

SECTION 09 96 00 – HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and application of high-performance coating systems on the following substrates:
 - 1. Interior Substrates:
 - a. Gypsum Wall Board (GWB)
- B. Related Sections include the following:
 - 1. Division 09 painting Sections for special-use coatings and general field painting.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of finish-coat product indicated.
- C. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
- E. Sustainable Design Submittals:
 - 1. Product Data: For coatings, including printed statement of VOC content and chemical components.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply benchmark samples 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 type of coating and substrate.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect will designate items or areas required.
 - 2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
 - 3. Final approval of color selections will be based on benchmark samples.
 - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

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° F (7° C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are within the temperature range requirements or recommendations made by the product manufacture for the product being used.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 %; at temperatures less than 5° F (3° C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged 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 and color applied.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. Provide products of same manufacturer for each coat in a coating system. Products of Tnemec Company have been cited as the basis of design for performance, durability and quality products.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 100g/L.

C. Colors: As selected by Architect from manufacturer's full range.

2.2 Performance Criteria

A. Tnemec 27WB Typoxy- Generic Class Water Borne 100% Solids Epoxy

1. Abrasion Requirement: No more than 181mg loss after 1000 cycles, average of three tests.
2. Adhesion Requirement: Not less than 1,320 psi (9.10 Mpa) pull, average three trials
3. Cathodic Disbondment Requirement: Classification Group A. No more than 0.18 inch (0.46mm) disbonded equivalent circle diameter, average of three samples.
4. Cycle Weathering Requirement: No blistering, cracking, rusting or delamination of film after 3000 hours of continuous exposure.
5. Hydrostatic Pressure Resistance Requirement: No visible leakage on the face of the block and no blistering after application of 4lbs pressure for 30 minutes.
6. Water Vapor Transmission Requirement: No more than 4.68 g/m² per 24 hour water vapor transmission and no more than 0.22 perms water vapor permeability, average of three trials.

B. Tnemec 1081 WB Endura Shield- Generic Class Water Borne Urethane Semi-gloss (1080 Gloss)

1. Abrasion
 - a. Method: ASTM D 4060 (CS17 Wheel, 1000 gram load)
 - b. Requirement: No more than 77 mg loss after 1000 cycles, average of three tests.
2. Adhesion

- a. Method: ASTM D 4541
- b. Requirement: No less than 883 psi (6.09 MPa) pull, average of three tests.
3. Flexibility
 - a. Method: ASTM D 522 (Method A – Conical Mandrel).
 - b. Requirement: No less than 35% elongation, average of three tests.
4. Hardness
 - a. Method: ASTM D 3363
 - b. Requirement: No gouging or scratching with a 5B or less pencil.
5. Impact
 - a. Method: ASTM D 2794
 - b. Requirement: No visible cracking or delamination of film after 80 inch-pounds or less indirect.
6. Steam Resistance
 - a. Method: Steam 5.5 hours at 250° F (121° C)
 - b. Requirement: No gloss change, blistering, yellowing, cracking or delamination of film.
7. QUV Exposure
 - a. Method: ASTM G 53 (UVA-340 bulbs, 4 hours light, 4 hours dark)
 - b. Requirement: No blistering, cracking or chalking. Less than 1% gloss loss and 1.31 DED FMCII color change after 3000 hours exposure.
8. Salt Spray (FOG)
 - a. Method: ASTM B 117
 - b. Requirement: No blistering, cracking, rusting or delamination of film. No more than 1/64" (0.5 mm) rust creepage at scribe after 1000 hours exposure.
9. Humidity
 - a. Method: ASTM D 4585
 - b. Requirement: No blistering cracking rusting or delamination of film after 1000 hours exposure.
- C. Tnemec 201 Epoxoprime - Generic Class- 100% Solids Epoxy Primer Clear
 1. Abrasion
 - a. Method: ASTM D 4060, (CS-17 Wheel, 1,000 grams load).
 - b. Requirement: 69.5 mg loss after 1,000 cycles, average three tests.
 2. Adhesion
 - a. Method: ASTM D 4151.
 - b. Requirement: 400 psi (2.8 MPa) pull, average of three tests.
 3. Compressive Strength
 - a. Method: ASTM D695
 - b. Requirement: 6,865.7 psi (47.34 MPa) compressive strength unfilled.
 4. Flexural Strength
 - a. Method: ASTM D2407
 - b. Requirement: 12,873.4 psi (88.76 MPa) flexural strength average of five tests. 553,832 psi (3,818.54 MPa) flexural modulus, average of five tests.
 5. Hardness
 - a. Method: ASTM D 2240 (Shore D Durometer).
 - b. Requirement: Durometer rating 68.
 6. Impact
 - a. Method: ASTM D 2794

- b. Requirement: 100 inch pounds (11.3 J) average, direct impact.
 - 7. Tensile Strength
 - a. Method: ASTM D 638
 - b. Requirement: 4,871.1 psi (33.59 Mpa) tensile strength, average of five tests.
- D. Tnemec 280 Tneme-Glaze - Generic Class- 100% Solids Epoxy
 - 1. Abrasion
 - a. Method: ASTM D 4060, (CS-17 Wheel, 1,000 grams load).
 - b. Requirement: No more than 55mg loss, average of three tests.
 - 2. Adhesion
 - a. Method: ASTM D 4541, Type II
 - b. Requirement: Exceeds the cohesive strength of concrete substrate (483 psi)
 - 3. Coefficient of Friction
 - a. Method: ASTM D 2047
 - b. Requirement: No less than 0.87 static coefficient of friction, average of 12 tests.
 - 4. Hardness
 - a. Method: ASTM D 2240.
 - b. Requirement: No less than a shore D hardness of 81, average of five tests.
 - 5. Impact
 - a. Method: ASTM D 2794
 - b. Requirement: No visible cracking or delamination after 115 in/lbs direct impact.
 - 6. Steam Resistance
 - a. Method: 250°F (121°C) Steam at 15-17 psi.
 - b. Requirement: No blistering, cracking, checking, gloss loss or delamination of film after 4 hours continuous exposure.
 - 7. Tensile Strength
 - a. Method: ASTM D 2370
 - b. Requirement: No less than 1,944 psi (13.4 MPa) tensile strength, average of 10 tests. 39.5% elongation and 1,238 psi (8.54) modulus of elasticity average of 10 samples.
- E. Tnemec 151 ElastoGrip Primer – Generic Class- Water Borne Epoxy Primer
 - 1. See Manufactures Data
- F. RD Inducoat Inducryl- Generic Class - Water Borne Acrylic Anti Bacteria Coating
 - 1. Adhesion
 - a. Method: ASTM D 3359, (Method B, Crosshatch).
 - b. Requirement: No less than a rating of 5.
 - 2. Chemical Resistance
 - a. Method: Four hour spot test. Requirement: No evidence of blistering, cracking, loss of adhesion or other film irregularities after four hours continuous exposure to:
 - 1) 5% Sodium Phosphate
 - 2) 5% Sodium Hypochlorite
 - 3) 5% Hydrochloric Acid
 - 4) 5% Sulfuric Acid

3. Elongation
 - a. Method: ASTM D 2370 Tensile Properties of Organic Coatings.
 - b. Requirement: No less than 50%, average of five tests.
 4. Humidity
 - a. Method: ASTM D 4585.
 - b. Requirement: No blistering, cracking, rusting or delamination of film after 800 hours exposure.
 5. Impact Resistance
 - a. Method: ASTM D 2794.
 - b. Requirement: No less than 68 inch-lbs (7.68 J) average direct impact.
 6. Moisture Vapor Transmission
 - a. Method: ASTM D 1653, Method B, Wet Cup, Condition C at 100°F (38°C).
 - b. Requirement: Average 62 grams/metre² in 24 hours (from outside coating in towards substrate). Average 150 grams/metre² in 24 hours (from inside substrate towards outside).
 7. Scrubbability
 - a. Method: ASTM D 4213.
 - b. Requirement: No breakthrough and only .50 mils (10 microns) erosion. 200 cycles.
- G. Tnemec 215 Mortar Cast – Generic Class- 100% solids epoxy surfacing compound
1. Abrasion Bond Strength
 - a. Method: ASTM D 4541.
 - b. System: Series 218 MortarClad cured 7 days at 75°F (24°C).
 - c. Requirement: Not less than 1040 psi (7.17 MPa) bond strength by slant shear, average of three trials.
 2. Splitting Tensile Strength
 - a. Method: ASTM C 496.
 - b. Requirement: No less than 640 psi (4.42 MPa) splitting tensile strength.
 3. Linear Shrinkage
 - a. Method: ASTM C 531.
 - b. Requirement: No more than 3150 millionths of an inch (80 micrometers) linear shrinkage, average of three tests.
 4. Drying Shrinkage
 - a. Method: ASTM C 596.
 - b. Requirement: No more than 2510 millionths of an inch (64 micrometers) linear shrinkage, average of five specimens.
 5. Working, Setting And Service Strength Times
 - a. Method: ASTM C 308.
 - b. Service Strength Setting Time: 1 day - 207 psi (1.43 MPa); 2 days - 403 psi (2.78 MPa); 5 days - 590 psi (4.07 MPa).
 6. Flexural Strength
 - a. Method: ASTM C 580.
 - b. Requirement: No less than 1289.5 psi (8.89 MPa) flexural strength, average of six tests. No less than 897,088.7 psi (6185.2 MPa) flexural modulus of elasticity, average of six tests.
 7. Compressive Strength
 - a. Method: ASTM C 579.
 - b. Requirement: No less than 5137 psi (35.42 MPa) compressive strength, average of six tests.

- H. Tnemec 290 CRU Urethane - Generic Class- Polyester Urethane
 - 1. Abrasion
 - a. Method: ASTM D 4060, (CS-17 Wheel, 1,000 grams load).
 - b. Requirement: 28.8 mg loss after 1,000 cycles.
 - 2. Adhesion
 - a. Method: ASTM D 7234.
 - b. Requirement: Exceeds the cohesive strength of the concrete substrate (400 psi).
 - 3. Chemical Resistance
 - a. Method: TTM-59 Chemical Spot Test, Method B
 - b. Requirement: No blistering, cracking or delamination of film after seven days exposure.
 - 4. Coefficient Of Friction
 - a. Method: ASTM D 2047.
 - b. Requirement: No less than 0.67 static coefficient of friction, average of 36 tests.
 - 5. Flexibility
 - a. Method: ASTM D 522 (Method A Conical Mandrel Bend).
 - b. Requirement: Not less than 43% elongation, average of three tests.
 - 6. Impact
 - a. Method: ASTM D 2794.
 - b. Requirement: Direct - greater than 160 in. lb. Reverse - greater than 80 in. lb.

2.3 Coating Systems

- A. Fiberglass Reinforced Wall Systems- Tnemec Stranlok System Matt Lay up (For Clean and Sterile Spaces)
 - 1. Substrate: High Impact or conventional Drywall* Qualified
 - a. Base Coat: Fiberglass joint tape to be embedded with Series 215 at all joints.
 - b. Prime Coat: Series 201 Epoxoprime applied by roller to 150 sq. ft. per gallon.
 - c. Intermediate Bedding Coat: Series 280 Tnemec-Glaze applied at a rate of 125 sq. ft. per gallon
 - d. Fiberglass Reinforcing Mat: Imbed Series 273 MATT FM into the wet film.
 - 1) Overlap and double cut or butt seams, smoothing the mat to saturation with additional application of Series 280 Tneme-Glaze thinned with 41-39 thinner at 5% at a rate of 150 sq. ft. per gallon.
 - 2) Following bedding coat cure, sand the surfaces to remove any raised fiber and or excess material
 - e. Intermediate Filling Coat: Series 27WB Typoxy applied at a rate of 150 sq. ft. per gallon. Sand thoroughly before topcoating especially if recoat window has been missed.
 - f. Finish Coat:
 - 1) Series 1080/1081 Endurashield WB applied to achieve 2.0 - 3.0 mils dry film thickness.

a) Color as indicated.

B. Drywall Ceilings – Antibacterial Coating

1. Substrate: High Impact or conventional Drywall* Qualified
 - a. Prime Coat: RD Inducoat Elastodeck thinned 15% at 3.0 – 4.0 mils DFT
 - b. Topcoats: RD Inducoat Inducryl Anti - Bacteria coating at 3.0 -4.0 mils DFT per coat . minimum apply two coats

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 work.
 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 3. Coating application indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place 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, reinstall items that were removed; use workers skilled in the trades involved.
- C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.

3.3 APPLICATION

- A. Apply high-performance coatings according to 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.
- 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 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. All joint treatments for drywall shall be performed by special coating applicator when applying high performance finishes.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when coatings are being applied:
1. Owner will engage the services of a qualified testing agency to sample coating material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will perform tests for compliance with specified requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with specified requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

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.

Maine Medical Center
Bean 2 Roof Addition
For Construction
Issued for Permit

PERKINS+WILL
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- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

END OF SECTION 099600