SECTION 230546 - COATINGS FOR HVAC

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. General provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section includes application of coating systems on internal HVAC components and external equipment surfaces, including the following systems:

Bake-cured corrosion-resistant coating systems.

Air-dried corrosion-resistant coating systems.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. Salt Water Acetic Acid Test (SWAAT): A salt fog-spray test of corrosion resistance performed in accordance with ASTM G85, Annex 3.
			1. MAINTENANCE MATERIAL SUBMITTALS
				1. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

If necessary, replace quantity in "Coatings" Subparagraphsubparagraph below with a specific number of gallons (liters) or spray cans, and include an expanded description of quantity of each material and color.

Coatings: [**1**] <**Insert number**> [**container**] [**spray can**] of each material and color applied [**, including base coat and top coat products**].

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Store materials not in use in tightly covered containers in clean, dry, well-ventilated areas with ambient temperatures continuously maintained between 50 and 75 deg F (10 and 24 deg C).

Keep containers out of direct sunlight; avoid excessive heat and keep from freezing.

Maintain containers in clean condition, free of foreign materials and residue.

Remove rags and waste from storage areas daily.

If necessary, insert special requirements for fire protection, heating, ventilation, and other conditions for storage areas on-site.

* + - 1. CONDITIONS FOR COATING APPLICATION
				1. Comply with manufacturer's recommendations regarding required temperature and humidity ranges during coating application.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and Masterworks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. CORROSION-RESISTANT COATING SYSTEMS, GENERAL
				1. Material Compatibility:

Provide materials for application within each coating system that are compatible with one another and with metal substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

For each coating material in coating system, submit compatibility certification from manufacturer of each coating product that products are compatible with substrate base material and with substrate-coating products applied as earlier coats.

If retaining subparagraph below, coordinate products retained, if any, in other Part 2 articles, to ensure that one manufacturer can provide products for an entire system.

Products shall be of same manufacturer for each coat in a coating system.

Retain "Colors" Paragaph below if color is deemed important. Color selection is often limited, and color is typically not deemed important, because the coatings are generally applied to internal equipment components and are not exposed to view. Consult manufacturers for availability.

* + - * 1. Colors: [**Manufacturer's standard**] <**Insert requirements**>.
			1. BAKE-CURED CORROSION-RESISTANT COATING SYSTEMS
				1. Base Coat Performance Requirements:

Check manufacturer's product data to verify the availability of options in subparagraphs below. Not all coating system manufacturers and coating products comply with all options shown. Delete or revise options to comply with retained products.

Corrosion Resistance: ASTM B117: [**1500**] [**2000**] [**3500**] [**6000**] <**Insert number**> hours.

In "Cross-Hatch Adhesion" Subparagraphsubparagraph below, optional value is available from Heresite and Modine; consult manufacturers.

Cross-Hatch Adhesion: ASTM D3359: [**5B**] <**Insert value**>.

Retain or delete any of "SWAAT," "Cyclic Weathering," "Mandrel Flexibility," "Adhesion," "Impact," "ph Range," or "Dry Heat Resistance" subparagraphs below. This specific information is only available for several products.

SWAAT: ASTM G85: [**1000**] [**Insert number**] hours.

In "Cyclic Weathering" Subparagraphsubparagraph below, information and optional values are currently only available for two Heresite products; consult manufacturers.

Cyclic Weathering: ISO 12944-9, [**4200**] <**Insert number**> hours.

In "Mandrel Flexibility" Subparagraphsubparagraph below, optional values are available from Heresite and Modine; consult manufacturers.

Mandrel Flexibility: ASTM D522/D522M: [**1/4 inch (6 mm)**] [**1/2 inch (13 mm)**] <**Insert value**> without cracking or delamination of film after full cure.

In "Adhesion - Elcometer" Subparagraphsubparagraph below, optional value is currently only available from for one Heresite product; consult manufacturers.

Adhesion - Elcometer: ASTM D4541: [**1100 psi (7.6 MPa)**] <**Insert value**>.

Impact: ASTM D2794.

In "Direct Hit" Subparagraphsubparagraph below, optional values are currently available from Heresite and Modine; consult manufacturers.

Direct Hit: [**70 lb.-in. (7.9 N-m)**] [**80 lb.-in. (9.0 N-m)**] [**90 lb.-in. (10.2 N-m)**] [**100 lb.-in. (11.3 N-m)**] <**Insert value**>.

In "Reverse Hit" Subparagraphsubparagraph below, optional values are currently only available for one Heresite product; consult manufacturers.

Reverse Hit: [**20 lb.-in. (2.2 N-m)**] [**30 lb.-in. (3.4 N-m)**] [**40 lb.-in. (4.5 N-m)**] [**50 lb.-in. (5.6 N-m)**] <**Insert value**>.

Retain "pH Range, 14-Day Liquid Spot Test" and "Dry Heat Resistance" subparagraphs below for Heresite products. Retain only "Dry Heat Resistance" Subparagraphsubparagraph for Modine products. Verify values for actual products and manufacturers specified.

pH Range, 14-Day Liquid Spot Test: [**2.4 to 12.6**] [**or**] [**3 to 12**] [**Insert value**].

In "Dry Heat Resistance" Subparagraphsubparagraph below, retain first option for Modine products, second option for Heresite.

Dry Heat Resistance: ASTM D2485: [**320 deg F (160 deg C)**] [**392 deg F (200 deg C)**] <**Insert value**> maximum.

Dry Film Thickness: [**0.5 to 1.2 mils (0.013 to 0.030 mm)**] [**0.6 to 1.5 mils (0.015 to 0.038 mm)**] <**Insert thickness range**>.

Heat-Transfer Reduction: [**1 percent maximum**] <**Insert value**>.

In "Hardness" Subparagraphsubparagraph below, verify coating system hardness with coating system manufacturer.

Hardness: ASTM D3363 Pencil Test: [**2B-HB**] [**5H-6H**] <**Insert value**>.

* + - * 1. Bake-Cured Coating Acceptable for Equipment Serving Food-Preparation Areas: In accordance with NSF 51.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13572) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163969).

[Modine Manufacturing Company](http://www.specagent.com/Lookup?uid=123457163976).

3M.

Approved equivalent.

Retain "Bake-Cured Top Coat Performance Requirements" Paragaph below when a top coat is required for desired UV radiation shielding, color stability, and sheen for coatings exposed to view and outdoor elements. Manufacturers provide top coats as air-dry components.

* + - * 1. Bake-Cured Top Coat Performance Requirements: Provide product with UV shielding properties, color stability, and maintenance of manufacturer's standard sheen, after exposure to outdoor conditions.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13819) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163972).

[Modine Manufacturing Company](http://www.specagent.com/Lookup?uid=123457163973).

3M.

Blygold America.

Induron Protective Coatings.

Approved equivalent.

Overall system and paint components in "Bake-Cured, Immersion-Applied Phenolic Epoxy System" Paragaph below are proprietary.

* + - * 1. Bake-Cured, Immersion-Applied Phenolic Epoxy System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13557) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163962).

3M.

Blygold America.

Induron Protective Coatings.

Approved equivalent.

Overall system and paint components in "Baked-Cured, Immersion-Applied Epoxy Coating System" Paragaph below are proprietary.

* + - * 1. Baked-Cured, Immersion-Applied Epoxy Coating System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13558) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Modine Manufacturing Company](http://www.specagent.com/Lookup?uid=123457163959).

Heresite Protective Coatings.

3M.

Blygold America.

Induron Protective Coatings.

Approved equivalent.

* + - 1. AIR-DRIED CORROSION-RESISTANT COATING SYSTEMS
				1. Performance Requirements:

Check manufacturer's product data to verify the availability of options in subparagraphs below. Not all coating system manufacturers and coating products comply with all options shown. Delete or revise options to comply with retained products.

Corrosion Resistance: ASTM B117: [**1500**] [**2000**] [**3500**] <**Insert number**> hours.

Cross-Hatch Adhesion: ASTM D3359: [**5B**] <**Insert value**>.

In "Cyclic Weather" Subparagraphsubparagraph below, optional value is only available for one Heresite product; consult manufacturers.

Cyclic Weathering: ISO 12944-9, Offshore Standard: [**4200**] <**Insert number**> hours.

In "Mandrel Flexibility" Subparagraphsubparagraph below, optional values are available from Heresite and Modine; consult manufacturers.

Mandrel Flexibility: ASTM D522/D522M: [**1/2 inch (13 mm)**] [**1/8 inch (3 mm)**] <**Insert value**> without cracking or delamination of film after full cure.

Impact: ASTM D2794.

Direct Hit: [**100 in-lb (11.3 N-m)**] <**Insert value**>.

In "Dry Heat Resistance" Subparagraphsubparagraph below, optional value is available from Heresite and Energy Guard only.

Dry Heat Resistance: ASTM D2485: [**356 deg F (180 deg C)**] <**Insert value**> maximum.

Dry Film Thickness: [**2 to 3 mils (0.050 to 0.075 mm)**] <**Insert thickness range**>.

Heat-Transfer Reduction: [**1 percent**] <**Insert value**> maximum.

In "Hardness" Subparagraphsubparagraph below, optional values are available from Heresite and Modine; consult manufacturers.

Hardness: ASTM D3363 Pencil Test: [**2B-HB**] [**2H**] [**HBF**] <**Insert value**>.

* + - * 1. Air-Dried, Spray-Applied Principle Coating System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13559) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Blygold America](http://www.specagent.com/Lookup?uid=123457163961).

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163960).

3M.

Induron Protective Coatings.

Approved equivalent.

* + - * 1. Air-Dried Phenolic System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13562) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163965).

Induron Protective Coatings.

Dampney Engineered Coatings.

Blygold America.

3M.

Approved equivalent.

* + - * 1. Air-Dried, Spray-Applied Coating System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13561) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Modine Manufacturing Company](http://www.specagent.com/Lookup?uid=123457163964).

Heresite Protective Coatings.

3M.

Energy Guard USA.

Blygold America.

Approved equivalent.

* + - * 1. Air-Dried, Spray-Applied, Polyurethane Mixed with Aluminum Flakes System.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13563) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Blygold America](http://www.specagent.com/Lookup?uid=123457163966).

[Energy Guard USA](http://www.specagent.com/Lookup?uid=123457163967).

Thermoguard International

Approved equivalent.

* + - * 1. Base Coat Performance Requirements:

Check manufacturer's product data to verify the availability of options in subparagraphs below. Not all coating system manufacturers and coating products comply with all options shown. Delete or revise options to comply with retained products.

Corrosion Resistance: ASTM B117: [**1500**] [**2000**] [**3000**] [**4000**] [**5000**] [**6000**] [**10,000**] <**Insert number**> hours.

SWAAT: ASTM G85: [**1000**] [**Insert number**] hours.

In "Cyclic Weathering" Subparagraphsubparagraph below, optional values are available for one Heresite product only.

Cyclic Weathering: ISO 12944-9: [**4200**] <**Insert number**> hours.

Cross-Hatch Adhesion: ASTM D3359: [**5B**] <**Insert value**>.

Mandrel Flexibility: ASTM D522/D522M: [**1/8 inch (3 mm)**] [**1/4 inch (6 mm)**] [**1/2 inch (13 mm)**] <**Insert value**> without cracking or delamination of film after full cure.

In "Adhesion - Elcometer" Subparagraphsubparagraph below, optional value is available for one Heresite product only.

Adhesion - Elcometer: ASTM D4541: [**1,100 psi (7.6 MPa)**] <**Insert value**>

Impact: ASTM D2794.

Direct Hit: [**100 lb.-in. (11.3 N-m)**] [**160 lb.-in. (18.0 N-m)**] <**Insert value**>.

Dry Heat Resistance: ASTM D2485: [**250 deg F (121 deg C)**] <**Insert value**> maximum.

Dry Film Thickness: [**0.5 to 1.2 mils (0.013 to 0.030 mm)**] [**0.6 to 1.5 mils (0.015 to 0.038 mm)**] <**Insert thickness range**>.

Heat-Transfer Reduction: [**1 percent**] <**Insert value**> maximum.

Hardness: ASTM D3363 Pencil Test: [**2B-HB**] [**HB-F**] <**Insert value**>.

Retain subparagraph below for coatings on equipment serving food-preparation areas.

21 CFR 175.300 regulates resinous and polymeric coatings used in food-preparation areas. This standard does not assure that the coating systems are suitable for contact with food.

Verify with the coating system manufacturer whether the specified products conform to, or have been approved as acceptable under this standard. Retain the options that apply or delete the subparagraph accordingly.

Retain "Air-Dried Coating Acceptable for Equipment Serving Food-Preparation Areas" Subparagraphsubparagraph below to limit manufacturer to Heresite only.

* + - * 1. Air-Dried Coating Acceptable for Equipment Serving Food-Preparation Areas": In accordance with 21 CFR 175.300.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13817) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163970).

Modine Manufacturing Company.

3M.

Axalta Coating Systems Ltd.

Approved equivalent.

Retain "Air-Dried Top Coat Performance Requirements" Paragaph below when a top coat is required for desired UV radiation shielding, color stability, and sheen for coatings exposed to view and outdoor elements. Manufacturers provide top coats as air-dry components.

* + - * 1. Air-Dried Top Coat Performance Requirements: Provide product with UV shielding properties, color stability, and maintenance of manufacturer's standard sheen, after exposure to outdoor conditions.
				2. Spray-Can Application Systems:

Type: Air dry, phenolic.

[Manufacturers:](http://www.specagent.com/Lookup?ulid=13564) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Heresite Protective Coatings](http://www.specagent.com/Lookup?uid=123457163968).

Modine Manufacturing Company.

3M.

Approved equivalent.

* + - 1. SOURCE QUALITY CONTROL

Retain this article for large projects or critical coatings where additional control is desired. Delete if tests are not required.

* + - * 1. Certification of Coating Material Testing: Submit manufacturer's test report of corrosion-resistance performance testing, as performed by a nationally recognized testing laboratory.
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates and conditions, with Applicator present, for compliance with coating manufacturer's requirements and other conditions affecting performance of the Work.
				2. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
				3. Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

* + - 1. PREPARATION
				1. Comply with manufacturer's written instructions applicable to substrates and coating systems indicated.

Thinning: Thin coating material with manufacturer's recommended thinning products when recommended or permitted by coating system manufacturer.

* + - * 1. Comply with coating system manufacturer's recommendations to clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
			1. APPLICATION
				1. Verify with coating manufacturer whether coatings required must be applied and cured in factory-certified application shop.
				2. Apply coating systems with equipment designed to deposit coating of specified uniform thickness over HVAC components, in complex, three-dimensional geometries.

Apply coatings with manufacturer-recommended tools and techniques suited for specified coating system and each coated HVAC component.

Do not apply coatings over labels or equipment name, identification, performance rating, or nomenclature plates.

* + - * 1. Perform inspection and coating system manufacturer's recommended tests to verify coating integrity and thickness. Where coating was damaged by testing, repair damage in accordance with coating system manufacturer's written recommendations.
				2. Perform inspection and coating system manufacturer's recommended tests to verify coating integrity and thickness. Where coating was damaged by testing, repair damage in accordance with coating system manufacturer's written recommendations.

END OF SECTION 230546