

Oakhurst Dairy – New Milk Cooler

SECTION 09960 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes surface preparation and field application of high-performance coating systems to items and surfaces scheduled.
- B. Related Sections include the following:
 - 1. Division 5 Section "Structural Steel" for shop priming structural steel.
 - 2. Division 5 Section "Formed-Metal Fabrications" for shop-primed ferrous metal.
 - 3. Division 9 Section "Painting" for general field painting.
- C. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 DEFINITIONS

- A. Standard coating terms defined in ASTM D 16 apply to this Section.
- B. Gloss ranges used in this Section include the following:
 - 1. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
 - 2. High gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.
- C. Environments: The following terms are used in Part 2 of this Section to distinguish between different corrosive exposures:
 - 1. "Moderate environments" are corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, and regular cleaning with strong chemicals. Environments with exposure to heavy concentrations of chemical fumes and occasional splashing and spilling of chemical products are moderate environments.
 - 2. "Mild environments" are industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew development, and infrequent cleaning with strong chemicals. Environments with low levels of mild chemical fumes and occasional splashing and spilling of chemical products are mild environments. Normal outdoor weathering is also considered a mild environment.

1.4 SUBMITTALS

- A. Product Data: For each coating system indicated. Include block fillers and primers.

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1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference the specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each material specified.
- B. Certification by manufacturer that products supplied comply with requirements indicated that limit the amount of VOCs in coating products.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
1. After color selection, Engineer will furnish color chips for surfaces to be coated.
- D. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.
1. Provide stepped 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.
 2. List of material and application for each coat of each sample. Label each sample for location and application.
 3. Submit samples on the following substrates for Engineer's review of color and texture:
 - a) Concrete Masonry: Provide two 8-inch-square samples of masonry, with mortar joint in the center, for each finish and color.
 - b) Ferrous and Nonferrous Metal: Provide two 4-inch-square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed high-performance coating system applications similar in material and extent to those indicated for Project and whose work has a record of successful in-service performance.
- B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
1. Engineer will select one room, area, or surface to represent surfaces and conditions for application of each type of coating and substrate.
 - a) Wall Surfaces: Provide samples on at least 64 sq. ft. of wall surface.
 - b) Small Areas and Items: Engineer will designate items or areas required.

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2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface as specified. Provide the required sheen, color, and texture of each surface.
 - a) After finishes are accepted, Engineer will use the room or surface to evaluate coating systems of a similar nature.
3. Final approval of colors will be from benchmark samples.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label with the following information:
 1. Name or title of material.
 2. Product description (generic classification or binder type).
 3. Manufacturer's stock number and date of manufacture.
 4. Contents by volume, for pigment and vehicle constituents.
 5. Thinning instructions.
 6. Application instructions.
 7. Color name and number.
 8. Handling instructions and precautions.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
 1. Protect materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and applying coatings.

1.7 PROJECT CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 and 95 deg F.
- B. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
 1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.
 2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.

1.8 EXTRA MATERIALS

- A. Furnish extra high-performance coating materials from the same production run as materials applied and in quantities described below. Package coating materials in unopened, factory-sealed containers for storage and identify with labels describing contents.
 1. Quantity: Furnish extra coating materials in quantities indicated below:
 - a) Semigloss, Waterborne, Acrylic Enamel: 1 gal. of each color applied.

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- b) High-Gloss, Polyamide Epoxy Coatings: 1 gal. of each color applied.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. Available Products: Materials produced by the Sherwin-Williams Company have been listed as the standard of quality for painting systems for this project. Substitution of any other manufacturer's systems will be based upon prior approval by the Engineer. Submittal for substitution will require submission of performance data for both the specified system and the proposed substitution.
- B. Manufacturers' Names: The following manufacturer is referred to in the coating system descriptions by shortened version of the names shown in parenthesis:
1. Sherwin Williams; Industrial and Marine Coatings (S-W).

2.2 COATINGS MATERIALS, GENERAL

- A. Material Compatibility: Provide primers, undercoats, and finish-coat materials 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.
- B. Material Quality: Provide manufacturer's highest grade of the various high-performance coatings specified. Materials not displaying manufacturer's product identification are not acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
- C. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 450 g/L or less.

2.3 COLORS

- A. Colors: As selected by Owner from manufacturer's full range.

2.4 EXTERIOR HIGH-PERFORMANCE COATING SYSTEMS

- A. Pre-cast concrete wall units: Provide the following finish systems over pre-cast exterior concrete :
1. Moderate Environment (Low luster Finish): Two coatsOne finish coat over an intermediate coat and a block filler.
 - a) Concrete Stain: Styrene acrylic filler applied at spreading rate recommended by manufacturer.
 - 1) S-W: H&C Shield Plus Concrete Stain.

2.5 INTERIOR HIGH-PERFORMANCE COATING SYSTEMS

- A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block:

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1. Moderate Environment (Semigloss Finish): One finish coat over an intermediate coat and a block filler.
 - a) Block Filler: Acrylic or epoxy block filler applied at spreading rate recommended by manufacturer as sufficient to fill pores.
 - 1) S-W: Epoxy Ester Masonry Filler Sealer B61W2 Series.
 - b) Intermediate Coat: Epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 to 5.0 mils, unless otherwise indicated.
 - 1) S-W: Epolon II Multi-Mil Epoxy Series B62V800.
 - 2) Tnemec: Series 66 Hi-Build Epoxoline Polamidoamine Epoxy.
 - c) Topcoat: Semigloss epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 2.0 to 5.0 mils, unless otherwise indicated.
 - 1) Carboline: Sanitile 250 WB Finish Waterborne Epoxy-Acrylic.
 - 2) DuPont: 25P High Solids Epoxy Mastic.
 - 3) ICI: Devran 224 HS High Build Epoxy Enamel.
 - 4) International: Intergard 475 Semi-Gloss Polyamide Epoxy Intermediate/Finish.
 - 5) PPG: 97-1XXX Series Aquapon High Build Semi-Gloss Polyamide Epoxy Coating.
 - 6) R-O: 9500 System High Build Polyamide Epoxy at 5.0- to 8.0-mil dry film thickness.
 - 7) S-W: Epolon II Multi-Mil Epoxy Series B62V800.
 - 8) Tnemec: Series 66 Hi-Build Epoxoline Polamidoamine Epoxy.
 2. Mild Environment (Semigloss Finish): One finish coat over an intermediate coat and a block filler.
 - a) Block Filler: Acrylic or epoxy block filler applied at spreading rate recommended by manufacturer as sufficient to fill pores.
 - 1) S-W: Heavy Duty Block Filler B42W46.
 - b) Intermediate Coat: Acrylic enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.5 to 4.0 mils.
 - 1) S-W: DTM Acrylic Semi-Gloss Coating B66W200 Series.
 - c) Topcoat: Semigloss acrylic enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.5 to 4.0 mils.
 - 1) S-W: DTM Acrylic Semi-Gloss Coating B66W200 Series.
- B. Ferrous Metal: Provide the following finish systems over interior ferrous-metal surfaces:
1. Moderate Environment (High-Gloss Finish): One finish coat over an intermediate coat and a primer.
 - a) Primer: Epoxy primer applied at spreading rate recommended by manufacturer.
 - 1) S-W: Recoatable Epoxy Primer B67 Series/B67V5.
 - b) Intermediate Coat: Epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.0 to 4.0 mils.
 - 1) S-W: Tile Clad II High Solids B62WZ Series/B60VZ70.

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- c) Topcoat: High-gloss epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.0 to 4.0 mils, unless otherwise indicated.
 - 1) S-W: Tile Clad II High Solids B62WZ Series/B60VZ70.
- C. Galvanized Metal: Provide the following finish systems over interior ferrous-metal surfaces:
 - 1. Moderate Environment (High-Gloss Finish): Two finish coats over an intermediate coat and a primer.
 - a) Primer: Epoxy primer applied at spreading rate recommended by manufacturer.
 - 1) S-W: Recoatable Epoxy Primer B67 Series/B67V5.
 - b) Intermediate Coat: Epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.0 to 4.0 mils.
 - 1) S-W: Tile Clad II High Solids B62WZ Series/B60VZ70.
 - c) Topcoat: High-gloss epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.0 to 4.0 mils, unless otherwise indicated.
 - 1) S-W: Tile Clad II High Solids B62WZ Series/B60VZ70.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. With Applicator present, examine substrates and conditions under which high-performance coatings will be applied, for compliance with coating application requirements.
 - 1. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
 - 2. Start of application is construed as Applicator's acceptance of surfaces within that particular area.
- B. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.
 - 1. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:
 - a) Confirmation of primer's suitability for expected service conditions.
 - b) Confirmation of primer's ability to be top coated with materials specified.
 - 2. Notify Engineer about anticipated problems before using the coatings specified over substrates primed by others.

3.2 PREPARATION

- A. General: 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.
- B. Cleaning: Before applying high-performance coatings, clean substrates of substances that could impair bond of coatings. Remove oil and grease before cleaning.

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1. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
1. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
 2. Cementitious Substrates: Prepare concrete and concrete masonry block surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
 - a) Use abrasive blast-cleaning methods if recommended by coating manufacturer.
 - b) Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 3. Ferrous-Metal Substrates: 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.
 - a) Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10/NACE No. 2.
 - b) Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c) Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.
 4. Nonferrous-Metal Substrates: Clean nonferrous and galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required.
 - a) Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
 2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
 3. Use only the type of thinners approved by manufacturer and only within recommended limits.
- E. 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.

3.3 APPLICATION

- A. General: Apply high-performance coatings according to manufacturer's written instructions.
1. Use applicators and techniques best suited for the material being applied.
 2. Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
 3. Coating colors, surface treatments, and finishes are indicated in the coating system descriptions.
 4. Provide finish coats compatible with primers used.
 5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convactor covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 - a) Coat surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - b) Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required is the same regardless of application method.
 - a) Omit primer on metal surfaces that have been shop primed and touchup painted.
 - b) Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
 - c) Where manufacturer's written instructions require sanding, sand between applications to produce a smooth, even surface.
 - d) Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat does not cause undercoat to lift or lose adhesion.
 2. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive a dry film thickness equivalent to that of flat surfaces.
- C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brush Application: Use brushes best suited for material applied and of appropriate size for the surface or item being coated.
 - a) Apply primers and first coats by brush unless manufacturer's written instructions permit using roller or mechanical applicators.
 - b) Brush out and work brush coats into surfaces in an even film.

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- c) Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for the material and texture required.
3. Spray Equipment: Use mechanical methods to apply coating if permitted by manufacturer's written instructions and governing regulations.
 - a) Use spray equipment with orifice size recommended by manufacturer for material and texture required.
 - b) Apply each coat to provide the equivalent hiding of brush-applied coats.
 - c) Do not double back with spray equipment building-up film thickness of two coats in one pass, unless recommended by manufacturer.
- D. Minimum Coating Thickness: Apply each material no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by manufacturer, to material required to be coated or finished that has not been prime coated by others.
 1. Recoat primed and sealed substrates if there is evidence of suction spots or unsealed areas in first coat, to ensure a finish coat with no burn-through or other defects caused by insufficient sealing.
- G. Completed Work: Match approved Samples for color, texture, and coverage. Remove, re-finish, or recoat work that does not comply with specified requirements.

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 appropriate tests for the following characteristics as required by Owner:
 - a) Quantitative materials analysis.
 - b) Absorption.
 - c) Accelerated weathering.
 - d) Accelerated yellowness.
 - e) Color retention.
 - f) Alkali and mildew resistance.
 - g) Abrasion resistance.
 - h) Apparent reflectivity.
 - i) Washability.
 - j) Dry opacity.

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- k) Recoating.
 - l) Skinning.
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. If necessary, Contractor may be required to remove rejected materials from previously coated surfaces if, on recoating with specified materials, the two coatings are not compatible.

3.5 CLEANING

- A. Cleanup: At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being coated or not, against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Engineer, and leave in an undamaged condition.
 - 1. Provide "Wet Paint" signs to protect newly coated finishes. After completing coating operations, remove temporary protective wrappings provided by others to protect their work.
 - 2. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION 09960