concrete slab-on-grade; ANSI A108.5 and ANSI A108.6.
 - c. Bonded Waterproof Membrane: Fleece-backed polyethylene sheet, ANSI A118.10.
 - d. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - e. Grout: Chemical-resistant epoxy grout, ANSI A118.3. Seal grout.
 - 2. Ceramic / Porcelain / Stone Tile Floor Installation – General Applications where another installation method is not otherwise indicated: For interior floor installations of this designation, comply with the following:
 - a. Tile Type/Products: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA F115 / F115A (cementitious bond coat, with crack isolation membrane bonded to concrete slab-on-grade or above-ground concrete sub-floor).
 - c. Bonded Crack Isolation Membrane: ANSI A118.12
 - d. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - e. Grout: High-performance tile grout, ANSI A118.7.
- C. Interior Floor Installations, Wood Subfloor (Elevator cabs):
 - 1. Porcelain Tile Floor Installation – Wood Subfloor: For interior floor installations of this designation, comply with the following:
 - a. Tile Type/Products: Refer to Interior Finish Legend on Drawings.
 - b. Installation Method: TCNA F144 (thin-set mortar bonded to cementitious backer units over wood sub-floor).
 - c. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.
 - d. Setting Bed and Grout: ANSI A108.5.
 - e. Bond Coat: Latex-portland cement mortar, ANSI A118.4.
 - f. Grout: High-performance tile grout, ANSI A118.7.

3.10 WALL TILE INSTALLATION SCHEDULE

- A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCNA installation methods and ANSI setting-bed standards.

B. Interior Wall Installations, Masonry Walls Constructed Within Required Tolerances:

1. Ceramic / Porcelain / Stone Wall Tile Installation: For interior wall installations of this designation, comply with the following.
 - a. Tile Type: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA W202 (thin set over masonry or concrete substrates); ANSI A108.5.
 - c. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - d. Grout: High-performance tile grout, ANSI A118.7.
 - 1) Restrooms: Use Chemical-resistant epoxy grout, ANSI A118.3.

C. Interior Wall Installations, Masonry Walls Constructed Outside of Required Tolerances:

1. Ceramic / Porcelain / Stone Wall Tile Installation: For interior wall installations of this designation, comply with the following:
 - a. Tile Type: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA W211 (mortar bed bonded to masonry or concrete substrates); ANSI A108.1A, 1B, or 1C.
 - c. Flattening Mortar Bed, 3/8- inch to 1/2-inch thickness, ANSI 108.1A.
 - d. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - e. Grout: High-performance tile grout, ANSI A118.7.
 - 1) Restrooms: Use Chemical-resistant epoxy grout, ANSI A118.3.

D. Interior Wall Installations, Gypsum Board Partitions Constructed Within Required Tolerances:

1. Ceramic / Porcelain / Stone Wall Tile Installation: For interior wall installations of this designation, comply with the following:
 - a. Tile Type: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA W244C (thin-set bonded to cement backer board on minimum 20 gage metal studs); ANSI A108.11.
 - c. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.
 - d. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - e. Grout: High-performance tile grout, ANSI A118.7.
 - 1) Restrooms: Use Chemical-resistant epoxy grout, ANSI A118.3.
2. Ceramic / Porcelain / Stone Wall Tile Installation: For interior wall installations of this designation, comply with the following:
 - a. Tile Type: Refer to Interior Finish Schedule on Drawings.
 - b. Installation Method: TCNA W245 / W248 (thin-set bonded to coated glass mat water-resistant gypsum backer board on minimum 20 gage metal studs).
 - c. Coated Glass Mat Water-Resistant Gypsum Backer Units: ASTM C1178.
 - d. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - e. Grout: High-performance tile grout, ANSI A118.7.
 - 1) Restrooms: Use Chemical-resistant epoxy grout, ANSI A118.3.

- E. Interior Wall Installations, Gypsum Board Partitions Constructed Outside of Required Tolerances:
1. Ceramic / Porcelain / Stone Wall Tile Installation: For interior wall installations of this designation, comply with the following:
 - a. Tile Type: Refer to Interior Finish Legend on Drawings.
 - b. Installation Method: TCNA W222 (one-coat mortar bed bonded to solid backing); ANSI A108.1A, 1B, or 1C.
 - c. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.
-- OR --
 - d. Coated Glass Mat Water-Resistant Gypsum Backer Units: ASTN C1178.
 - e. Metal lath and Flattening Mortar Bed, 3/8- inch to 3/4-inch thickness, ANSI 108.1A.
 - f. Bond Coat: Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
 - g. Grout: High-performance tile grout, ANSI A118.7.
 - 1) Restrooms: Use Chemical-resistant epoxy grout, ANSI A118.3.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Rated and nonrated acoustical ceiling panels and suspension system.
 - 2. Ceiling panels for wet or humid areas.
 - 3. Perimeter trim.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: Technical data for each ceiling panel and grid component with installation instructions indicating special procedures, perimeter conditions requiring special attention, and seismic conditions.
- B. Shop Drawings: Submit grid layout and related dimensioning, splicing, junctions with adjacent work or ceiling finishes, interrelation of mechanical and electrical items related to system.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- (150-mm-) long Samples of each type, finish, and color.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificate: Submit manufacturer's certification that suspension system is capable of supporting light fixtures, grilles and acoustical panels.
- B. Delegated Design Submittal: Submit for seismic restraints for ceiling systems including design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension system members.
 2. Structural members to which suspension systems will be attached.
 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast in place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 4. Carrying channels or other supplemental support for hanger wire attachment where conditions do not permit installation of hanger wires at required spacing.
 5. Size and location of initial access modules for acoustical panels.
 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
 7. Show operation of hinged and sliding components covered by or adjacent to
- D. Product Test Reports: Submit for each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
- E. Evaluation Reports: Submit ICC-ES report for each acoustical panel ceiling suspension system and anchor and fastener type.
- F. Field quality control reports.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Acoustical Ceiling Units: Full size panels equal to 3 percent of quantity installed.
 2. Suspension System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
 3. Hold Down Clips: Equal to 2 percent of quantity installed.
 4. Impact Clips: Equal to 2 percent of quantity installed.

1.6 QUALITY ASSURANCE

- A. Qualifications:
1. Grid Manufacturer: Entity having minimum 5 years documented experience who specializes in manufacturing ceiling grids.

2. Acoustical Unit Manufacturer: Entity having minimum 5 years documented experience who specializes in manufacturing acoustical units.
 3. Installer: Entity having minimum 5 years documented experience who employs trained and experienced installers.
- B. Comply with applicable regulations regarding toxic and hazardous materials.
1. Coating Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment; and showing no mold or mildew growth when tested in accordance with ASTM D3273.
 2. Panel Based Antimicrobial Treatment: Provide acoustical panels manufactured with antimicrobial treatment in the panels.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to site and store in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.
- B. Coordinate layout and installation of acoustical ceiling units and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire suppression system components (if any) and partition system (if any).

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Acoustical Panel Standard: Provide ceiling panels complying with ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

- B. Delegated Design: Engage a qualified professional engineer to design seismic restraints for ceiling systems.
- C. Surface Burning Characteristics: Ceiling panels with surface burning characteristics complying with IBC Chapter 8 and ASTM E 1264 for Class A materials determined by testing identical products in accordance with ASTM E 84:
 - 1. Flame Spread Index: Class A according to ASTM E 1264.
 - 2. Smoke Developed Index: 50 or less.
- D. Fire Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.2 ACOUSTICAL PANELS

- A. Source Limitations:
 - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
 - 2. Suspension System: Obtain each type through one source from a single manufacturer.
- B. Manufacturer: Subject to compliance with requirements, provide ceiling panels and grid systems by one of the following:
 - 1. Acoustic Ceiling Panel:
 - a. Armstrong World Industries, Inc.
 - b. CertainTeed Corporation.
 - c. Rockfon (Roxul Inc.).
 - d. USG Interiors.
- C. Classification: Standard and fire resistance rated panels.
- D. Basis of Design Acoustical Panel Manufacturers and Products: As indicated in Interior Finish Schedule on Drawings.

2.3 METAL SUSPENSION SYSTEM

- A. Manufacturer: Subject to compliance with requirements, provide ceiling panels and grid systems by one of the following:
 - 1. Concealed and Exposed Suspension Grid:
 - a. Armstrong World Industries, Inc.
 - b. CertainTeed Corporation.
 - c. Chicago Metallic; Rockfon (Roxul Inc.).
 - d. Hunter Douglas.
 - e. USG Interiors.

- B. Metal Suspension System Standard: Provide direct hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
 - 1. High Humidity Finish: Where indicated, provide coating tested and classified for severe environment performance according to ASTM C 635/C 635M.
- C. Standard Exposed Tee Grid: ASTM C 635, nonfire rated.
 - 1. Structural Classification: Heavy duty system.
 - 2. End Condition of Cross Runners: Butt edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Commercial quality cold rolled steel with galvanized coating.
 - 5. Face Flange Width: 15/16 inch (23.5 mm)
 - 6. Exposed Finish: Baked on enamel, white satin finish.
 - 7. Products: Subject to compliance with requirements, provide one of the following:
 - a. Prelude XL by Armstrong World Industries.
 - b. Classic Stab System by CertainTeed Corp.
 - c. Donn Suspension System DX by USG Interiors, Inc.
- D. Standard Exposed Tegular Grid: ASTM C 635, nonfire rated.
 - 1. Structural Classification: Heavy duty system.
 - 2. End Condition of Cross Runners: Butt edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Commercial quality cold rolled steel with galvanized coating.
 - 5. Face Flange Width: 9/16 inch (15 mm).
 - 6. Exposed Finish: Baked on enamel, white satin finish.
 - 7. Products: Subject to compliance with requirements, provide one of the following:
 - a. Centricitee by USG Interiors, Inc.
 - b. Elite Narrow Stab by CertainTeed Corp.
 - c. Suprafine XL by Armstrong World Industries.
- E. Moisture Resistant Exposed Tee Grid: ASTM C 635, nonfire rated.
 - 1. Structural Classification: Heavy duty system.
 - 2. End Condition of Cross Runners: Butt edge type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Double web extruded aluminum components.
 - 5. Face Flange Width: 15/16 inch (23.5 mm).
 - 6. Exposed Finish: White satin paint finish.
 - 7. Products: Subject to compliance with requirements, provide one of the following:
 - a. Donn Suspension System "AX" by USG Interiors, Inc.
 - b. AL Prelude Plus by Armstrong World Industries.
 - c. 830 by Chicago Metallic Corporation.

- F. Rough Suspension: Galvanized steel carrying channels and hangers, sized and type to suit application and to rigidly secure complete acoustic unit ceiling system, with maximum deflection of $L/360$.
- G. Grid Accessories: Stabilizer bars, furring clips, splices, retention clips, and edge moldings as required to complete and compliment suspended ceiling grid system.
 - 1. Color: Match exposed grid system.
- H. Perimeter Trim: Extruded aluminum alloy 6063 trim channel, 6 inch (150 mm) wide face with 3/4 inch (19 mm) horizontal legs, straight or curved sections with special bosses formed for attachment to the tee bar connection clip or hanging clip; commercial quality, extruded aluminum, factory applied baked polyester paint.
 - 1. Color: Match exposed grid system.
 - 2. Acceptable Product:
 - a. Axiom by Armstrong.
 - b. Compásso Elite by USG.
- I. Cove Lighting Diffusers: 1/2 inch by 1/2 inch by 1/2 inch (13 mm by 13 mm by 13 mm), pressure injected, molded, white acrylic eggcrate louver diffuser.
 - 1. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - a. Artcrest Products Company, Inc.
 - b. A.L.P. Lighting Ceiling Products, Inc.
 - c. American Louver Company.
 - d. Scientific Lighting Products.

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1 Direct Hung unless otherwise indicated. Comply with seismic design requirements.
- B. Wire Hangers, Braces, and Ties: Provide wires:
 - 1. Zinc Coated, Carbon Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1 Direct Hung) will be less than yield stress of wire, but not less than 0.106 inch (2.69 mm) diameter wire.
- C. Hanger Rods: Mild steel, zinc coated or protected with rust inhibitive paint.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust inhibitive paint.
- E. Hold Down Clips: Standard hold down.
- F. Impact Clips: Impact clip system designed to absorb impact forces against acoustical panels.

- G. Acoustical Sealant: Comply with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
 - 2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll Formed, Sheet Metal Edge Moldings and Trim: Type and profile necessary for edges and penetrations that comply with design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Edge moldings shall fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
 - 2. For lay in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
 - 4. Color: Match exposed grid system.
- B. Extruded Aluminum Edge Moldings and Trim: Provide extruded aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
 - 1. Baked Enamel or Powder Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 2. Color: Match exposed grid system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut for compliance with requirements that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less than half width panels at borders unless otherwise indicated and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
 - 1. Fire Rated Assembly: Install fire rated ceiling systems according to tested fire rated design.
- B. Exposed Grid Suspension System: Suspend ceiling hangers from building's structural members:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required and, if permitted with fire resistance rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast in place hanger inserts, postinstalled mechanical or adhesive anchors, or power actuated fasteners that extend through forms into concrete.
 - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - 8. Do not attach hangers to steel deck tabs.
 - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.

10. Space hangers not more than 48 inches (1220 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Concealed Grid Suspension System: Install suspension system in accordance with ASTM C 636. Install seismic system in accordance with ASTM E 580.
1. Lay out grid system to balanced grid design with edge units no less than 50 percent of acoustical unit size.
 2. Supply hangers, inserts, or clips as necessary for installation with instructions for their correct placement.
 3. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 4. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
 5. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches (150 mm) of each corner; or support components independently.
 6. Do not eccentrically load system or produce rotation of runners.
 7. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
- D. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast in place or post-installed anchors.
- E. Edge Moldings: Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- F. Install suspension system runners to be square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- G. Acoustical Panels: Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels:
 - a. As indicated on reflected ceiling plans.
 - b. Install panels with pattern running in one direction parallel to **[long]** **[short]** axis of space.
 - c. Install panels in a basket weave pattern.
2. For square edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
3. For reveal edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal edged panels on suspension system members with box shaped flanges, install panels with reveal surfaces in firm contact with suspension system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Where round obstructions occur, provide preformed closers to match edge molding.
7. Protect lighting fixtures and air ducts according to requirements indicated for fire resistance rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), noncumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), noncumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 61 16
CONCRETE FLOOR SEALING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the following:
 - 1. Liquid applied floor sealing where scheduled.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data to indicate chemical, solvent, and detergent resistance.
 - 2. Include information for primer, sealants, waterproofing, accessories and other required components, and application instructions.
- B. Product Data, Low Emitting Materials: Submit product data for interior sealants indicating VOC content limits and emissions and description of testing or certification for site installed interior materials and products.

1.3 INFORMATIONAL SUBMITTALS

- A. Test Reports: From Testing Agency for pre-installation substrate moisture and alkalinity tests.
- B. Qualification Data: For applicator.
- C. Sample Warranty: Copy of manufacturer's warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Executed copy of Special Manufacturer's Warranty.
- B. Maintenance Data: For fluid-applied floor sealer to include in maintenance manuals. Include the following:
 - 1. Manufacturer's instructions on maintenance renewal of applied treatments.
 - 2. Protocols and product specifications for joint filing, crack repair and/or surface repair.
- C. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An installer (applicator) with minimum 5 years documented experience who is approved, trained, or certified by fluid-applied floor sealer manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
- B. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- C. Store materials in accordance with manufacturer's instructions in clean and dry location with temperature between 60 deg F and 90 deg F.
- D. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- E. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- F. Keep products away from fire or open flame.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with floor sealing manufacturer's written instructions for substrate temperature, ambient temperature, humidity, ventilation, and other conditions affecting floor sealing application.
 - 1. Do not apply floor sealing until spaces are enclosed and weatherproof; wet work in spaces is complete and dry; and overhead work, including installing mechanical systems, lighting, and athletic equipment, is complete.
- B. Conditioning Period: Begins not less than 7 days before floor sealing application, is continuous through application, and continues not less than 3 days after application.
 - 1. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- C. Ventilate area where sealing is being installed. Post and enforce no smoking and no open flame signs until sealing has cured.
- D. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during floor sealer application.

- E. Close spaces to traffic during floor sealer application and for not less than 24 hours after application unless manufacturer recommends a longer period.

1.8 WARRANTY

- A. Special Warranty: Provide written warranty signed by manufacturer warranting work to be free from defective materials and workmanship, and agreeing to replace components which fail within 2 years from date of Substantial Completion.
 - 1. Failed materials and workmanship includes spalling, cracking, and delamination.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Source Limitations: Furnish products from one manufacturer for entire Project, unless otherwise acceptable to Architect.

2.2 SUSTAINABILITY REQUIREMENTS

- A. Sealers: Comply with testing and product requirements of the California Department of Public Health Standard Method v1.2 for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

2.3 FLOOR SEALING MATERIALS

- A. Hardener and Sealer: Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Maximum VOC Content: ≤ 5 g/L.
 - 2. Subject to compliance with requirements, provide one of the following:
 - a. BASF Construction Chemicals - Building Systems; MasterKure HD 300WB.
 - b. Euclid Chemical Company (The), an RPM company; Surfhard.
 - c. Meadows, W.R., Inc.; Liqui-Hard.
 - d. NoxCrete; Duro-Nox LSC.
- B. Concrete Cleaner: Recommended by sealer manufacturer.
- C. Joint Sealant Materials: Floor Sealer Manufacturer's recommended sealant compatible with sealing system for type of service and joint condition indicated.
 - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Rezi-Weld Flex, WR Meadows.
 - b. RS 88; Metzger/McGuire.
 - c. Euco QwikJoint 300; Euclid.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer (Applicator) present, for conditions affecting performance of floor sealing including substrate moisture content.
- B. Examine areas to receive sealing for:
 - 1. Defects in substrate that may affect proper execution of floor sealing work.
 - 2. Deviations beyond allowable tolerance for concrete slab work.
 - 3. Surface curing agents or sealers that would inhibit bond.
 - 4. Surface defects such as cracks that could transfer through to finished floor sealing surface if not corrected.
- C. Do not begin sealing work until concrete has cured a minimum of 90 days.
- D. Do not begin work until unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit floor sealing manufacturer's written acceptance of the concrete floor substrate as represented by moisture and alkalinity testing.
- C. Submit copies of test reports and floor sealing manufacturer's written acceptance of substrate conditions to Owner and Architect prior to sealing installation.
- D. If test results indicate concrete subfloor is not within sealing manufacturers' acceptable range, notify Owner and Architect.

3.3 PREPARATION

- A. Prepare Substrate: Tests concrete substrate for pH, contaminants, and moisture content in accordance with manufacturer's recommendations. Ensure concrete is within manufacturers recommended limits prior to installation.
- B. Concrete Sub-Floors: Verify that concrete slabs comply with ASTM F 710.
- C. Ensure surfaces are clean and free of dirt, markings, and other foreign matter harmful to performance of concrete finishing materials. Remove surface contamination.
- D. Prepare and clean substrates according to floor sealer manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for application of floor sealer.

1. Remove projections and substances detrimental to the Work; comply with recommendations of floor sealer manufacturer for proper preparation procedures. Mask off or protect adjacent surfaces not scheduled to receive sealer.
 2. Remove residue and curing compounds with cleaner recommended by sealer manufacturer with a bristle brush or broom or mechanically abrade concrete surface to a uniform profile complying with ASTM D 4259. Do not acid etch.
 3. Patch holes in existing concrete slabs with grout recommended by sealer manufacturer.
 4. Repair cracks, divots and surface imperfections according to manufacturer's instructions.
 5. Vacuum to remove dust and debris.
- E. Protect walls, floor openings, equipment, electrical openings, door frames, and other obstructions during installation. Cover floor and wall areas at mixing stations.

3.4 CONCRETE SEALING APPLICATION

- A. General: Mix and apply floor sealing components according to manufacturer's written instructions.
- B. Apply a minimum of 2 coats in accordance with manufacturer's recommended coverage rates.
- C. Penetrating Sealer: Spray apply sealer to comply with manufacturer's instructions except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
1. Apply sealer to produce surface without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections. Produce sharp glass lines and color breaks. Do not permit sealer to pond and dry on concrete surface. Squeegee ponding sealer to spread.
- D. Curing: Cure floor sealing materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process.

3.5 CLEANING AND PROTECTION

- A. Clean as recommended by manufacturer. Do not use materials or methods which may damage surface or surrounding construction.
1. Cleaner: Maximum VOC content shall be in accordance with applicable codes.
- B. Remove temporary covering and clean floor sealing prior to final inspection. Use cleaning materials and procedures recommended by floor sealing manufacturer.
- C. Protect finished work in accordance with Division 01 Section "Execution."

- D. Do not permit traffic over finished sealed floor surfaces.
- E. Protect sealed floor materials from damage and wear during construction operation.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements including but not limited to:
 - 1. Resilient base.
 - 2. Resilient stair accessories.
 - 3. Resilient accessories.
- B. Related Requirements:
 - 1. Division 09 Section "Preinstallation Testing for Flooring" for substrate moisture and alkalinity tests to be performed on concrete substrates.

1.2 ACTION SUBMITTALS

- A. Product Data: Technical data, installation instructions, and maintenance procedures.
- B. Samples for Verification: For resilient accessories, submit samples not less than 12 inches (300 mm) long, of each resilient accessory color and pattern specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit data for Installer.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit data for each type of floor tile to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum 5 years documented experience who employs trained or certified by manufacturer for required installation techniques and are competent in techniques required for resilient flooring accessories installation.
 - 1. Engage an installer who employs workers trained or certified by resilient accessory manufacturer for installation techniques required.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient base and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive flooring during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.

1.8 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Base: Minimum 10 linear feet for each 500 linear feet (150 linear m) or fraction thereof for each different type and color installed.
 - 2. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of stair landing tile and stair tread installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flexco.
 - 2. Johnsonite; A Tarkett Company.
 - 3. Roppe Corporation, USA.
 - 4. VPI Corporation.
- B. Basis of Design Manufacturers: As indicated in Interior Finish Schedule on Drawings.

2.2 MATERIALS

- A. Thermoset Rubber Base ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location:

- a. Straight: Provide in areas scheduled to receive carpet and elsewhere as indicated on Drawings.
 - 1) Height: 6 inches (152 mm).
 - b. Cove: Provide in areas scheduled to receive resilient flooring and elsewhere as indicated on Drawings.
 - 1) Height: 4 inches (102 mm)
 2. Thickness: 0.125 inch (3.2 mm).
 3. Lengths: Coils in 100 foot lengths. Field cut to size.
 4. Outside Corners: Job formed or preformed.
 5. Inside Corners: Job formed or preformed.
 6. Colors: As indicated in Interior Finish Schedule on Drawings.
- B. Rubber Molding Accessory:
1. Carpet edge for glue down applications.
 2. Nosing for carpet.
 3. Nosing for resilient flooring.
 4. Reducer strip for resilient flooring.
 5. Joiner for tile and carpet.
 6. Transition strips.
 7. Profile and Dimensions: As indicated.
 8. Locations: Provide rubber molding accessories in areas indicated.
 9. Colors and Patterns: As selected by Architect from manufacturer's complete line.
- C. Rubber Stair Accessories:
1. Stair Treads: ASTM F 2169.
 - a. Type: TS (rubber, vulcanized thermoset).
 - b. Class: 2 (pattern; embossed, grooved, or ribbed).
 - c. Group: 1 (embedded abrasive tape) and 2 (with contrasting color for the visually impaired).
 - d. Nosing Style: Square.
 - e. Nosing Height: Minimum 1 5/8 inches (41 mm).
 - f. Thickness: 1/4 inch (6 mm) and tapered to back edge.
 - g. Size: Lengths and depths to fit each stair tread in one piece.
 2. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
 - a. Style: Toeless, by length matching treads.
 - b. Thickness: 0.125 inch (3.2 mm).
 3. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.
 4. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.
- D. Installation Materials:
1. Trowelable Leveling and Patching Compounds: Latex modified, portland cement based formulation provided or approved by floor tile manufacturer for applications indicated.

2. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- E. Stair Tread Nose Filler: Two part epoxy compound recommended by resilient stair tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit floor covering and adhesive manufacturer's written acceptance of the concrete floor substrate as represented by moisture and alkalinity testing.
- C. Submit copies of test reports and flooring manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- D. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.
- E. Moisture Remediation: If substrates fail to meet manufacturer's recommended moisture, humidity, and alkalinity levels or ranges, provide moisture vapor emissions control system as specified in Section 09 05 63.
- F. Proceed with floor covering installation only after substrates past testing.

3.3 PREPARATION

- A. Prepare substrates according to resilient accessory manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare horizontal and vertical surfaces according to ASTM F 710.
 1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and substances incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
- C. Do not install resilient tiles, treads, and accessories until materials are the same temperature as installation space.

1. At least 48 hours in advance of installation, move resilient tile, accessories, and installation materials into spaces where they will be installed.
- D. Use stair tread nose filler, according to resilient tread manufacturer's written instructions, to fill nosing substrates that do not conform to tread contours.

3.4 INSTALLATION

- A. Resilient Base: Comply with manufacturer's written instructions for installing resilient base. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
 1. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
 2. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
 3. Do not stretch resilient base during installation.
 4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
 5. Preformed Corners: Install preformed corners before installing straight pieces.
 6. Job Formed Corners:
 - a. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - b. Form without producing discoloration (whitening) at bends.
 - c. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
 - 1) Miter or cope corners to minimize open joints.
- B. Preformed Cove Base: Comply with manufacturer's written instructions.
 1. Dry fit base. Cut and fit material to required lengths, miter cut inside and outside corners.
 2. Dry fit and cut metal cove cap prior to base installation.
 3. Scribe glue line on walls and floor at edge of base material. Apply adhesive in full spread (100% coverage on two surfaces) for full length of base material. Apply base to wall surface straight and level.
 4. Slide cove cap behind base material.
 5. Hand roll base material onto wall and floor surface, and remove bumps, ripples, and fishmouths. Remove excess adhesive.
- C. Resilient Accessories: Comply with manufacturer's written instructions for installing resilient accessories.
 1. Resilient Stair Accessories: Use stair tread nose filler to fill nosing substrates that do not conform to tread contours. Tightly adhere to substrates throughout length of each piece.
 - a. For treads installed as separate, equal-length units, install to produce a flush joint between units.

2. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning resilient accessories.
- B. Perform cleaning operations immediately after completing flooring installation:
 1. Remove adhesive and other blemishes from exposed surfaces.

END OF SECTION

SECTION 09 65 19

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile.
2. Rubber floor tile.
3. Vinyl composition floor tile.
4. Bio-Based composition floor tile.
5. Luxury vinyl floor tile.
6. Resilient terrazzo floor tile.

B. Related Requirements:

1. Section 09 05 62 "Preinstallation Testing for Flooring" for substrate moisture and alkalinity tests to be performed on concrete substrates.
2. Section 09 65 13 "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to resilient tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.
2. Review concrete substrate requirements for conditions affecting performance of flooring, including results of moisture and alkalinity tests.
3. Review locations and frequency of moisture and alkalinity tests.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product specified.

B. Sustainable Design Submittals:

1. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.

- C. Shop Drawings: Submit for each type of resilient flooring. Include floor covering layouts, edges, columns, doorways, enclosing partitions, built in furniture, cabinets, and cutouts.
 - 1. Show details of special patterns.
- D. Samples for Verification: Maximum 8 by 10 inches (200 by 250 mm) units of each color and pattern of floor tile required showing full range of variations anticipated.
 - 1. Welded Seam Samples: Submit for seamless installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6 inch by 9 inch (150 mm by 230 mm) sample applied to a rigid backing and prepared by Installer.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: From Testing Agency for pre-installation substrate moisture and alkalinity tests.
- B. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit data for each type of floor tile to include in maintenance manuals.
- B. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum 5 years documented experience who employs trained or certified by manufacturer for required installation techniques and are competent in techniques required for resilient flooring and seaming method.
 - 1. Engage an installer who employs workers trained or certified by resilient flooring manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Coordinate mockups in this Section with mockups specified in other Sections.

- a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern in locations directed by Architect.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 90 degrees F (32 degrees C).
 1. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 95 degrees F (35 degrees C), in spaces to receive floor tile during the following periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. During installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 90 degrees F (32 degrees C).
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

1.10 EXTRA MATERIALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Refer to Interior Finish Schedule on Drawings.
- B. Source Limitations:
 - 1. Tile: Obtain floor products of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
 - 2. Sheet Materials: Obtain sheet materials from same production run and of consistent quality in appearance and physical properties for each contiguous area.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire Test Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Accessibility Requirements: Comply with applicable requirements.
 - 1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
 - 2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.3 SUSTAINABLE REQUIREMENTS

- A. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
 - 1. Interior Adhesives and Chemical Bonding Compound: Comply with the testing and product requirements of the California Department of Public Health's Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
 - 2. Adhesives shall have a VOC content of 50 g/L or less.

2.4 SOLID VINYL FLOOR TILE

- A. Tile Standard: ASTM F 1700.
- B. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
 - 1. Thickness: 0.125 inch (3.2 mm).
 - 2. Size: As indicated in Interior Finish Schedule on Drawings.
 - 3. Seamless Installation Method: Chemically bonded.
 - 4. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.

2.5 RUBBER FLOOR TILE

- A. Tile Standard: ASTM F 1344.
- B. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
 - 1. Thickness: 0.125 inch (3.2 mm).
 - 2. Size: As indicated in Interior Finish Schedule on Drawings.
 - 3. Seamless Installation Method: Chemically bonded.
 - 4. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.

2.6 VINYL COMPOSITION FLOOR TILE

- A. Tile Standard: ASTM F 1066.
- B. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
 - 1. Thickness: 0.125 inch (3.2 mm).
 - 2. Size: As indicated in Interior Finish Schedule on Drawings.
 - 3. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.

2.7 BIO-BASED COMPOSITION TILE

- A. Description: Composed of polyester resin binder, fillers and pigments with colors and texture dispersed uniformly throughout its thickness.
- B. Tile Standard: Products complying with ASTM F 2982.
- C. Basis of Design Product: Refer to Interior Finish Schedule on Drawings.
 - 1. Recycled Content: Minimum 10 percent.
 - 2. Wearing Surface: Smooth.
 - 3. Thickness: 0.125 inch (3.2 mm).
 - 4. Size: 12 inches by 12 inches (305 by 305 mm).
 - 5. Colors and Patterns: As indicated by manufacturer's designations.

2.8 LUXURY VINYL FLOOR TILE

- A. Tile Standard: ASTM F 1700.
- B. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
 - 1. Thickness: 0.120 inch (3.0 mm).
 - 2. Size: As indicated in Interior Finish Schedule on Drawings.
 - 3. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.

2.9 RESILIENT TERRAZZO FLOOR TILE

- A. Resilient Terrazzo Floor Tile: Marble or granite chips embedded in flexible, thermoset polyester resin matrix; electrically nonconductive and chemical, oil, and corrosion resistive, with smooth wearing surface and factory applied, protective coating.
- B. Basis of Design Product: As indicated in Interior Finish Schedule on Drawings.
 - 1. Thickness: 0.1875 inch (4.8 mm).
 - 2. Size: As indicated in Interior Finish Schedule on Drawings.
 - 3. Seamless Installation Method: Chemically bonded.
 - 4. Colors and Patterns: As indicated in Interior Finish Schedule on Drawings.
- C. Accessories:
 - 1. Base: As indicated in Interior Finish Schedule on Drawings.
 - a. Type: Straight unless otherwise indicated.
 - 2. Metal divider strips.

2.10 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex modified, portland cement based or blended hydraulic cement based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Low VOC water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Seamless Installation Accessories:
 - 1. Chemical Bonding Compound: Manufacturer recommended product for chemically bonding seams.
- D. Floor Polish: Provide protective, liquid floor polish products recommended by floor tile manufacturer.
- E. Joint Sealant for Resilient Terrazzo Floor Tile: Silicone sealant of type and grade recommended in writing by floor tile manufacturer to suit resilient terrazzo floor tile.
 - 1. Joint-Sealant Color: Selected by Architect.
- F. Sealers and Finish Coats for Resilient Terrazzo Floor Tile: Products recommended by floor tile manufacturer for resilient terrazzo floor tile.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify finishes of substrates comply with specified tolerances and requirements and substrates are free of cracks, ridges, depressions, scale, and foreign deposits that interfere with adhesion of floor tile.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit floor covering and adhesive manufacturer's written acceptance of the concrete floor substrate as represented by moisture and alkalinity testing.
- C. Submit copies of test reports and flooring manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- D. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.
- E. Moisture Remediation: If substrates fail to meet manufacturer's recommended moisture, humidity, and alkalinity levels or ranges, provide moisture vapor emissions control system as specified in Section 09 05 63.
- F. Proceed with floor covering installation only after substrates past testing.

3.3 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and substances incompatible with adhesives and contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 3. Perform additional moisture and vapor tests recommended by manufacturer. If substrates fail to meet manufacturers recommended moisture content, remediate moisture. Proceed with floor covering installation after substrates past testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
- E. Move resilient flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation. Do not install resilient flooring until it is same temperature as space where it is to be installed.

- F. Immediately before installation, sweep and vacuum clean substrates covered by resilient floor tile.

3.4 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes as directed by Architect.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
 - 1. Chemically Bonded Seams: Bond seams with chemical bonding compound to fuse sections permanently into seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.
- J. Resilient Terrazzo Accessories: Install according to manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp on surfaces to remove marks and soil.
- C. Protect floor tile from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, debris, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coats.
- E. Joint Sealant: Apply sealant to resilient terrazzo floor tile perimeter and around columns, at door frames, and at other joints and penetrations.
- F. Sealers and Finish Coats: Remove soil, visible adhesive, and surface blemishes from resilient terrazzo floor tile surfaces before applying liquid cleaners, sealers, and finish products.
 - 1. Sealer: Apply two base coats of liquid sealer.
 - 2. Finish: Apply two coats of liquid floor finish.
- G. Cover floor tile until Substantial Completion.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 65 36

STATIC CONTROL RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Static dissipative rubber floor tile.

B. Related Requirements:

1. Section 09 05 62 "Preinstallation Testing for Flooring" for substrate moisture and alkalinity tests to be performed on concrete substrates.
2. Section 09 65 13 "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.
3. Section 09 65 19 "Resilient Tile Flooring" for other non-static-control resilient floor coverings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to resilient tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.
2. Review concrete substrate requirements for conditions affecting performance of flooring, including results of moisture and alkalinity tests.
3. Review locations and frequency of moisture and alkalinity tests.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product specified.

B. Sustainable Design Submittals:

1. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.

C. Shop Drawings: Submit for each type of static control resilient flooring. Include floor covering layouts, edges, columns, doorways, enclosing partitions, built in furniture, cabinets, and cutouts.

1. Show details of special patterns.

2. Show locations of inscribed maintenance tiles.
 3. Submit grounding diagram showing location of grounding strips and connections.
- D. Samples for Verification: Maximum 8 by 10 inches (200 by 250 mm) units of each color and pattern of static control floor tile required showing full range of variations anticipated.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit qualification data for installer.
- B. Product Test Reports:
1. Submit reports based on evaluation of comprehensive tests performed by a qualified testing agency for static control resilient flooring.
 2. Submit test result for pre-installation substrate moisture, humidity, and alkalinity tests.
 3. Submit test reports for adhesion testing.
- C. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit for each type of static control resilient flooring to include in maintenance manuals.
- B. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum 5 years documented experience who employs trained or certified by manufacturer for required installation techniques and are competent in techniques required for static control resilient flooring and seaming method.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store static control resilient flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer but not less than 50 degrees F (10 degrees C) or more than 90 degrees F (32 degrees C).
1. Floor Tile: Store on flat surfaces.

1.8 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive static control resilient flooring during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. During installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 90 degrees F (32 degrees C).
- C. Close spaces to traffic during static control resilient flooring installation.
- D. Close spaces to traffic for 48 hours after static control resilient flooring installation.
- E. Install static control resilient flooring after other finishing operations, including painting, have been completed.

1.9 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Refer to Interior Finish Schedule on Drawings.
- B. Source Limitations:
 - 1. Obtain floor products of same type and color or finish from one source or producer. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

2.2 PERFORMANCE REQUIREMENTS

- A. Static Dissipative Properties: Provide static control resilient flooring with static control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.
 - 1. Electrical Resistance: Test in accordance with ASTM F 150 with 100-V applied voltage and ESD-STM-7.1.

- a. Average greater than 1 megohm and less than or equal to 1000 megohms when test specimens are tested surface to ground.
 - b. Average greater than 1 megohm and less than or equal to 1000 megohms when installed floor coverings are tested surface to ground.
2. Static Generation: Less than 300 V when tested per AATCC-134 at 20 percent relative humidity with conductive footwear.
3. Static Decay: 5000 to zero V in less than 0.25 seconds when tested per FED-STD-101C/4046.1.
- B. Fire Test Response Characteristics: Determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- C. Accessibility Requirements: Comply with applicable requirements.
 1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
 2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.

2.3 SUSTAINABLE REQUIREMENTS

- A. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
 1. Interior Adhesives and Chemical Bonding Compound: Comply with the testing and product requirements of the California Department of Public Health's Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

2.4 STATIC DISSIPATIVE RESILIENT FLOOR COVERINGS

- A. Static Dissipative Rubber Floor Tile: ASTM F 1344; except in standard hardness when tested per ASTM D 2240 using Shore, Type A durometer.
 1. Basis of Design Product and Color: Refer to Interior Finish Schedule on Drawings.

2.5 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex modified portland cement or blended hydraulic cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Static Control Adhesive: Low VOC water-resistant type that maintains electrical continuity of floor covering system to ground connection, as recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
 1. Adhesives shall have a VOC content of 50 g/L or less.

- C. Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor covering system to ground connection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Verify finishes of substrates comply with tolerances and other requirements and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static control characteristics of floor coverings.
- C. Proceed with installation after unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit floor covering and adhesive manufacturer's written acceptance of the concrete floor substrate as represented by moisture and alkalinity testing.
- C. Submit copies of test reports and flooring manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- D. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.
- E. Moisture Remediation: If substrates fail to meet manufacturer's recommended moisture, humidity, and alkalinity levels or ranges, provide moisture vapor emissions control system as specified in Section 09 05 63.
- F. Proceed with floor covering installation only after substrates pass testing.

3.3 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions and with oversight by manufacturer's representative to ensure adhesion of static control resilient flooring and electrical continuity of floor covering systems.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

3. Perform additional moisture and vapor tests recommended by manufacturer. If substrates fail to meet manufacturers recommended moisture content, remediate moisture. Proceed with floor covering installation after substrates past testing.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Move static control resilient flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation. Do not install static control resilient flooring until it is same temperature as space where it is to be installed.
- E. Sweep and vacuum substrates to be covered by static control resilient flooring immediately before installation.

3.4 INSTALLATION

- A. Install static control resilient flooring according to manufacturer's written instructions and with oversight by manufacturer's representative.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.
 1. Lay floor tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.
- D. Embed grounding strips in static control adhesive. Extend grounding strips beyond perimeter of static control resilient floor covering surfaces to ground connections.
- E. Scribe, cut, and fit static control resilient flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built in furniture, cabinets, pipes, outlets, and door frames.
- F. Extend static control resilient flooring into toe spaces, door reveals, closets, and similar openings. Extend static control resilient flooring to center of door openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on static control resilient flooring as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- H. Adhere static control resilient flooring to substrates using a full spread of static control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified testing agency to test electrical resistance of static control resilient flooring for compliance with requirements.
 - 1. Arrange for testing after static control adhesives have fully cured and static control resilient flooring has stabilized to ambient conditions and after ground connections are completed.
- B. Static control resilient flooring will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of static control resilient flooring.
- B. Perform operations immediately after completing static control resilient flooring:
 - 1. Remove static control adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp mop surfaces to remove marks and soil.
- C. Protect static control resilient flooring from marks, marks, indentations, and damage from construction operations and placement of equipment and fixtures during remainder of construction period.
 - 1. Do not wax or polish static control resilient flooring.
- D. Cover static control resilient flooring until Substantial Completion.

END OF SECTION

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SECTION 09 67 23
RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resinous flooring systems.
- B. Related Requirements:
 - 1. Section 09 05 62 "Preinstallation Testing for Flooring" for substrate moisture, RH, alkalinity, and porosity tests to be performed on concrete substrates.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
 - 2. Review concrete substrate requirements for conditions affecting performance of flooring, including results of moisture and alkalinity tests.
 - a. Review locations and frequency of moisture and alkalinity tests.
 - 3. Review details of integral cove bases.
 - 4. Review manufacturer's written instructions for installing resinous flooring systems.
 - 5. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.
- B. Sustainable Design Submittals:
 - 1. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.
- C. Samples for Initial Selection: For each type of exposed finish required.

- D. Samples for Verification: For each resinous flooring system required and for each color and texture specified, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Material Certificates: For each resinous flooring component.
- C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.
- D. Test Reports: From Testing Agency for pre-installation substrate moisture and alkalinity tests.
- E. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For resinous flooring to include in maintenance manuals.
- B. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
 - 1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
- B. Manufacturer Field Technical Service Representatives: Resinous flooring manufacture shall retain the services of Field Technical Service Representatives trained specifically in the installation of the specified system.
 - 1. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and available to perform field problem solving issues with the installer.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Apply full-thickness mockups on 96-inch- (2400-mm-) square floor area in location mutually agreed upon by Owner and Architect.
 - a. Include 96-inch (2400-mm) length of integral cove base with inside corner.
 - 2. Simulate finished lighting conditions for Architect's review of mockups.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Conditioning Period: Commence minimum 7 days before coating application, is continuous through application, and continues minimum 3 days after application.
 1. During conditioning period, maintain an ambient temperature between 65 degrees F and 85 degrees F (18 degrees C and 30 degrees C) and not more than 50 percent relative humidity in spaces to receive flooring.
 2. After conditioning period, maintain relative humidity and ambient temperature planned for building occupants.
- C. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.
- D. Close spaces to traffic during resinous flooring installation and for 72 hours after installation unless manufacturer recommends a longer period.

1.9 WARRANTY

- A. Written warranty signed by Manufacturer and Applicator in which the Manufacturer and Applicator agree to repair or replace components of resinous floor installation that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Minimum one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 1. Arizona Polymer Flooring.

2. BASF Corp. - Construction Chemicals.
3. Crossfield Products Corp.
4. Duraflex, Inc.
5. Sherwin-Williams Company, General Polymers.
6. Sika Corporation; Flooring.
7. Tamms; a brand of Euclid Chemical Company; an RPM Company.

- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire Test Response Characteristics: Determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency. Critical Radiant Flux Classification of Class I, not less than 0.45 W/sq. cm.
- B. Flammability: Self-extinguishing in accordance with ASTM D635.

2.3 SUSTAINABLE REQUIREMENTS

- A. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.

2.4 RESINOUS FLOORING

- A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
- B. System Characteristics:
1. Color and Pattern: As selected by Architect from manufacturer's full range.
 2. Wearing Surface: Textured for slip resistance, smooth, or Manufacturer's standard wearing surface, as indicated in Flooring Systems Schedule.
 3. Overall System Thickness: Not less than 1/8 inch (3.2 mm).
- C. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested in accordance with test methods indicated:
1. Compressive Yield Strength: 9,850 psi minimum per ASTM D695.
 2. Tensile Strength: 6,230 psi minimum in accordance with ASTM D638.

3. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch (1.6-mm) permanent indentation in accordance with MIL-D-3134J.
 4. Resistance to Elevated Temperature: No slip or flow of more than 1/16 inch (1.6 mm) in accordance with MIL-D-3134J.
 5. Hardness: 78, Shore D in accordance with ASTM D2240.
- D. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested in accordance with ASTM D1308 for 50 percent immersion in the following reagents for no fewer than 24 hours:
1. Vegetable Oil: No effect.
 2. Urine: No effect.
 3. Gasoline: No effect.
 4. Motor Oil: No effect.
 5. Transmission Fluid: No effect.
 6. Mineral Spirits: No effect.
 7. 10% Sulfuric Acid: No effect.
 8. 10% Hydrochloric Acid: No effect.
 9. 10% Acetic Acid: No effect.
- E. Primer: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
1. Formulation Description: 100 percent solids.
- F. Waterproofing Membrane: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
1. Formulation Description: High solids.
- G. Reinforcing Membrane: Flexible resin formulation that is recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated and that inhibits substrate cracks from reflecting through resinous flooring.
1. Formulation Description: High solids.
 - a. Provide fiberglass scrim embedded in reinforcing membrane.
- H. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended in writing by manufacturer for installation indicated.
- I. Body Coats:
1. Resin: Epoxy or Urethane, as indicated in Flooring Systems Schedule.
 2. Formulation Description: 100 percent solids.
 3. Type: Pigmented.
 4. Installation Method: Self-leveling slurry or troweled, as applicable.
 5. Broadcast Aggregates: Where indicated.
 6. Number of Coats: One.

7. Thickness of Coats: As recommended by resinous flooring manufacturer, for applications indicated.
 8. Non-Slip Aggregates: Manufacturer's standard colored quartz (ceramic-coated silica), or granite.
- J. Grout Coat:
1. Resin: Urethane.
 2. Formulation Description: High solids.
 3. Type: Pigmented.
 4. Thickness of Coat: As recommended by resinous flooring manufacturer, for applications indicated.
- K. Topcoats: Sealing or finish coats.
1. Resin: Epoxy or Urethane, as indicated in Flooring Systems Schedule.
 2. Formulation Description: 100 percent solids.
 3. Type: Pigmented.
 4. Number of Coats: Two.
 5. Thickness of Coats: As recommended by resinous flooring manufacturer, for applications indicated.
 6. Finish: Matte or Gloss, as selected by Architect.

2.5 FLOORING SYSTEMS SCHEDULE

- A. Provide the following resinous flooring systems for the applications indicated.
1. Kitchens / Food Service Areas: Urethan Cement, non-slip.
 2. Restrooms: Epoxy with Urethane Top Coat, non-slip.
 3. Shower Areas: Epoxy, non-slip.
 4. Warehouse / Storage: Epoxy.
 5. Garage / Shop / Maintenance: Epoxy with Urethane Top Coat, non-slip.
 6. Central Plant, General: Epoxy.
 7. Central Plant, Walkways: Epoxy, non-slip.
 8. Electrical Rooms: Epoxy.
 9. Custodial Rooms: Epoxy, non-slip.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit resinous flooring manufacturer's written acceptance of the concrete floor substrate as represented by moisture, humidity, and alkalinity testing.
- C. Submit copies of test reports and resinous flooring manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- D. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.
- E. Moisture Remediation: If substrates fail to meet manufacturer's recommended moisture, humidity, and alkalinity levels or ranges, provide moisture vapor emissions control system as specified in Section 09 05 63.
- F. Proceed with resinous flooring installation only after substrates past testing.

3.3 PREPARATION

- A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.
- B. 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.
1. Prepare concrete surfaces according to ASTM F 710.
 2. Roughen concrete substrates as follows:
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 3. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
 4. Perform additional moisture and vapor tests recommended by manufacturer. If substrates fail to meet manufacturers recommended moisture content, remediate moisture. Proceed with flooring installation after substrates past testing.
- C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.
2. Construction and Cold Joints: Treat construction and cold joints as recommended by manufacturer on horizontal and vertical surfaces.
 - a. Discontinue resinous floor at vertical and horizontal contraction and expansion joints by installing backer rod and sealant upon completion of installation.
 - 1) Sealant: Provide sealant recommended by manufacturer for traffic conditions and chemical exposures to be encountered in accordance with Section 07 92 00.
- D. Resinous Materials: Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.

3.4 INSTALLATION

- A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
 1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
 2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
 3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.
- B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.
- C. Waterproofing Membrane: Apply waterproofing membrane where indicated on Drawings, in thickness recommended in writing by manufacturer.
 1. Apply waterproofing membrane to integral cove base substrates.
- D. Reinforcing Membrane: Apply reinforcing membrane to substrate cracks.
- E. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
 1. Integral Cove Base: 4 inches (100 mm) high unless otherwise indicated.
- F. Self-Leveling Body Coats: Apply self-leveling slurry body coats in thickness specified for flooring system.
 1. Aggregates: Broadcast aggregates at rate recommended in writing by manufacturer. After resin is cured, remove excess aggregates to provide surface texture indicated.

- G. Troweled or Screeded Body Coats: Apply troweled or screeded body coats in thickness specified for flooring system. Hand or power trowel and grout to fill voids. When body coats are cured, remove trowel marks and roughness using method recommended in writing by manufacturer.
- H. Grout Coat: Apply grout coat to fill voids in surface of final body coat.
- I. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

3.5 FIELD QUALITY CONTROL

- A. Material Sampling: Owner may, at any time and any number of times during resinous flooring installation, require material samples for testing for compliance with requirements.
 - 1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
 - 3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reinstall flooring materials to comply with requirements.
- B. Core Sampling: At Owner's direction and at locations designated by Owner, take one 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. Correct deficiencies in installed flooring as indicated by testing.

3.6 PROTECTION

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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RESINOUS FLOORING APPLICATION AND EXPOSURE MATRIX

Last Updated: October 27, 2021

APPLICATION	EXPOSURE	HEAT RESISTANCE (140 deg F maximum)	SLIP RESISTANCE (Non-Slip Aggregate)	RESIN TYPE (see Legend Below)						RECOMMENDED SYSTEM
				Epoxy	Ureth.	Ep Nov	Vin Est	Poly	MMA	
Kitchens / Food Service Areas	Food Stains / Grease / Cleaning Agents	Yes	Yes	-	YES	-	-	-	-	Urethane Cement
Restrooms	Mild Chemicals, Cleaning Agents	Yes	Yes	HYBRID SYSTEM		-	-	-	-	Epoxy with Urethane Top Coat
Shower Areas	Mild Chemicals, Cleaning Agents	Yes	Yes	YES	-	-	-	-	-	Epoxy
Warehouse / Storage	Cleaning Agents	Yes	No	YES	-	-	-	-	-	Epoxy
Garage / Shop / Maintenance	Chemicals / Fuel / Oil / Grease / Brake Fluid Transmission Fluid / Cleaning Agents	TBD	Yes	HYBRID SYSTEM		-	-	-	-	Epoxy with Urethane Top Coat
Central Plant	Oils / Mild Chemicals / Mild Cleaning Agents	Yes	Walkways only	YES	-	-	-	-	-	Epoxy
Electrical Rooms	Predominantly Dry	No	No	YES	-	-	-	-	-	Epoxy
Custodial	Mild Chemicals, Cleaning Agents	TBD	Yes	YES	-	-	-	-	-	Epoxy

Resin Types:		
Used for Flooring subject to severe chemical or environmental exposures.	Epoxy	More water and chemical resistant than Urethane, but less UV-resistant Should not be exposed to hot water or steam cleaning.
	Ureth: Urethane	Abrasion and UV-light resistant. Better color retention than epoxy. Less water and chemical resistant than epoxy. Urine-resistant.
	Ep Nov: Epoxy Novolac	Resistant to aggressive chemicals such as sulfuric acid.
	Vin Est: Vinyl Ester	Resistant to a range of chemicals, including acids and alkalis. Typically used where extreme durability, extreme corrosion resistance, and thermal stability are required.
	Poly: Polyasparatic	Hard, color stable, weather and abrasion resistant, and fast curing; have good gloss retention; and are tolerant of temperature extremes.
	MMA: Methyl Methacrylate	Fast curing but has a strong odor while curing. CDC points out respiratory health concerns. Systems can be applied to concrete substrates that have a high rate of water-vapor emission; resins are breathable and allow water vapor to pass through them.

SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Modular carpet tile.
- B. Related Requirements:
 - 1. Section 09 05 62 "Preinstallation Testing for Floor Finishes" for substrate moisture and alkalinity tests to be performed on concrete substrates.
 - 2. Section 09 65 13 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.
 - 2. Review concrete substrate requirements for conditions affecting performance of flooring, including results of moisture and alkalinity tests.
 - 3. Review locations and frequency of moisture and alkalinity tests.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation recommendations for each type of substrate.
- B. Sustainable Design Submittals:
 - 1. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.
- C. Shop Drawings: For carpet tile installation, plans showing the following:
 - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.

2. Carpet tile type, color, and dye lot.
 3. Type of subfloor.
 4. Type of installation.
 5. Pattern of installation.
 6. Pattern type, location, and direction.
 7. Pile direction.
 8. Type, color, and location of insets and borders.
 9. Type, color, and location of edge, transition, and other accessory strips.
 10. Transition details to other flooring materials.
- D. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet Tile: Maximum 8 by 10 inches (200 by 250 mm).
 2. Exposed Edge, Transition, and Other Accessory Stripping: 10-inch- (250-mm-) long Samples.
- E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Test Reports: From Testing Agency for pre-installation substrate moisture and alkalinity tests.
- B. Qualification Data: For Installer.
- C. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.
- D. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- B. Record Documents: Showing locations of substrate moisture and alkalinity tests. Provide markups on floor plan indicating the location of each test and the dates tests were performed.
 1. Record carpet tile installation date in each room or space.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Install mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven days in advance of dates and times when mockups will be installed.
 - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 4. Obtain Architect's approval of mockups before starting work.
 - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 6. Remove mockups when directed.
 - 7. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

- A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer, and field moisture and alkalinity tests.

1.10 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent edge raveling, snags, and runs.
 - b. Dimensional instability.
 - c. Excess static discharge.
 - d. Loss of tuft-bind strength.
 - e. Loss of face fiber.
 - f. Delamination.
 - 3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Basis of Design Manufacturer and Products: Refer to Interior Finish Legend on Drawings.
- B. Color: As indicated by manufacturer's designations.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Low VOC water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Provide adhesives that are appropriate for and compatible with subfloor substrates to which they are bonded.
- C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.
- D. Resilient Edge/Transition Strips: Refer to Section 09 65 13 "Resilient Base and Accessories."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
 - 1. Verify finishes of substrates comply with specified tolerances and requirements and substrates are free of cracks, ridges, depressions, scale, and foreign deposits that interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREINSTALLATION TESTING

- A. General: Perform preinstallation testing under provisions of Section 09 05 62.
- B. Submit floor covering and adhesive manufacturer's written acceptance of the concrete floor substrate as represented by moisture and alkalinity testing.
- C. Submit copies of test reports and flooring manufacturer's written acceptance of substrate conditions to Owner and Architect prior to flooring installation.
- D. If test results indicate concrete subfloor is not within flooring manufacturers' acceptable range, notify Owner and Architect.
- E. Moisture Remediation: If substrates fail to meet manufacturer's recommended moisture, humidity, and alkalinity levels or ranges, provide moisture vapor emissions control system as specified in Section 09 05 63.
- F. Proceed with floor covering installation only after substrates past testing.

3.3 PREPARATION

- A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

- D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Sweep and vacuum substrates to be covered immediately before installing carpet tile.

3.4 INSTALLATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard," Section 18, "Modular Carpet" and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns as indicated or scheduled on Drawings.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 69 00

ACCESS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Cementitious-core steel panel access flooring.
 - 2. Understructure.
 - 3. Floor panel coverings.
- B. Related Requirements:
 - 1. Section 26 05 26 "Grounding and Bonding for Electrical Systems" for connection to ground of access-flooring understructure.

1.2 COORDINATION

- A. Coordinate location of mechanical and electrical work in underfloor cavity to prevent interference with access flooring pedestals.
- B. Mark pedestal locations on subfloor using a grid to enable mechanical and electrical work to proceed without interfering with access flooring pedestals.
- C. Coordinate locations of all penetrations in access flooring required for all mechanical, electrical, plumbing, communications, and other Work where penetrations, cut outs, or other openings are required.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review connection with mechanical and electrical systems.
 - 2. Review requirements related to sealing the plenum.
 - 3. Review procedures for keeping underfloor space clean.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for access flooring.
 - 2. Include loading capacities.

- B. Shop Drawings: For access flooring:
 - 1. Include layout of access flooring and relationship to adjoining Work based on field-verified dimensions.
 - 2. Details and sections with descriptive notes indicating materials, finishes, fasteners, typical and special edge conditions, accessories, and understructures.
- C. Samples for Initial Selection: For each type of exposed finish and for products requiring color selection.
- D. Samples for Verification: For the following products:
 - 1. Floor Covering: 8 by 10 inches (200 by 250 mm) for each color and texture specified.
 - 2. Exposed Metal Accessories: Approximately 10 inches in length.
 - 3. One complete full size floor panel, pedestal, and understructure unit for each type of access flooring system required.

1.5 INFORMATIONAL SUBMITTALS

- A. Delegated Design Submittals:
 - 1. Submit calculations for seismic design of access flooring to comply with performance requirements and design criteria.
 - 2. Submit calculations for ramps, stairs, steps, and railings inclusive to the Project design of access flooring to comply with the requirements of the Performance Requirements Article and related design criteria.
 - 3. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For Installer.
- C. Product Certificates: Submit certificates for each type of access flooring system.
- D. Product Test Reports: For each type of flooring material and exposed finish, for tests performed by a qualified testing agency.
- E. Preconstruction Test Reports: For preconstruction adhesive field test.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Flooring Panels: 3 percent.
 - 2. Pedestals: 1.5 percent.
 - 3. Stringers: 1.5 percent.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to verify selections made under Sample submittals to demonstrate aesthetic effects and to set quality standards for materials and execution.
 - 1. Build mockup of typical access flooring assembly as shown on Drawings. Size to be an area no fewer than five floor panels in length by five floor panels in width.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.
 - 1. Use personnel, materials, and methods of construction that will be used at Project site.
 - 2. Notify Architect seven days in advance of the dates and times when laboratory mockups will be tested.
- B. Preconstruction Adhesive Field Test: Before installing pedestals, field test their adhesion to subfloor surfaces by doing the following:
 - 1. In areas representative of each subfloor surface, set typical pedestal assemblies in same adhesive and use methods required for the completed work.
 - 2. Allow test installation to cure for manufacturer's recommended cure time, with a pressure of 25 lbf applied vertically to pedestals during this period.
 - 3. After curing, apply lateral load against a straight steel bar inserted 2 inches into pedestal stems. Measure the force needed to cause adhesive failure of pedestal base.
 - 4. Remove and discard failed pedestals and clean pedestals of adhered residue.
 - 5. Proceed with installation after tests show compliance with performance requirement specified for pedestals' capability to resist overturning moment.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install access flooring until spaces are enclosed, subfloor has been sealed, ambient temperature is between 50 degrees F and 90 degrees F, and relative humidity is not less than 20 percent and not more than 70 percent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain access flooring system and related components from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design access flooring for seismic performance, including loads imposed on the access flooring by items and equipment installed on the access flooring.
- B. Seismic Performance: Access flooring shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Live Loads:
- Live load is equal to uniform load test value indicated in the "Structural Performance" paragraph below, unless otherwise indicated.
 - Calculate live load with imposed loads unfastened at access flooring surface.
- C. Structural Performance: Provide access flooring systems capable of complying with the performance requirements according to testing procedures in CISCA's Recommended Test Procedures for Access Floors: *(Design Team to select either the 1500 system or the 2000 system as required to suit project requirements and anticipated loads.)*
- Concentrated Loads: [1500 lbf] [2000 lbf] with the following deflection and permanent set:
 - Top Surface Deflection: 0.10 inch.
 - Permanent Set: 0.010 inch.
 - Ultimate Loads: [2500 lbf] [2800lbf].
 - Rolling Loads: With local or overall deformation not to exceed 0.040 inch.
 - CISCA Wheel 1: 10 passes [1250 lbf] [1500 lbf].
 - CISCA Wheel 2: 10,000 passes at [1000 lbf] [1250 lbf].
 - Stringer Load Test: [450 lbf] [450 lbf] at center of span with a permanent set not to exceed 0.010 inch.
 - Pedestal Axial Load Test: [5000 lbf] [5000 lbf].
 - Pedestal Overturning Moment Test: 1000 lbf x inches.
 - Uniform Load Test: [500 lbf/sq. ft.] [600 lbf/sq. ft.] with a maximum top-surface deflection not to exceed 0.040 inch and a permanent set not to exceed 0.010 inch.
 - Drop Impact Load Test: [150 lb] [150 lb].
- D. Structural Performance of Ramps, Stairs, and steps: integrated ramps, stairs and steps shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated:
- Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).

2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
 3. Uniform and concentrated loads need not be assumed to act concurrently.
 4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
 5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch (6.4 mm), whichever is less.
- E. Structural Performance for Railings: Railings including attachment to surrounding construction shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 2. Infill of Guards:
 - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
 - b. Infill load and other loads need not be assumed to act concurrently.
 3. Pipe Railing Standard: Comply with applicable provisions of ANSI/NAAMM AMP 521 Pipe and Railing Systems Manual.
 4. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 5. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - a. Temperature Change: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C, material surfaces).
- F. Fire Performance:
1. Surface Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame Spread Index: 25 or less.
 - b. Smoke Developed Index: 50 or less.
 2. Combustion Characteristics: ASTM E 136.

2.3 SUSTAINABILITY REQUIREMENTS

- A. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
1. Adhesives and Sealants: Comply with the specified content limits and emissions.

2.4 UNDERSTRUCTURE

- A. Pedestal System Understructure (Type A): System consisting of base, column with provisions for height adjustment, and head (cap); made of steel.
 - 1. Provide pedestals designed for use in seismic applications.
 - 2. Base: Square or circular base with not less than 25 sq. in. (161 sq. cm of bearing area).
 - 3. Column: Of height required to bring finished floor to elevations indicated. Weld to base plate.
 - 4. Provide vibration proof leveling mechanism for making and holding fine adjustments in height over a range of not less than 2 inches (50 mm) and for locking at a selected height, so deliberate action is required to change height setting and prevent vibratory displacement.
 - 5. Head: Designed to support the panel system indicated.
 - a. Provide sound deadening pads or gaskets at contact points between heads and panels.
 - b. Bolted Assemblies: Provide head with four holes aligned with holes in floor panels for bolting of panels to pedestals.
- B. Stringer System Understructure (Type B): Modular steel stringer systems designed to bolt to pedestal heads and form a grid pattern. Protect steel components with manufacturer's standard galvanized or corrosion-resistant paint finish.
 - 1. Continuous Gaskets: At contact surfaces between panel and stringers to deaden sound, seal off the underfloor cavity from above, and maintain panel alignment and position.

2.5 FLOOR PANELS

- A. Floor Panels: Provide modular panels interchangeable with other field panels without disturbing adjacent panels or understructure.
 - 1. Size: Nominal 24 inches by 24 inches (610 mm by 610 mm).
 - 2. Attachment to Understructure:
 - a. Type A: By gravity.
 - 1) Egress Paths: Bolted at corners.
 - b. Type B: By gravity, on bolted stringers.
- B. Cementitious Core Steel Panels: Fabricated from cold rolled steel sheet, with the die cut flat top sheet and die formed and stiffened bottom pan welded together, and with metal surfaces protected against corrosion by factory applied finish. Fully grout internal spaces of completed units with cementitious fill.
 - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASM Modular Systems, Inc.
 - b. Bergvik North America, Inc.
 - c. Computer Environments, Inc.

- d. Global IFS (formerly Haworth).
 - e. Tate Access Floors, Inc.
 - 2. Basis of Design Products: Subject to compliance with requirements, provide one of the following:
 - a. Type A Pedestal System:
 - 1) ASM Modular Systems, Inc.; FS 200.
 - 2) Tate Access Floors, Inc.; ConCore 1250.
 - b. Type B Stringer System:
 - 1) ASM Modular Systems, Inc.; [FS 300] [FS 400].
 - 2) Tate Access Floors, Inc.; [ConCore 1500] [ConCore 2000].
- C. Exposed Concrete Surface Panels: Fabricated with bottom pan that is die formed from metallic coated steel sheet and filled with lightweight concrete that is reinforced and bonded to pan by shear ties.
- 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Global IFS (formerly Haworth).
 - 2. Product: Subject to compliance with requirements, provide the following:
 - a. Global IFS [TecCrete 1500] [TecCrete 2000].

2.6 FLOOR PANEL COVERINGS

- A. High Pressure Plastic Laminate: Factory applied, NEMA LD 3, High Wear type, Grade HDM; fabricated in one piece to cover each panel face with integral trim edging.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.
 - b. Nevamar; a Panolam Industries International, Inc. brand.
 - 2. Electrical Resistance: Average no less than 1 megohm and no more than 20,000 megohms when installed floor coverings are surface to ground tested according to NFPA 99.
 - 3. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

2.7 FABRICATION

- A. Fabrication Tolerances:
- 1. Size: Plus or minus 0.020 inch of required size.
 - 2. Squareness: Plus or minus 0.015 inch between diagonal measurements across top of panel.
 - 3. Flatness: Plus or minus 0.035 inch, measured on a diagonal on top of panel.
- B. Panel Markings: Clearly and permanently mark floor panels on their underside with panel type and concentrated-load rating.

- C. Bolted Panels: Provide panels with holes drilled in corners to align precisely with threaded holes in pedestal heads and to accept countersunk screws with heads flush with top of panel.
 - 1. Captive Fasteners: Provide fasteners held captive to panels.
- D. Cutouts: Fabricate cutouts in floor panels for cable penetrations and service outlets. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with structural performance requirements.
 - 1. Number, Size, Shape, and Location: As indicated.
 - 2. Grommets: Where indicated, fit cutouts with manufacturer's standard grommets; or, if size of cutouts exceeds maximum grommet size available, trim edge of cutouts with manufacturer's standard plastic molding with tapered top flange.
 - 3. Provide foam rubber pads for sealing annular space formed in cutouts by cables.

2.8 ACCESSORIES

- A. Adhesives: Recommended adhesive for bonding pedestal bases to subfloor.
- B. Post Installed Anchors: For anchoring pedestal bases to subfloor, provide four post installed expansion anchors or threaded concrete screws made from carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 (Mild), with the capability to sustain, without failure, a load equal to 1.5 times the loads imposed by pedestal overturning moment on fasteners, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- C. Raised Access Floor Brush Grommets: Provide self-sealing cable brush grommet with usable area for passage of power and signal cables through floor penetrations. Provide ABS plastic frame passageway with closure of interwoven nylon filaments and intermediate layer of EPDM.
 - 1. Provide Raised Access Floor Brush Grommets at all penetrations. Contractor shall coordinate all locations, sizes, and types of grommets required for a complete installation.
- D. Cavity Dividers: Provide metal dividers located where indicated to divide underfloor cavities.
- E. Closures: Where underfloor cavity is not enclosed by abutting walls or other construction, provide metal closure plates with standard finish.
- F. Security Barrier: Where security barrier is indicated underfloor, but air flow cannot be interrupted; provide wire mesh metal closure, fastened top and bottom to pedestal structure. Include accessories as required to complete installation.
 - 1. Mesh: Pattern and openness as approved by Architect and Engineer.
 - 2. Finish: As selected by Architect.

- G. Ramps: Ramp construction of width and slope indicated, but not steeper than 1:12, with raised disc or textured rubber or vinyl tile floor coverings, and of same materials, performance, and construction requirements as access flooring.
- H. Steps: Provide steps of size and arrangement indicated with floor coverings to match access flooring. Apply nonslip aluminum nosings to treads unless otherwise indicated.
- I. Railings: Extruded aluminum railings at ramps and open sided perimeter of access flooring where indicated. Include handrail, intermediate rails, posts, brackets, end caps, wall returns, wall and floor flanges, plates, and anchorages where required.
- J. Panel Lifting Device: Panel portable lifting device for each type of panel required.
 - 1. Provide one lifting device and wall mounted bracket for every 5,000 sq. ft. of access flooring, or fraction thereof. Coordinate final locations with Owner.
- K. Perimeter Support: Where indicated, provide method for supporting panel edge and forming transition between access flooring and adjoining floor coverings at same level as access flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer and manufacturer's representative present, for compliance with requirements for installation tolerances and other conditions affecting performance of the work.
 - 1. Verify substrates comply with tolerances and requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, foreign deposits, and debris that might interfere with attachment of pedestals.
 - 2. Verify that concrete floor sealer and finish have been applied and cured.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Lay out floor panel installation to keep the number of cut panels at floor perimeter to a minimum. Avoid using panels cut to less than 6 inches (150 mm).
- B. Locate each pedestal, complete any necessary subfloor preparation, and vacuum subfloor to remove dust, dirt, and construction debris before beginning installation.

3.3 INSTALLATION

- A. Install access flooring system and accessories under supervision of access flooring manufacturer's authorized representative to produce a rigid, firm installation that complies with performance requirements and is free of instability, rocking, rattles, and squeaks.
- B. Adhesive Attachment of Pedestals: Set pedestals in adhesive, according to access flooring manufacturer's written instructions, to provide full bearing of pedestal base on subfloor.
- C. Mechanical Attachment of Pedestals: Attach pedestals to subfloor with post installed mechanical anchors.
- D. Adjust pedestals to permit top of installed panels to be set flat, level, and to proper height.
- E. Stringer Systems: Install stringers in an overlapping, basket weave pattern. Secure stringers to pedestal heads according to access flooring manufacturer's written instructions.
- F. Install flooring panels securely in place, properly seated with panel edges flush. Do not force panels into place.
- G. Scribe perimeter panels to provide a close fit with adjoining construction with no voids greater than 1/8 inch (3 mm) where panels abut vertical surfaces.
 - 1. To prevent dusting, seal cut edges of steel encapsulated, wood core panels with sealer recommended in writing by panel manufacturer.
- H. Cut and trim access flooring and perform other dirt or debris producing activities at a remote location or as required to prevent contamination of subfloor under already installed access flooring.
- I. Grounded Flooring Access Panel Systems: Ground flooring system as recommended by manufacturer and as needed to comply with performance requirements for electrical resistance of floor coverings.
 - 1. Panel to Understructure Resistance: Not more than 10 ohms as measured without floor coverings.
- J. Underfloor Dividers: Scribe and install underfloor cavity dividers to closely fit against subfloor surfaces, and seal with mastic.
- K. Closures: Scribe closures to closely fit against subfloor and adjacent finished-floor surfaces. Set in mastic and seal to maintain plenum effect within underfloor cavity.
- L. Clean dust, dirt, and construction debris caused by floor installation, and vacuum subfloor area as installation of floor panels proceeds.
- M. Seal underfloor air cavities at construction seams, penetrations, and perimeter to control air leakage, according to manufacturer's written instructions.

- N. Install access flooring without change in elevation between adjacent panels and within the following tolerances:
 - 1. Plus or minus 1/16 inch (1.5 m) in any 10-foot distance.
 - 2. Plus or minus 1/8 inch (3 mm) from a level plane over entire access-flooring area.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.5 PROTECTION

- A. Prohibit traffic on access flooring for 24 hours and removal of floor panels for 72 hours after installation to allow pedestal adhesive to set.
- B. After completing installation, vacuum access flooring and cover with continuous sheets of reinforced paper or plastic. Maintain protective covering until time of Substantial Completion.
- C. Replace access flooring panels that are stained, scratched, or damaged or that do not comply with specified requirements.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 72 00

WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl wall covering.
- B. Related Requirements:
 - 1. Section 09 29 50 "Gypsum Board" for application of Level 5 finish on gypsum board partitions scheduled to receive wallcovering.
 - 2. Section 10 22 39 "Folding Panel Partitions" for additional substrates to which wallcoverings specified in this Section are to be applied.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.
- B. Sustainable Design Submittals:
 - 1. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.
- C. Samples for Verification: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36-inch- (914-mm-) long in size.
 - 1. Wall Covering Sample: From same production run to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
- D. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each wall covering, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For wall coverings to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wall Covering Materials: For each type, color, texture, and finish, full width by length to equal to 5 percent of amount installed.

1.7 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for installation.
 - 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
- B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.
- C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

- B. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
 - 2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.2 SUSTAINABILITY REQUIREMENTS

- A. Low Emitting Materials: Submit VOC content limits and emissions data, and description of testing or certification for site installed interior materials and products.
- B. Comply with the testing and product requirements of the California Department of Public Health's Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

2.3 VINYL WALL COVERING

- A. Description: Provide vinyl products in rolls from same production run and complying with the following:
 - 1. FS CCC-W-408D and Wallcovering Association's W-101 for Type II, Medium Duty.
- B. Colors, Textures, and Patterns: As indicated by reference to manufacturers' products indicated in Interior Finish Schedule on Drawings.
- C. Total Weight: As indicated in Interior Finish Schedule on Drawings.
- D. Mildew Resistance: Rating of zero or 1 when tested in accordance with ASTM G21.
- E. Features:
 - 1. Water-based inks.
 - 2. Phthalate free.
 - 3. Heavy-metals free.
 - 4. Halogenated-fire-retardant free.
- F. Basis of Design Manufacturers and Products: As indicated in Interior Finish Schedule on Drawings.

2.4 ACCESSORIES

- A. Adhesive: Mildew-resistant, non-staining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall covering manufacturer.
 - 1. Adhesives shall have a VOC content of 50 g/L or less.
 - 2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Primer/Sealer: Mildew resistant, complying with requirements in Section 09 91 23 "Interior Painting" and recommended in writing by primer/sealer and wall covering manufacturers for intended substrate.
- C. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended in writing by wall covering manufacturer.
- D. Seam Tape: As recommended in writing by wall covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Level 5 finish, surface flatness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.
- C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
 - 1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
 - 2. Plaster: Allow new plaster to cure. Neutralize areas of high alkalinity. Prime with primer recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
 - 3. Metals: If not factory primed, clean and apply primer recommended in writing by primer/sealer manufacturer and wall covering manufacturer.

- 4. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
- 5. Painted Surfaces: Treat areas susceptible to pigment bleeding.
- D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.
- E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.
- F. Acclimatize wall covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL LINER

- A. Install wall liner, without gaps or overlaps. Form smooth wrinkle-free surface for finished installation. Do not begin wall covering installation until wall liner has dried.

3.4 INSTALLATION OF WALL COVERING

- A. Comply with wall covering manufacturers' written installation instructions applicable to products and applications indicated.
- B. Cut wall covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.
- C. Install strips in same order as cut from roll.
- D. Install wall covering without lifted or curling edges and without visible shrinkage.
- E. Match pattern 72 inches (1830 mm) above the finish floor.
- F. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 3 inches (75 mm) from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.
- G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.
- H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.5 CLEANING

- A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.
- B. Use cleaning methods recommended in writing by wall covering manufacturer.
- C. Replace strips that cannot be cleaned.

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- D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

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EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and application of exterior paint coating systems.
 - 1. Concrete not otherwise scheduled to receive elastomeric coating.
 - 2. Concrete masonry units not otherwise scheduled to receive elastomeric coating.
 - 3. Steel and iron not otherwise schedule to receive high-performance coating.
 - 4. Galvanized metal not otherwise schedule to receive high-performance coating.
 - 5. Other exposed surfaces not scheduled to receive factory finish.
- B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following shop- and factory-finished components:
 - a. Architectural woodwork and casework.
 - b. Metal lockers.
 - c. Prefinished elevator entrance doors and frames.
 - d. Elevator equipment.
 - e. Finished mechanical and electrical equipment.
 - f. Light fixtures.
 - g. Distribution cabinets.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. Pipe spaces.
 - d. Duct shafts.
 - e. Elevator shafts.
 - 3. Finished metal surfaces include the following:
 - a. Door hardware.
 - b. Aluminum.
 - c. Brass.
 - d. Bronze.
 - e. Chromium plate.
 - f. Copper.
 - g. Nickel.
 - h. Stainless steel.
 - 4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

5. Operating parts including moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.

1.2 DEFINITIONS

- A. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D 523 shall comply with following:
 1. Gloss Level 1 – Flat: Not more than five units at 60 degrees and 10 units at 85 degrees.
 2. Gloss Level 2 – Low Sheen: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
 3. Gloss Level 3 – Eggshell: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 4. Gloss Level 4 – Satin: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
 5. Gloss Level 5 – Semigloss: 35 to 70 units at 60 degrees.
 6. Gloss Level 6 – Gloss: 70 to 85 units at 60 degrees.
 7. Gloss Level 7 – High Gloss: More than 85 units at 60 degrees.

1.3 COORDINATION

- A. Coordination of Work: Coordinate field finishing of shop primed metals are provided to ensure compatibility of total systems for various substrates.

1.4 ACTION SUBMITTALS

- A. Product Data: Technical data and product information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, surface preparation, and application for each paint and coating system.
 1. For field painting of factory primed metal products and fabrications, submit technical data for each type of paint product, surface preparation requirements, and application instructions.
 2. Indicate manufacturer's instructions for special surface preparation procedures and substrate conditions requiring special attention.
 3. Product List: Provide inclusive list of required coating systems and materials. Indicate each material and cross reference specific coatings, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification. Use same designations indicated in Finish Schedules.
- B. Samples: Submit aged (minimum seven days) paint samples for each type of paint system and each color and gloss of topcoat.

1. Provide stepped draw-down samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
 - a. Label draw-down samples with the following:
 - 1) Paint manufacturer.
 - 2) Manufacturer's color name, number, and sheen.
 - 3) Paint formula employed to produce designated color and sheen.
 - 4) Date paint was mixed.
2. Provide list of material and application for each coat of each sample. Label each sample as to location and application.
3. Submit samples on substrates for review of color and texture:
 - a. Concrete: Two 4 inch (50 mm) square samples for each color and finish.
 - b. Concrete Masonry: Two 4 by 8 inch (100 by 200 mm) samples of masonry, with mortar joint in the center, for each finish and color.
 - c. Ferrous and Nonferrous Metals: Two 4 inch (100 mm) square samples of flat metal and two 8 inch (200 mm) long samples of solid metal for each color and finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For applicator.
- B. Quality Control Submittals: Furnish certificates from manufacturer that products supplied comply with VOC content limits and emission in accordance with local, state, and federal regulations and sustainability limit requirements.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals including but not limited to lead and mercury. Do not use solvents in paint products that contribute to air pollution.
- B. Applicator Qualifications: Entity having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing and reducing drying time, cleanup requirements, color designation, and application instructions.
- B. Store materials not in use in tightly covered containers in well ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Do not thin or add water to waterbased paints, including waterbased alkyds.
- B. Weather Conditions:
 1. Apply paints when temperature of surfaces to receive paint and ambient air temperatures are between 50 degrees F and 95 degrees F (10 degrees C and 35 degrees C).
 2. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
 3. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (35 degrees C) for exterior, or as indicated by manufacturer's Product Data Sheet.
- C. Apply solvent thinned paints when temperatures of surfaces to receive paint and surrounding air are between 45 degrees F. and 95 degrees F (7 degrees F and 35 degrees C).
 1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
- D. Painting may continue during inclement weather if surfaces and areas to receive paint and coatings are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.
- E. Provide lighting level of 80 foot-candles (860 lx) measured mid-height at substrate surface.

1.9 SURPLUS MATERIALS

- A. Inquire and coordinate with Owner regarding disposition of excess and leftover paint materials. If Owner wishes to retain excess materials for maintenance and touch-up purposes, deliver excess materials to designated storage area as directed by Owner.
 - 1. Any materials not retained by Owner shall become the property of the Contractor and shall be removed from the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain block fillers, primers, and undercoats for each coating system from the same manufacturer as the finish coats.
- B. Acceptable Manufacturers: Provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential-grade products are not permitted.
 - 1. Benjamin Moore & Co.
 - 2. The Comex Group: Kwal, Frazee, Colorwheel, Parker, General Paint.
 - 3. Dunn Edwards (DE).
 - 4. Glidden Professional Paints (GP).
 - 5. Kelly-Moore Paint Company Inc. (KM).
 - 6. PPG Industries, Pittsburgh Paints (PPG).
 - 7. Sherwin-Williams Company (The).

2.2 PERFORMANCE REQUIREMENTS

- A. Performance and Durability:
 - 1. ASTM D 16 Standard Test Method for Load Testing Refractory Shapes at High Temperatures.
 - 2. ASTM D 2486 Standard Test Method for Scrub Resistance of Interior Wall Paint.
 - 3. ASTM D 2805 Standard Test Method for Hiding Power of Paints by Reflectometry.
 - 4. ASTM D 4828 Standard Test Method for Practical Washability of Organic Coatings.
- B. Chemical Components of Paints and Coatings: Provide products complying with limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
 - 2. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.

2.3 MATERIALS

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Accessories: Linseed oil, shellac, turpentine, paint thinners, and similar materials not specifically indicated but necessary to achieve the finishes specified for commercial quality.
- C. Patching Materials: Latex filler compatible with paint systems.
- D. Fastener Head Cover Materials: Latex filler.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings.
 - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMUs): 12 percent.
 - c. Portland Cement Plaster: 12 percent.
 - d. Gypsum Board: 12 percent.
 - 2. Test cementitious substrates and plaster cement/stucco for alkalinity (pH).
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
 - 1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint or coating system consisting of primer and two top coats at a minimum.
 - a. When previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint or coating system. Failure of new paint system is not permitted.
 - 2. Shop Primed Metals: Inspect shop primed metals to determine if primer is in condition to receive and is compatible with topcoats.

- D. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator's acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Coordination of Work:
 - 1. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.
 - 2. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
 - 3. Repair defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
 - 4. Seal marks which may bleed through surface finishes.
 - 5. Touch up shop primer or previously painted surfaces prior to application of topcoats.
- C. Surface Cleaning: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition.
- D. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting
 - 1. Before applying paint or surface treatments, clean substrates of substances that impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces.
 - 2. Remove in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, protect items before surface preparation and painting.
 - a. After completing painting operations, reinstall removed items. Remove surface applied protection from in place items.
 - 3. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
 - 4. Seal marks which may bleed through surface finishes with shellac. Provide barrier coats over incompatible primers or remove and reprime.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

- E. Cementitious Substrates: Remove release agents, curing compounds, efflorescence, chalk, dust, dirt, grease, oils, release agents, mold, mildew, and existing paint. Roughen as necessary to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
1. Use abrasive blast cleaning methods if recommended by paint manufacturer.
 2. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions.
 - a. Determine alkalinity and moisture content of surfaces by performing appropriate pH testing. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct condition prior to application of paint.
 - b. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
 - c. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation after substrates have obtained percent relative humidity level recommended by paint manufacturer.
 - d. Perform additional moisture tests when recommended by manufacturer. Proceed with installation when moisture content complies with that permitted in manufacturer's written instructions.
 - e. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to thoroughly dry.
 3. Clean concrete decks and floors to receive paint or coating with a 5 percent solution of muriatic acid or etching cleaner. Flush floors with clean water to remove acid; neutralize with ammonia, rinse, allow to dry; vacuum before painting.
- F. Ferrous Metals: Remove rust, loose mill scale, and shop primer. Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
1. SSPC-SP 6/NACE No. 3: Blast steel surfaces clean as recommended by paint system manufacturer.
 2. SSPC-SP 2.
 3. SSPC-SP 3.
 4. SSPC-SP 7/NACE No. 4.
 5. SSPC-SP 11.
- G. Shop Primed Ferrous Metal Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop primed surfaces.
1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 2. Touch up bare areas and damaged shop applied prime coats. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

- H. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces with nonpetroleum based solvents leaving surface free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- I. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- J. Protective Coverings: Provide protections for duration of the work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.
- K. Renovated Surfaces: Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system.
 - 1. Remove surface film preventing proper adhesion and bond.
 - 2. Wash glossy paint with a solution of sal soda and rinse thoroughly.
 - 3. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
 - 4. Clean corroded iron and steel surfaces.
 - 5. Repair and blend into portland cement plaster.
 - 6. Prime bare surfaces.
 - 7. Tone varnished surfaces with stain bringing to uniform color.
 - 8. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.
- L. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.
- M. Paint and Coating Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 - 3. Do not use thinners for water based paints.
 - 4. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied.

- a. Tint undercoats to match the color of the finish coat. Provide sufficient differences in shade of undercoats to distinguish each separate coat.
- N. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- O. Metal Doors: Seal top and bottom edges with primer.

3.3 APPLICATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
 - 1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convactor covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
 - 2. Provide finish coats compatible with primers.
 - 3. Use applicators and techniques suited for paint and substrate indicated.
 - 4. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat.
 - 5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces.
 - a. Field painting of exposed surfaces include bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
 - b. Areas visible when permanent or built in fixtures, grilles, convactor covers, covers for finned tube radiation, and similar components are in place.
 - c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
 - 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 - 7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 8. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 9. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.
 - 10. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 11. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

12. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
 13. Sand lightly between each succeeding enamel or varnish coat.
- B. If undercoats or substrate conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Minimum Coating Thickness: Apply paint materials to dry film thickness indicated in paint schedule but no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
1. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.
- E. Application: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 2. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.
 3. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- F. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
1. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 2. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.

3. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
 4. Color code equipment, piping, conduit, and exposed duct work in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 5. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
 6. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.
 7. Paint the following work where exposed to view:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or paintable jacket material.
 8. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- G. Items Not to Receive Paint: Do not paint prefabricated items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- H. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.
- I. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.
- J. Finish Coats: Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through.
1. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.

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2. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- L. Touch Up: Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated.
 1. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
 2. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
 3. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
 4. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

3.4 WASTE MANAGEMENT

- A. Paint products are considered hazardous materials. Do not empty or allow excess paint to enter storm drainage systems. Comply with manufacturer's written instructions for disposal of leftover paint and paint buckets.
- B. Waste Disposal: Legally dispose of metal, plastic, and product waste, including accessories and used items, by recycling or reusing waste materials.
- C. Clean and recycle plastic paint containers. Do not dispose of paint containers in landfills.
- D. Do not dispose of unused paints, stains, and coatings by pouring into storm drainage or sewer systems.
- E. Do not allow run off water resulting from washing paint containers and applicators to seep into the ground or run into the storm drainage or sewer systems.
 1. Prior to disposing, allow unused paint to dry in can before legally disposing.
- F. Legally dispose of unused paint, stain, and coatings and the containers in accordance with manufacturer's recommendations and environmental regulations.

3.5 CLEANING AND PROTECTION

- A. Clean Up: At end of each day, remove rubbish, empty cans, rags, and other discarded materials from site. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

- B. Protections: Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- D. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.
- E. Provide *Wet Paint* signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 EXTERIOR PAINT AND COATING SCHEDULE

- A. Ferrous Metal - Structural Steel and Metal Fabrications:
 - 1. Finish: Semi-gloss acrylic, anticorrosive alkyd primer and two finish coats.
 - 2. Primer:
 - a. GP: Devoe Coatings Devguard 4160 Tank & Structural Primer, 2.0 - 2.5 mils dft/coat.
 - b. Moore: Super Spec Universal Alkyd Metal Primer, 1.5 – 2.5 mils dft/coat.
 - c. PPG: Speedhide Interior/Exterior Rust Inhibitive Steel Primer, 1.5 – 2.0 mils dft/coat.
 - d. S-W: Kem Kromik Universal Metal Primer, 3.0 – 4.0 mils dft/coat.
 - e. KM: 1710 Kel-Guard Alkyd Rust Inhibitive Primer, 1.5 – 2.0 mils dft/coat.
 - f. Comex UltraTech C305 Alkyd Rust Inhibitive Metal Primer 1.5-2.0 mils dft.
 - 3. Finish Coats:
 - a. GP: 2516 Exterior Alkyd Semi-Gloss, 1.7 – 2.1 mils dft/coat.
 - b. Moore: SuperSpec DTM Alkyd Semi-Gloss Enamel, 1.5 – 2.5 mils dft/coat.
 - c. PPG: Industrial Semi-Gloss Oil, 2.0 – 2.2 dft/coat
 - d. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.
 - e. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
 - f. Comex UltraTech C413 High Performance DTM Semi-Gloss Acrylic 1.5-2.0 mils dft.
- B. Ferrous Metal – Guardrails and Handrails: Refer to Section 09 96 00 “High-Performance Coatings.”
- C. Ferrous Metal – Doors, Frames:
 - 1. Finish: Semi-gloss alkyd, anticorrosive primer and two finish coats.
 - 2. Primer:
 - a. Moore: Super Spec Universal Alkyd Metal Primer, 1.5 – 2.5 mils dft/coat.
 - b. GP: Devoe Coatings Devguard 4160 Tank & Structural Primer, 2.0 - 2.5 mils dft/coat.
 - c. KM: 1710 Kel-Guard Alkyd Rust Inhibitive Primer, 1.5 – 2.0 mils dft/coat.

- d. PPG: Speedhide Interior/Exterior Rust Inhibitive Steel Primer, 1.5 – 2.0 mils dft/coat.
 - e. S-W: Kem Kromik Universal Metal Primer, 3.0 – 4.0 mils dft/coat.
 - f. Comex UltraTech C305 Alkyd Rust Inhibitive Metal Primer 1.5-2.0 mils dft
 - 3. Finish Coats:
 - a. Moore: SuperSpec DTM Alkyd Semi-Gloss Enamel, 1.5 – 2.5 mils dft/coat.
 - b. GP: 2516 Exterior Alkyd Semi-Gloss, 1.7 – 2.1 mils dft/coat.
 - c. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
 - d. PPG: Industrial Semi-Gloss Oil, 2.0 – 2.2 dft/coat.
 - e. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.
 - f. Comex UltraTech C248 Ext Alkyd Semi-Gloss Enamel 2.0-3.0 mils dft
- D. Galvanized Metal - Structural Steel and Metal Fabrications:
- 1. Finish: Semi-gloss acrylic, primer and two finish coats.
 - 2. Primer:
 - a. GP: Devoe Coatings Devguard 4160 Tank & Structural Primer, 2.0 - 2.5 mils dft/coat.
 - b. Moore: IMC Universal Metal Primer, 1.5 – 2.5 mils dft/coat.
 - c. PPG: Speedhide Interior/Exterior Galvanized Steel Primer, 1.5 – 2.0 mils dft/coat.
 - d. S-W: Galvite HS, 3.0 – 4.5 mils dft/coat.
 - e. KM: 1712 All Metal Gard White Rust-Inhibitive Primer, 1.5 – 2.0 mils dft.
 - f. Comex UltraTech C309 Universal Water-Based Metal Primer 1.5-2.0 mils dft
 - 3. Finish Coats:
 - a. GP: 2516 Exterior Alkyd Semi-Gloss, 1.7 – 2.1 mils dft/coat.
 - b. Moore: SuperSpec DTM Alkyd Semi-Gloss Enamel, 1.5 – 2.5 mils dft/coat.
 - c. PPG: Industrial Semi-Gloss Oil, 2.0 – 2.2 dft/coat.
 - d. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.
 - e. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
 - f. Comex UltraTech C413 High Performance DTM Semi-Gloss Acrylic 1.5-2.0 mils dft.
- E. Galvanized Metal –Guardrails and Handrails: Refer to Section 09 96 00 “High-Performance Coatings.”
- F. Galvanized Metal – Doors, Frames:
- 1. Finish: Semi-gloss alkyd, primer and two finish coats.
 - 2. Primer:
 - a. Moore: IMC Universal Metal Primer, 1.5 – 2.5 mils dft/coat.
 - b. GP: Devoe Coatings Devguard All Purpose Metal & Galvanized Primer, 1.5 – 2.0 mils dft/coat.
 - c. KM: 1712 All Metal Gard White Rust-Inhibitive Primer, 1.5 – 2.0 mils dft.
 - d. PPG: Speedhide Interior/Exterior Galvanized Steel Primer, 1.5 – 2.0 mils dft/coat.
 - e. S-W: Galvite HS Alkyd, 3.0 – 4.5 mils dft/coat.
 - f. Comex UltraTech C309 Universal Water-Based Metal Primer 1.5-2.0 mils dft

3. Finish Coats:
 - a. Moore: SuperSpec DTM Alkyd Semi-Gloss Enamel, 1.5 – 2.5 mils dft/coat.
 - b. GP: 2516 Exterior Alkyd Semi-Gloss, 1.7 – 2.1 mils dft/coat.
 - c. KM: 1275 Weather Shield Int/Ext Semi-Gloss Oil, 1.7 – 2.2 mils dft/coat.
 - d. PPG: Industrial Semi-Gloss Oil, 2.0 – 2.2 dft/coat.
 - e. S-W: B54Z Industrial Enamel, 2.0 – 3.0 dft/coat.
 - f. Comex UltraTech C248 Ext Alkyd Semi-Gloss Enamel 2.0-3.0 mils dft.
- G. Wood – Plywood:
 1. Finish: Semi-Gloss acrylic latex, primer and two finish coats.
 2. Primer:
 - a. GP: Hydrosealer Primer Sealer 6001-1200, 1.4 – 1.7 mils dft.
 - b. Moore: 169 Moorcraft Supper Spec Latex Exterior Primer, 1.4 mils dft minimum.
 - c. PPG: 6-609 Speedhide Exterior House and Trim Wood Primer Flat, 1.3 – 1.6 dft.
 - d. S-W: A100 Exterior Latex Primer, 1.4 mils dft minimum.
 - e. KM: 250 Color Shield Exterior 100% Primer-Sealer 1.5-2.0 mils dft.
 - f. Comex UltraTech C312 Int/Ext 100% Acrylic Wood Primer 1.5-2.0 mils dft.
 3. Finish Coats:
 - a. Ultra-Hide 150 Exterior Semi-Gloss Paint 2416V, 1.3 – 1.5 mils dft/coat.
 - b. Moore: 170 Super Spec Latex House and Trim Paint, 1.1 mils dft minimum.
 - c. PPG: 6-900 Series Speedhide Exterior House and Trim Semi-Gloss Acrylic, 0.90 – 1.10 mils dft/coat.
 - d. S-W: Metallatex Semi-Gloss Coating B42 Series, 3.0 – 5.0 dft/coat.
 - e. KM: 1215 Color Shield Exterior Semi-Gloss Enamel 1.7-2.2 mils dft.
 - f. Comex UltraTech C206 Ext 100% Acrylic Semi-Gloss Enamel 1.5-2.0 mils dft.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and application of interior paint coating systems on interior substrates.
 - 1. Concrete.
 - 2. Concrete masonry units (CMUs).
 - 3. Steel and iron not otherwise schedule to receive high-performance coating.
 - 4. Galvanized metal.
 - 5. Aluminum (not anodized or otherwise coated).
 - 6. Gypsum board.
 - 7. Cotton or canvas insulation covering.
 - 8. ASJ insulation covering.
 - 9. Other exposed surfaces not scheduled to receive factory finish.
- B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following shop- and factory-finished components:
 - a. Architectural woodwork and casework.
 - b. Metal lockers.
 - c. Prefinished elevator entrance doors and frames.
 - d. Elevator equipment.
 - e. Finished mechanical and electrical equipment.
 - f. Light fixtures.
 - g. Distribution cabinets.
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - c. Pipe spaces.
 - d. Duct shafts.
 - e. Elevator shafts.
 - 3. Finished metal surfaces include the following:
 - a. Door hardware.
 - b. Aluminum.
 - c. Brass.
 - d. Bronze.
 - e. Chromium plate.

- f. Copper.
 - g. Nickel.
 - h. Stainless steel.
- 4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- 5. Operating parts including moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.

1.2 DEFINITIONS

- A. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D 523 shall comply with following:
 - 1. Gloss Level 1 – Flat: Not more than five units at 60 degrees and 10 units at 85 degrees.
 - 2. Gloss Level 2 – Low Sheen: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
 - 3. Gloss Level 3 – Eggshell: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
 - 4. Gloss Level 4 – Satin: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
 - 5. Gloss Level 5 – Semigloss: 35 to 70 units at 60 degrees.
 - 6. Gloss Level 6 – Gloss: 70 to 85 units at 60 degrees.
 - 7. Gloss Level 7 – High Gloss: More than 85 units at 60 degrees.

1.3 COORDINATION

- A. Coordination of Work: Coordinate field finishing of shop primed metals are provided to ensure compatibility of total systems for various substrates.

1.4 ACTION SUBMITTALS

- A. Product Data: Technical data and product information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, surface preparation, and application for each paint and coating system.
 - 1. For field painting of factory primed metal products and fabrications, submit technical data for each type of paint product, surface preparation requirements, and application instructions.
 - 2. Indicate manufacturer's instructions for special surface preparation procedures and substrate conditions requiring special attention.

3. Product List: Provide inclusive list of required coating materials. Indicate each material and cross reference specific coatings, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification. Use same designations indicated in Finish Schedules.
- B. Samples: Submit aged (minimum seven day old) paint samples for each type of paint system and each color and gloss of topcoat.
1. Provide stepped draw-down samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
 - a. Label draw-down samples with the following:
 - 1) Paint manufacturer.
 - 2) Manufacturer's color name, number, and sheen.
 - 3) Paint formula employed to produce designated color and sheen.
 - 4) Date paint was mixed.
 2. Provide list of material and application for each coat of each sample. Label each sample as to location and application.
 3. Submit samples on substrates for review of color and texture:
 - a. Concrete: Two 4 inch (50 mm) square samples for each color and finish.
 - b. Concrete Masonry: Two 4 by 8 inch (100 by 200 mm) samples of masonry, with mortar joint in the center, for each finish and color.
 - c. Painted Wood: Two 12 inch (305 mm) square samples of each color and material on hardboard.
 - d. Ferrous and Nonferrous Metals: Two 4 inch (100 mm) square samples of flat metal and two 8 inch (200 mm) long samples of solid metal for each color and finish.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For applicator.
- B. Quality Control Submittals: Furnish certificates from manufacturer that products supplied comply with VOC content limits and emission in accordance with local, state, and federal regulations and sustainability limit requirements.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals including but not limited to lead and mercury. Do not use solvents in paint products that contribute to air pollution.
- B. Applicator Qualifications: Entity having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing and reducing drying time, cleanup requirements, color designation, and application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Do not thin or add water to waterbased paints, including waterbased alkyds.
- B. Weather Conditions:
 1. Apply paints when temperature of surfaces to be painted and ambient air temperatures are between 50 degrees F and 95 degrees F (10 degrees C and 35 degrees C).
 2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
 3. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (35 degrees C) for exterior, unless otherwise indicated by manufacturer's Product Data Sheet.
- C. Apply solvent thinned paints when temperatures of surfaces to receive paint and surrounding air are between 45 degrees F. and 95 degrees F (7 degrees F and 35 degrees C).
 1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.

- D. Painting may continue during inclement weather if surfaces and areas to receive paint and coatings are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.
- E. Provide lighting level of 80 foot-candles (860 lx) measured mid-height at substrate surface.

1.9 SURPLUS MATERIALS

- A. Inquire and coordinate with Owner regarding disposition of excess and leftover paint materials. If Owner wishes to retain excess materials for maintenance and touch-up purposes, deliver excess materials to designated storage area as directed by Owner.
 - 1. Any materials not retained by Owner shall become the property of the Contractor and shall be removed from the site.

PART 2 - PRODUCTS

- A. Source Limitations: Obtain block fillers, primers, and undercoats for each coating system from the same manufacturer as the finish coats.
- B. Acceptable Manufacturers: Provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential-grade products are not permitted.
 - 1. Benjamin Moore & Co. (Moore).
 - 2. The Comex Group: Kwal, Frazee, Colorwheel, Parker, General Paint.
 - 3. Dunn Edwards (DE).
 - 4. Glidden Professional Paints (AN).
 - 5. Kelly-Moore Paint Company Inc. (KM).
 - 6. PPG Industries, Pittsburgh Paints (PPG).
 - 7. The Sherwin-Williams Company (S-W).

2.2 PERFORMANCE REQUIREMENTS

- A. Performance and Durability:
 - 1. ASTM D 16 Standard Test Method for Load Testing Refractory Shapes at High Temperatures.
 - 2. ASTM D 2486 Standard Test Method for Scrub Resistance of Interior Wall Paint.
 - 3. ASTM D 2805 Standard Test Method for Hiding Power of Paints by Reflectometry.
 - 4. ASTM D 4828 Standard Test Method for Practical Washability of Organic Coatings.
- B. Chemical Components of Field Applied Interior Paints and Coatings: Provide topcoat paints and anticorrosive and antirust paints applied to ferrous metals that comply with chemical restrictions; these requirements do not apply to paints and coatings applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.

2.3 MATERIALS

- A. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Accessories: Linseed oil, shellac, turpentine, paint thinners, and similar materials not specifically indicated but necessary to achieve the finishes specified for commercial quality.
- C. Patching Materials: Latex filler compatible with paint systems.
- D. Fastener Head Cover Materials: Latex filler.
- E. Colors: As indicated in Finish Schedule on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings.
 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMUs): 12 percent.
 - c. Portland Cement Plaster: 12 percent.
 - d. Gypsum Board: 12 percent.
 2. Test cementitious substrates and plaster cement/stucco for alkalinity (pH).
- C. Gypsum Board Substrates: Verify joints are properly taped and finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint or coating system consisting of primer and two top coats at a minimum.
 - a. When previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint or coating system. Failure of new paint system is not permitted.
 2. Shop Primed Metals: Inspect shop primed metals to determine if primer is in condition to receive and is compatible with topcoats.
- E. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator's acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Coordination of Work:
1. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.
 2. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
 3. Repair defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
 4. Seal marks which may bleed through surface finishes.
 5. Touch up shop primer or previously painted surfaces prior to application of topcoats.
- C. Surface Cleaning and Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition.
- D. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting
1. Before applying paint or surface treatments, clean substrates of substances that impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces.

2. Remove hardware, covers, plates, and similar items in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.
 - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection.
 3. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
 4. Seal marks which may bleed through surface finishes with shellac.
 5. Provide barrier coats over incompatible primers or remove and reprime.
 6. Correct defects and clean surfaces which affect the Work.
 7. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- E. Cementitious Substrates: Remove release agents, curing compounds, efflorescence, chalk, dust, dirt, grease, oils, release agents, mold, mildew, and existing paint. Roughen as necessary to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
1. Use abrasive blast cleaning methods if recommended by paint manufacturer.
 2. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions.
 - a. Determine alkalinity and moisture content of surfaces by performing appropriate pH testing. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct condition prior to application of paint.
 - b. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
 - c. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation after substrates have obtained percent relative humidity level recommended by paint manufacturer.
 - d. Perform additional moisture tests when recommended by manufacturer. Proceed with installation when moisture content complies with that permitted in manufacturer's written instructions.
 - e. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to thoroughly dry.
 3. Clean concrete floors to receive paint or coating with a 5 percent solution of muriatic acid or etching cleaner. Flush floors with clean water to remove acid; neutralize with ammonia, rinse, allow to dry; vacuum before painting.
- F. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

- G. Ferrous Metals: Remove rust, loose mill scale, and shop primer. Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
 - 1. SSPC-SP 11.
- H. Shop Primed Ferrous Metal Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop primed surfaces.
 - 1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - 2. Touch up bare areas and damaged shop applied prime coats. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- I. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces with nonpetroleum based solvents leaving surface free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- J. Aluminum Substrates: Remove surface oxidation with acid etch and solvent washing. Remove oil, grease, surface oxidation, and contaminants in accordance with SSPC SP-1 Solvent Cleaning. Apply etching primer immediately following cleaning.
- K. Wood Substrates:
 - 1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime, stain, or seal wood to be painted. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - 4. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- L. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- M. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- N. Mildew and Mold Removal: Remove mildew and mold by high power washing (pressure range of 1500 to 4000 psi) with solution of trisodium phosphate and bleach. If substrate is too soft for high power washing, scrub substrate with solution. Rinse with clean water and allow surface to dry.

- O. Protective Coverings: Provide protections for duration of the Work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.
- P. Renovated Surfaces: Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system.
 - 1. Remove surface film preventing proper adhesion and bond.
 - 2. Wash glossy paint with a solution of sal soda and rinse thoroughly.
 - 3. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
 - 4. Clean corroded iron and steel surfaces.
 - 5. Repair and blend into portland cement plaster.
 - 6. Prime bare surfaces.
 - 7. Tone varnished surfaces with stain bringing to uniform color.
 - 8. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.
- Q. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- R. Pipe Covering and Insulation: Remove loose, foreign, and objectionable material before applying sealing coat.
- S. Preparation of Substrates for Wallcovering: Prime and seal substrate with release coat in accordance with wallcovering manufacturer's recommendations for substrate.
 - 1. Assure compatibility with product of wall covering manufacturer.
 - 2. Fill indentations in substrate and prime with opaque white primer before applying release coat.
 - 3. Apply release coat in accordance with manufacturer's recommendations.
- T. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.
- U. Paint and Coating Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
 - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Do not use thinners for water based paints.
 4. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat. Provide sufficient differences in shade of undercoats to distinguish each separate coat.
- V. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- W. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- X. Wood and Metal Doors: Seal top and bottom edges with primer.

3.3 APPLICATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convactor covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
 2. Provide finish coats compatible with primers.
 3. Use applicators and techniques suited for paint and substrate indicated.
 4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces.
 - a. Field painting of exposed surfaces include bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
 - b. Areas visible when permanent or built in fixtures, grilles, convactor covers, covers for finned tube radiation, and similar components are in place.
 - c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
 - d. Finish doors on tops, bottoms, and side edges the same as exterior faces.
 6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 8. rating, or nomenclature plates.
 9. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.

10. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 11. Paint entire exposed surface of window frames and sashes.
 12. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 13. Sand lightly between each succeeding enamel or varnish coat.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Minimum Coating Thickness: Apply paint materials to dry film thickness indicated in paint schedule but no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
1. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.
- F. Application: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 2. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.
 3. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

1. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
 2. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
 3. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
 4. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
 5. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
 6. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
 7. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.
 8. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Tanks that do not have factory applied final finishes.
 - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or paintable jacket material.
 9. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.
 - d. Pipe hangers and supports.
 - e. Metal conduit.
 - f. Plastic conduit.
 - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - h. Other items as directed by Architect.
 10. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- H. Items not to Receive Paint: Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

- I. Electrostatic Spray Painting: Apply coating electrostatically to finished surfaces, free from runs, sags, visible overlaps, holidays, craters, pinholes and other defects detrimental to protective and decorative qualities of coating.
 - 1. Thickness of Coatings: 1.5 to 2.0 mils dry film thickness. Measure dry film thickness with magnetic gauge.
 - 2. Use application techniques, equipment, materials, and preparation procedures recommended by manufacturer.
- J. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.
- K. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.
- L. Finish Coats: Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through.
 - 1. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.
 - 2. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.
- M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- N. Touch Up: Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated.
 - 1. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
 - 2. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
 - 3. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
 - 4. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 WASTE MANAGEMENT

- A. Paint products are considered hazardous materials. Do not empty or allow excess paint to enter storm drainage systems. Comply with manufacturer's written instructions for disposal of leftover paint and paint buckets.
- B. Waste Disposal: Legally dispose of metal, plastic, and product waste, including accessories and used items, by recycling or reusing waste materials.
- C. Clean and recycle plastic paint containers. Do not dispose of paint containers in landfills.
- D. Do not dispose of unused paints, stains, and coatings by pouring into storm drainage or sewer systems.
- E. Do not allow run off water resulting from washing paint containers and applicators to seep into the ground or run into the storm drainage or sewer systems.
 - 1. Prior to disposing, allow unused paint to dry in can before legally disposing.
- F. Legally dispose of unused paint, stain, and coatings and the containers in accordance with manufacturer's recommendations and environmental regulations.

3.6 CLEANING AND PROTECTION

- A. Clean Up: At end of each day, remove rubbish, empty cans, rags, and other discarded materials from site. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protections: Protect Work of other trades against damage from paint application. Correct damage to Work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- D. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.

- E. Provide *Wet Paint* signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related Work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 INTERIOR PAINT AND COATING SCHEDULE

A. Cotton or Canvas Covering over Insulation:

- 1. Finish: Interior, flat, latex-based paint.
 - a. AN: Glidden Ultra-Hide No VOC Interior Flat Paint 1209 (0 g/L VOC), 1.3 - 1.5 mils dft/coat.
 - b. Moore: 219 Eco Spec Interior Latex Flat 9) g/L VOC), 1.2 mils dft/coat minimum.
 - c. PPG: 9100 Series Pure Performance Interior flat Latex (0 g/L VOC), 1.8 mils dft/coat minimum.
 - d. S-W: ProMar 200 Zero VOC Interior Flat Paint B30-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
 - e. KM: 1500 Enviro-Coat 100% Acrylic Interior Flat Wall Paint (0 g/L VOC) 1.5 - 2.0 mils dft/coat.
 - f. Comex: UltraTech C115 Interior Latex Flat Finish (35g/L VOC) 1.5 - 2.0 mils

B. Gypsum Board:

- 1. Finish: Lusterless (flat) latex; primer and two finish coats.
- 2. Primer: No Substitutions.
 - a. GP: Glidden Lifemaster No VOC Interior Primer Sealer 9116-1200, (0 g/L VOC), 1.4 mils dft minimum.
 - b. Moore: Ultra Spec 500 Waterborne Interior Primer Sealer N534, (0 g/L VOC), 1.8 mils dft minimum.
 - c. PPG: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dft minimum.
 - d. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W2600 (0 G/L VOC), 1.5 mils dft minimum.
 - e. KM: 971 Acry-Plex Zero VOC Interior PVA Primer/Sealer (0 g/L VOC), 2.0 mils dft minimum.
 - f. Comex: Ultratech Interior Latex Primer Sealer C152, (44 g/L VOC), 2.0 mils dft minimum.
- 3. Finish Coats:
 - a. GP: Glidden Lifemaster No VOC Interior Flat Paint 9100 (0 g/L VOC), 1.3 - 1.5 mils dft/coat.
 - b. Moore: Waterborne Ceiling Paint, Flat, 0 VOC, 508, 1.4 mils dft/coat
 - c. PPG: 6-4110XI Speedhide zero Interior Flat Latex (0 g/L VOC), 1.8 mils dft/coat minimum.
 - d. S-W: ProMar 200 Zero VOC Interior Flat Paint B30-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
 - e. KM: 1005 KM PROFESSIONAL Interior Acrylic ZERO VOC Flat Wall Paint (0 g/L VOC) 1.5-2.0 mils dft.
 - f. Comex: UltraTech C129 Int Low Odor Zero VOC Flat (0g/L VOC) 1.6 mils dft/coat minimum.

4. Location: Ceilings Only.

C. Gypsum Board:

1. Finish: Satin latex enamel; primer and two finish coats.
2. Primer: No Substitutions.
 - a. DE: Vinylastic Premium Interior Wall Sealer VNPR00-1 (<51 g/L VOC)
 - b. BM: Eco Spec WB Interior Latex Primer N372/F372 (<51 g/L VOC)
 - c. PPG: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dft minimum.
 - d. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W2600 (0 G/L VOC), 1.5 mils dft minimum.
3. Finish Coats:
 - a. BM: Premium Interior Latex Eggshell W626/K626 (<51 g/L VOC)
 - b. DE: Low Odor Zero VOC Interior Velvet Paint EVER20 (<51 g/L VOC)
 - c. PPG: 6-411 Series Speedhide Interior Enamel Eggshell Latex (73 g/L VOC), 1.5 – 1.7 mils dft/coat.

D. Ferrous Metal:

1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
2. Primer:
 - a. AN: Devoe Coatings Devflex 4020PF DTM Primer & Finish (75 g/L VOC), 2.2 – 3.5 mils dft.
 - b. Moore: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dft minimum.
 - c. PPG: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dft.
 - d. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 (<100 g/L VOC), 2.0 – 4.0 mils dft.
 - e. KM: 5725 DTM Acrylic Metal Primer (125 g/L VOC) 1.5 - 2.0 mils dft.
 - f. Comex: UltraTech C309 Universal Water-based Metal Primer (85g/L VOC) 1.5 - 2.0 mils dft.
3. Finish Coats:
 - a. AN: Glidden Ultra-Hide No VOC Interior Semi-Gloss Paint 1415 (0 g/L VOC), 1.3 dft/coat minimum.
 - b. Moore: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (< 150 g/L), 1.2 mils dft/coat minimum.
 - c. PPG: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dft/coat.
 - d. S-W: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
 - e. KM: 2020 Green Coat –ZERO VOC- Interior Latex Semi-Gloss Enamel (0 g/L VOC) 1.7 - 2.2 mils dft.
 - f. Comex: UltraTech C413 High Perf DTM Semi Gloss Acrylic (240g/L VOC) 1.5-2.0 mils dft/coat.

E. Ferrous Metal – Guardrails and Handrails: Refer to Section 09 96 00 “High-Performance Coatings.”

F. Ferrous Metal – Doors, Frames:

1. Finish: Semi-gloss, waterborne light industrial coating; primer and two finish coats.
2. Primer:
 - a. AN: Devoe, Devflex 4020 Direct to Metal Primer & Flat Finish (91 g/L VOC) 2.2 – 3.5 mils dft.
 - b. PPG: Pitt-Tech Plus, Int/Ext DTM Industrial Primer 90-912 (<90 g/L VOC) 2.0 – 4.0 mils dft.
 - c. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 (<100 g/L VOC) 2.0 – 4.0 mils dft.
3. Finish Coats:
 - a. AN: Devoe High Performance Devflex 4216 High Performance WB Acrylic Semi-Gloss Enamel 4216L (<150 g/L VOC) 2.0 – 4.0 mils dft/coat.
 - b. PPG: Pitt-Glaze WB1, Pitt-Glaze WBI Int. Semi-Gloss Acrylic Epoxy 16-510 (<100 g/L VOC) 1.5 mils dft/coat minimum.
 - c. S-W: Pro Industrial, Pre-Catalyzed Waterbased Epoxy Semi-Gloss (<143 g/L VOC) 1.5 mils dft/coat minimum.

G. Ferrous Metal – Galvanized:

1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
2. Primer:
 - a. AN: Devoe Coatings Devflex 4020 DTM Primer & Finish (75 g/L VOC), 2.2 – 3.5 mils dft.
 - b. Moore: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dft minimum.
 - c. PPG: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dft.
 - d. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 (<100 g/L VOC), 2.0 – 4.0 mils dft.
 - e. KM: 1725 Acry-Shield 100% Acrylic Metal Primer (100 g/L VOC) 1.5 - 2.0 mils dft.
 - f. Comex: UltraTech C309 Universal Water-based Metal Primer (85g/L VOC) 1.5 - 2.0 mils dft.
3. Finish Coats:
 - a. AN: Glidden Ultra-Hide No VOC Interior Semi-Gloss Paint 1415 (0 g/L VOC), 1.3 dft/coat minimum.
 - b. Moore: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (<150 g/L VOC), 1.2 mils dft/coat minimum.
 - c. PPG: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dft/coat.
 - d. S-W: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.7 mils dft/coat minimum.
 - e. KM: 2020 Green Coat –ZERO VOC- Interior Latex Semi-Gloss Enamel (0 g/L VOC) 1.7 - 2.2 mils dft/coat.
 - f. Comex: UltraTech C136 Int Low Odor Zero VOC Semi-Gloss Finish (0g/L VOC) 1.5 - 2.0 mils dft/coat.

H. Woodwork:

1. Finish: Semi-gloss waterborne acrylic enamel; primer and two finish coats.
2. Primer:
 - a. AN: Glidden Gripper Interior/Exterior Primer Sealer 3210-1200, (<100 g/L VOC), 1.7 mils dft minimum.
 - b. Moore: 216 Regal First Coat Interior Latex Primer & Underbody (<100 g/L VOC), 1.0 mils dft minimum.
 - c. PPG: 17-921 Series Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer (89 g/L VOC), 1.2 – 1.5 mils dft.
 - d. S-W: Premium Wall & Wood Interior Latex Primer B28W8111 (41 g/L VOC), 1.8 mils dft minimum.
 - e. KM: 973 Acry-Plex Zero VOC Interior Wall Primer & Undercoat (0 g/L VOC) 1.5 - 2.0 mils dft.
 - f. Comex UltraTech C312 Int/Ext Acrylic primer (49g/L VOC) 1.5 - 2.0 mils dft
3. Finish Coats:
 - a. AN: Glidden Ultra-Hide 250 Interior Semi-Gloss Paint 1406N (<50 g/L VOC), 1.4 mils dft/coat minimum.
 - b. Moore: 314 Low Lustre Waterborne Satin Impervo (<150 g/L VOC), 1.4 mils dft/coat minimum.
 - c. PPG: 87-6 Series Manor Hall Interior Semi-Gloss Acrylic Latex (140 g/L VOC), 1.3 – 1.4 mils dft/coat.
 - d. S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
 - e. KM: 2020 Green Coat –ZERO VOC- Interior Latex Semi-Gloss Enamel (0 g/L VOC) 1.7 - 2.2 mils dft/coat.
 - f. Comex: UltraTech C119 Int Latex Semi-Gloss (50g/L VOC) 1.5 mils dft/coat minimum.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Unprimed steel.
 - b. Primed steel
 - c. Galvanized metal.
 - 2. Interior Substrates:
 - a. Primed steel where scheduled.
- B. Related Requirements:
 - 1. Section 09 91 13 "Exterior Painting" for general exterior field painting.
 - 2. Section 09 91 23 "Interior Painting" for general interior field painting.
 - 3. Section 09 96 53 "Elastomeric Coatings" for field painting of exterior cementitious and masonry substrates.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 DEFINITIONS

- A. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D 523 shall comply with following:
- B. Gloss Level 5 – Semigloss: 35 to 70 units at 60 degrees.
- C. Gloss Level 6 – Gloss: 70 to 85 units at 60 degrees.
- D. Gloss Level 7 – High Gloss: More than 85 units at 60 degrees.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Formulate product data sheets into sets for each coating system required.
 - 2. Indicate VOC content.

- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on actual substrate material to be coated, 8 inches (200 mm) square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
 - 5. Allow samples to dry a minimum of 7-days before submitting.
- C. Product List: Use same designations indicated on Drawings and in High-Performance Coating Schedule. Include color designations and product runs (batch numbers).

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For installer / applicator.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. No extra materials will be required for owner's attic stock.

1.7 QUALITY ASSURANCE

- A. Applicator Qualifications: Approved and trained by coating manufacturer, with minimum five years documented experience applying coatings on commercial projects of similar size, scope, and complexity.
- B. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 1. Include manufacturer's name, product name, lot number, and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing, drying time, cleanup requirements, and application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.9 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply coatings when relative humidity exceeds 85 percent. The surface should be dry and at least 5 degrees above the dew point and rising.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Manufacturer: Tnemec Company, Inc.
- B. Acceptable Manufacturers: Provide products from the Basis of Design manufacturer or, subject to compliance with requirements, provide comparable products, as determined by the Architect, from one of the following manufacturers:
 - 1. AkzoNobel (AN).
 - 2. Comex Group (CG)
 - 3. PPG Industries, Inc. (PPG).
 - 4. Precision Coatings (PC).
 - 5. Sherwin Williams Co. (SW).

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

HIGH-PERFORMANCE COATINGS

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2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 3. Provide products of same manufacturer for each coat in a coating system.
- B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior coatings applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 150 g/L.
 3. Primers, Sealers, and Undercoaters: 100 g/L.
 4. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: 250 g/L.
 5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 6. Pre-Treatment Wash Primers: 420 g/L.
 7. Floor Coatings: 100 g/L.
- C. Low-Emitting Materials: Interior coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Colors: Provide custom colors of the finished paint systems to match the Architect's samples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and coating systems indicated.

- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
 - 3. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:
 - 1. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metals, Stainless Steel and Non-Ferrous Metals including Aluminum Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings. Clean using methods recommended in writing by coating manufacturer, but not less than the following:
 - 1. SSPC-SP 16 "Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals".
- G. Steel Fire Stand Pipes or Water Filled Pipes: Paint with Anti-corrosion epoxy finish and prep accordingly (Remove grease and oil residue...) show the current product information used (pull information from past project: Central plants and exterior fire valves.

3.3 APPLICATION

- A. Apply high-performance coatings in accordance with manufacturer's written instructions.
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

HIGH-PERFORMANCE COATINGS

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4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings at spreading rates recommended by coating manufacturer to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.
- E. Remove and refinish or recoat work that does not comply with specified requirements.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
 1. Contractor shall touch up and restore coated surfaces damaged by testing.
 2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 HIGH-PERFORMANCE COATINGS SCHEDULE

- A. Basis of Design products listed below are from Tnemec unless otherwise indicated.
- B. Steel, Zinc-Coated (Galvanized and Galvannealed) (Sg) Moderate Environment:

1. Paint System Sg-P5: Aliphatic Polyurethane Enamel over Epoxy primer, Semi-gloss Finish:
 - a. Prime Coat: Series N69 Hi-Build Epoxoline II Polyamidoamine Epoxy; 4.0 to 6.0 mils DFT.
 - b. Topcoat: Series 1075 Endura-Shield II; 2.0 to 5.0 DFT.
 2. Paint System Sg-P6: Aliphatic Polyurethane Enamel over Epoxy primer, Gloss Finish:
 - a. Prime Coat: Series N69 Hi-Build Epoxoline II Polyamidoamine Epoxy; 4.0 to 6.0 mils DFT.
 - b. Topcoat: Series 1074 Endura-Shield II; 2.0 to 5.0 DFT.
- C. Steel, Unprimed (Su) Substrates Moderate Environment:
1. Paint System Su-P7: Acrylic Aliphatic Polyurethane Enamel over Zinc-Rich or Manufacturer's recommended Epoxy Primer, High-Gloss Finish:
 - a. Prime Coat: Tneme-Zinc 90-97 – 3.0 DFT.
 - b. Intermediate Coat: Series N69 Hi-Build Epoxoline II Polyamidoamine Epoxy - 3.0 DFT.
 - c. Topcoat: Series 1074 Endura-Shield II. – 2.0 to 3.0 DFT.
 2. Paint System Su-P5: Acrylic Aliphatic Polyurethane Enamel over Zinc-Rich or Manufacturer's recommended Epoxy Primer, Semi-gloss Finish:
 - a. Prime Coat: Series N69 Hi-Build Epoxoline II Polyamidoamine Epoxy - 3.0 DFT
 - b. Topcoat: Series 1075 Endura-Shield – 4.0 DFT.
- D. Steel, Factory-Primed (Sp) Substrates Moderate Environment:
1. Paint System Sp-P7 Aliphatic Polyurethane, over primer, High-Gloss Finish:
 - a. Prime Coat: Tneme-27 W.B. Typoxy – 3.0 DFT
 - b. Topcoat: Series 1074 Endura-Shield II. – 2.0 to 3.0 DFT.
 2. Paint System Sp-P5 Aliphatic Polyurethane, over primer, Semi-Gloss Finish:
 - a. Prime Coat: Series N69 Hi-Build Epoxoline II Polyamidoamine Epoxy - 3.0 DFT
 - b. Topcoat: Series 1075 Endura-Shield – 4.0 DFT.

END OF SECTION

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SECTION 09 96 53

ELASTOMERIC COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation and application of elastomeric coatings to the following exterior substrates:
 - 1. Exposed exterior precast concrete where scheduled.
 - 2. Exposed exterior cast-in-place concrete where scheduled.
 - 3. Exposed concrete unit masonry where scheduled.
 - 4. Exposed cement stucco where scheduled.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include label analysis and instructions for handling, storing, surface preparation, and application for each paint and coating system.
 - 2. Indicate manufacturer's instructions for special surface preparation procedures and substrate conditions requiring special attention.
- B. Samples for Verification: Submit for each type of elastomeric coating indicated and each color and gloss.
 - 1. Submit Samples on same type of substrate as that to receive application, 8 inches (200 mm) square.
 - 2. Apply coats on Samples in steps to show each separate coat, including primers and block fillers as applicable.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: Cross reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For applicator.
- B. Sample Warranty: For special warranty.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Entity having minimum 5 years documented experience in applying elastomeric coatings similar in material, design, and extent to those indicated.
- B. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).
 - 1. Protect elastomeric coating materials from freezing or becoming hot.
 - 2. Maintain containers in clean condition, free of foreign materials and residue.

1.6 FIELD CONDITIONS

- A. Do not thin or add water to waterbased paints, including waterbased alkyds.
- B. Weather Conditions:
 - 1. Apply coatings when temperature of surfaces to be painted and ambient air temperatures are between 50 and 90 degrees F (10 degrees C and 32 degrees C).
 - 2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.
 - 3. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (35 degrees C) for exterior, unless otherwise indicated by manufacturer's Product Data Sheet.
- C. Painting may continue during inclement weather if surfaces and areas to receive paint and coatings are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.

- D. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before starting or continuing coating operation.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace elastomeric coatings that fail within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Water penetration through the coating.
 - b. Deterioration of coating beyond normal weathering.
 - 2. Warranty Period: 10 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Quantity: Furnish an additional 5 percent but not less than 1 gal. (3.8 L) of each material, color, and texture applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BASF Corporation.
 - 2. Kelly-Moore Paint Company Inc.
 - 3. PPG Paints.
 - 4. Pratt & Lambert.
 - 5. Sherwin-Williams Company (The).
- B. Source Limitations: Obtain elastomeric coating materials from single source and from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Performance and Durability:
 - 1. ASTM D 16 Standard Test Method for Load Testing Refractory Shapes at High Temperatures.
 - 2. ASTM D 412 Rubber Properties in Tension.
 - 3. ASTM D 16 53 Test Methods for Water Vapor Transmission of Organic Coating Films.
 - 4. ASTM D 2486 Standard Test Method for Scrub Resistance of Interior Wall Paint.

5. ASTM D 2805 Standard Test Method for Hiding Power of Paints by Reflectometry.
6. ASTM D 4828 Standard Test Method for Practical Washability of Organic Coatings.

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.3 MATERIALS

- A. Elastomeric Paint Coating: Factory formulated, 100 percent acrylic or silicone emulsion finish coating materials, compatible with substrate, filler, and primer required.
1. Physical Properties:
 - a. Elongation at Break: Not less than 240 percent when tested according to ASTM D 412 or ASTM D 2370.
 - b. Low Temperature Flexibility: Passes 1/8 inch, 180 degree mandrel bend at minus 10 degrees F at 20 mil dry film thickness when tested according to ASTM D 552.
 - c. Tensile Strength: Not less than 220 psi when tested according to ASTM D 412 or ASTM D 2370.
 - d. Water Vapor Permeability: Not less than 10 perms when tested according to ASTM D 1653 or ASTM E 96.
 - e. Wind Driven Rain Test: No water penetration when tested according to ASTM D 6904.
 - f. Minimum Dry Film Thickness per Coat: Not less than 10 mils.
 - g. Minimum Solids Content by Volume: Not less than 45 percent.
- B. Moisture Vapor Transmission: Minimum 34.4 perms, based on testing according to ASTM D1653.
- C. Basis of Design Product: Conflex By Sherwin Williams.
1. Texture: Light, unless otherwise indicated.
 2. Colors: As selected by Architect from manufacturer's full range.
- D. Crack Fillers: Elastomeric coating manufacturer's recommended, factory formulated crack fillers or sealants, including crack filler primers, compatible with substrate and other materials indicated.
- E. Primer: Elastomeric coating manufacturer's recommended, factory formulated, alkali resistant primer compatible with substrate and other materials indicated.
- F. Concrete Unit Masonry Block Filler: Elastomeric coating manufacturer's recommended, factory formulated, high performance latex block filler compatible with substrate and other materials indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with manufacturer's requirements for maximum moisture content, alkalinity, and conditions affecting performance of work.
- B. Test substrates for moisture and alkalinity after repairing and cleaning substrates but prior to application of paint and coatings.
- C. Begin coating only when moisture content of substrate is 12 percent or less when measured with an electronic moisture meter.
- D. Begin coating no sooner than 28 days after substrate is constructed and is visually dry on both sides.
- E. Verify that substrate is within the range of alkalinity recommended by manufacturer.
- F. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- G. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and coating systems indicated.
- B. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
 - 1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
 - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
 - 2. Perform cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
 - 3. Cementitious Surfaces: Prepare surfaces of concrete, concrete masonry, stucco, and similar surfaces to receive elastomeric coatings by removing efflorescence, chalk, dust, dirt, release agents, grease, oils, and similar conditions by water blasting followed by a clear water rinse.

4. Remove mildew and neutralize surfaces according to manufacturer's recommendations before materials are applied.
 5. Determine alkalinity and moisture content of surfaces to be coated by testing. Do not apply coatings over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
- D. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.

3.3 APPLICATION

- A. Apply elastomeric coatings according to manufacturer's written instructions.
1. Use equipment and techniques best suited for substrate and type of material being applied.
 2. Coat surfaces behind movable items the same as similar exposed surfaces.
 3. Apply each coat separately according to manufacturer's written instructions.
- B. Primers: Apply at a rate to ensure complete coverage.
- C. Block Fillers: Apply at a rate to ensure complete coverage with pores filled.
- D. Elastomeric Finish Coat(s): Minimum two coats with a total dry film thickness of 16 to 18 mils (0.41 to 0.45 mm).
- E. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform finish, color, and appearance.
- F. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- G. Apply coatings to prepared surfaces as soon as practicable after preparation and before subsequent surface soiling or deterioration.
- H. Spray Application: Use spray equipment for application when permitted by authorities having jurisdiction. Wherever spray application is used, do not double back with spray equipment to build up film thickness of two coats in one pass.

3.4 FIELD QUALITY CONTROL

- A. Field Testing and Inspection: Owner reserves the right to engage the services of a qualified testing agency to verify installed thickness of elastomeric coatings.

3.5 CLEANING AND PROTECTION

- A. At end of each day, remove rubbish, empty cans, rags, and discarded materials from project site.

- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities, touch up and restore damaged or defaced coated surfaces.

3.6 ELASTOMERIC COATING SCHEDULE

- A. General:
 - 1. Elastomeric Coating: Pigmented, exterior, water-based, flat coating.
- B. Provide the following coating systems for substrates indicated.
- C. Concrete Substrates: Two finish coats over primer with total dry film thickness not less than 20 mils.
 - 1. Prime Coat: As recommended in writing by topcoat manufacturer.
 - 2. Intermediate Coat: Elastomeric coating.
 - 3. Topcoat: Elastomeric coating.
- D. Concrete Unit Masonry Substrates: Two finish coats over block filler and primer with a total dry film thickness not less than 24 mils.
 - 1. Prime Coat: As recommended in writing by topcoat manufacturer.
 - 2. Block Filler: As recommended in writing by topcoat manufacturer.
 - 3. Intermediate Coat: Elastomeric coating.
 - 4. Topcoat: Elastomeric coating.
- E. Cement Stucco Substrates: Two finish coats over primer with total dry film thickness not less than 20 mils.
 - 1. Prime Coat: As recommended in writing by topcoat manufacturer.
 - 2. Intermediate Coat: Elastomeric coating.
 - 3. Topcoat: Elastomeric coating.

END OF SECTION

Project Name
Project Number

Deliverable
Issue Date

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