STATE OF CALIFORNIA

Department of Transportation Specification

Light Green Finish Paint
Waterborne Acrylic Latex Vehicle
(Specification PWB-171C)

SCOPE

This specification covers a pre-mixed waterborne paint formulated for use as a finish coat on properly prepared metal surfaces. This coating is intended for spray application. Limited application can be made by brushing and rolling.

REQUIREMENTS

General:

This specification is intended to specify a paint that will meet service requirements for bridge construction and maintenance. Application and use of this coating shall be in conformance with the provisions in Section 59-2, "Painting Structural Steel", or Section 59-3, "Painting Galvanized Surfaces", whichever is applicable, and Section 91, "Paint", of the 2025 *State of California Department of Transportation Standard Specifications*. All properties listed shall be maintained for a minimum of one year after acceptance. If the vendor is making this paint for the first time, the Transportation Laboratory in Sacramento must be consulted.

Materials:

The raw materials for use in the paint formula shall conform to the specifications designated.

QUALITY ASSURANCE

All paint intended for use by the California Department of Transportation (Department) must be sampled, tested, and approved by the Transportation Laboratory **before** shipment.

The manufacturer shall take a representative one-pint sample of each batch of paint and ship the samples to the Transportation Laboratory for approval, unless other arrangements have been made. Raw materials and copies of batch records used in the manufacture of the paint shall be submitted if requested.

Caltrans Transportation Laboratory, Chemical Testing Branch, 5900 Folsom Blvd., Sacramento, CA 95819
chemistry.branch@dot.ca.gov

A batch shall be that amount of paint that was manufactured and packaged in a single operation. The paint container shall be labeled with, but not limited to, the State Specification number, date of manufacture, and batch number. The Department also reserves the right to retest any batch after delivery. Results from such retesting shall prevail over all other tests and will be the basis of rejection. Material not meeting the specification shall be removed and replaced by the supplier at their expense, including all costs for handling, retesting, and shipping. All tests shall be conducted in accordance with the appropriate ASTM test methods referenced under the "Characteristics of Paint" section of this document and methods used by the Transportation Laboratory.

Patents:

The contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the State of California, and its duly authorized representatives from all suits at law or action of every nature for, or on account of, the use of any patented materials, equipment, devices, or processes.

Description:

This specification covers a pre-mixed waterborne paint formulated for use as a finish coat on properly prepared metal surfaces. This coating is colored Light Green and used as a contrast to the PWB-172C Dark Green finish paint. This coating is intended for spray application. Limited application can be made by brushing or rolling. This paint is an industrial maintenance coating and is not for residential use.

Predispersed colorants:

Chroma-Chem® 897 colorants were used in the development of this formulation. Minor adjustments of the amounts used may be necessary to match the colors specified due to manufacturing variations. Predispersed colorants from other manufacturers may not be compatible with this formulation. Colorants selected shall be light fast and chemically resistant. They shall not contain lead, chrome, or zinc.

Composition:

Paint shall be mixed in the following sequence and proportions. Use sufficient time and agitation necessary to get a good grind viscosity with uniform dispersion. Minor adjustments may be necessary to obtain an acceptable batch of paint due to manufacturing variations. Do not exceed 100˚F during this operation.

Note-1: High concentrations of grind ingredients in the latex can cause irreversible agglomeration of the latex-pigment composite particles. This will occur if the latex is let down into the grind. Consequently, it is important to slowly add the grind into the latex resin during the letdown phase. This should be done with moderate agitation

Caution: With moderate agitation slowly add to coalescent into the Avanse MV-100 latex resin. Next add the colorants. The rheology modifiers are added last. Acrysol® RM-12W and RM-995 are a very effective combination. Add half the amount of Acrysol® RM-12W initially, then add small amounts of Acrysol RM-995 until the desired KU viscosity is obtained. After all the additions are complete, the final viscosity could continue to increase slightly for 24 hrs. It is highly recommended to make a small test batch of this coating before attempting full scale production.

	Grind Ingredients	**Weight Percent**	**Lbs. / 100gal**
(1)	Water	3.51	33.5
(2)	Dispersant	0.10	1.0
(3)	Surfactant	0.23	2.24
(4)	Ammonium hydroxide (28%)	0.21	2.5
(5)	Pigment	11.73	112.0
(6)	Flash rust inhibitor (15%)	0.21	2.0
(7)	Defoamer	0.16	1.5
(8)	Preservative	0.10	1.0

	Let Down Ingredients	Weight Percent	Lbs. / 100gal
(9)	Acrylic Emulsion Polymer	72.17	689.00
(10)	(Coalescent)	4.15	39.60
(11)	Ammonium hydroxide (28%)	0.31	3.0
(12)	Colorant-1	2.44	23.34
(13)	Colorant-2	3.51	33.54
(14)	Colorant-3	0.68	6.47
(15)	Thickener -1	0.37	3.5
(16)	Thickener – 2	0.10	1.0

Characteristics of Paint	Measurements
VOC, grams per liter, ASTM Designation: D 3960	100
Flash Point, ˚F, ASTM Designation: D 3828	>215
Density, grams per milliliter, ASTM Designation: D 1475	1.12 – 1.16
Nonvolatile content, percent, ASTM Designation: D 2369	49 – 55
Pigment content, percent, ASTM Designation: D 3723	13.5 – 15
Consistency, ASTM Designation: D562, g (Equivalent KU)	165 – 202 75 - 82
High-shear viscosity, poise, ASTM Designation: D 4278 0 to 5-P cone, shear rate 12 000 s-1	0.3 – 0.5
pH	8 - 9
Fineness of grind, Hegman, ASTM Designation: D 1210	6 minimum
Specular Gloss, ASTM Designation: D 523	
@ 20°	5 – 7
@ 60°	29 – 33

Characteristics of Paint	**Measurements**
Light green color to match Federal Standard 595B color number 14223 unless otherwise specified.	
Color Tolerance, ASTM Designation: D2244, CIE 1976 L*a*b*, 10° Standard observer, Illuminant D 65	2 ΔE maximum
Color Tolerance after 300 hours of UV- Exposure, ASTM Designation: D 4587, Cycle-2, UVA-340 bulbs	4 ΔE maximum
Film hardness by pencil test, ASTM Designation: D 3363	3B minimum
Salt Fog Exposure, 100 hours, ASTM Designation: B 117	
Rust Rating, ASTM Designation D610:	10 minimum
Blistering, ASTM Designation D714:	No more than 8F
Dry time at 25°C, 4 mils wet film, ASTM Designation: D1640	
Set to touch, hours	1/2 maximum
Dry through, hours	1 maximum

Material Ingredients of Paint:

1) Water
2) Tamol® 165A (Dow Chemical Co.)
3) Surfynol™ CT-111 (Evonik Industries AG)
4) Ammonium Hydroxide (28%)
5) Ti-Pure® R-706 (Du Pont)
6) Sodium Nitrite (15% aqueous solution)
7) BYK -035 (BYK Additives & Instruments)
8) PROXEL® BD20 (Lonza Inc.)
9) Avanse® MV-100 (Dow Chemical Co.)
10) Dowanol™ DPnB, Dipropylene glycol n-butyl ether, (Dow Chemical Co.)
11) Ammonium Hydroxide (28%)
12) Phthalogreen 897-5501 (Vibrantz Technologies)
13) Medium Yellow 897-2555 (Vibrantz Technologies)
14) Carbon Black 897-9998 (Vibrantz Technologies)
15) Acrysol® RM-12W (Dow Chemical Co.)
16) Acrysol® RM-995 (Dow Chemical Co.)

Packaging:

The containers shall be new, round and of no more than five-gallon capacity. Pails larger than three gallons shall be standard, full open head. One gallon and larger containers shall have ears and bails. All containers shall be suitably lined or constructed so as to prevent any reaction between the container and contents and also must comply with U.S. Department of Transportation or I.C.C. Regulations as applicable.

Labels must be marked with the volatile organic compound (VOC) content, mixing instructions and the following provision in addition to any other labeling required:

Application:

The paint shall be applied to a total dry film thickness of 1.5 mil minimum and 3 mil maximum. For best results, HVLP spray application of this coating is recommended, limited application can be made by brush and roll. Paint should not be applied when the ambient or surface temperature is above 100˚F or below 50˚F, when the relative humidity exceeds 75 percent, or when the surface temperature is less than 5˚F above the dew point.

Clean-up:

Use tap water for clean-up. 10% ammonia, acetone or other suitable solvent may be used to remove dried paint from spray guns and other equipment.