

STATE OF CALIFORNIA

Department of Transportation Specification

Red Primer Paint (Specification PWB-145F)*

SCOPE

This specification covers a pre-mixed waterborne paint formulated for use as a prime coat on abrasive blast cleaned, metal surfaces exposed to the air. This coating is intended for spray application. Limited application can be made by brushing and rolling. This coating is intended to have a topcoat to protect it from UV exposure.

REQUIREMENTS

General:

This specification is intended to specify paint that will meet service requirements for bridge construction and maintenance. 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-quart 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

*Cancels and supersedes previous revisions

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 Mixed 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.

Composition:

Paint shall be mixed in the following proportions and sequence:

	<u>Component</u>	<u>Weight Percent</u>	<u>Lbs. / 100gal</u>
	Water	13.85	164
(1)	Defoamer	0.19	2.3
(2)	Thickener } blend	~0.13	~1.5
	Water } blend	0.84	10.0
(3)	Hydroxypropyl Methylcellulose (2.5% solution in water, pH adjusted to 8.5-9.0)	4.00	47.0
(4)	Surfactant (30% in water)	0.89	10.5

Hold back part of water initially to get good grind viscosity. Grind under high shear to achieve specified grind. Do not exceed 38°C during this operation. Add remainder of water after grind is achieved.

	<u>Component</u>	<u>Weight Percent</u>	<u>Lbs. / 100gal</u>
(5)	Calcium Phosphosilicate	5.53	65.5
(6)	Magnesium Silicate	18.00	213.0
(7)	Red Iron Oxide	2.70	32.0
(8)	Flash rust inhibitor	1.26	15.00
(9)	Biocide	0.10	1.2

Reduce speed and slowly add stabilized latex. Stabilize latex by first adjusting to pH 3.5 with 28% ammonium hydroxide, then blend with surfactant solution. (Failure to make this adjustment will result in an unacceptable batch of material.)

(10)	Vinyl acrylic latex	49.67	588.0
(4)	Surfactant (30% in water)	1.98	23.4
(12)	Ammonium Hydroxide 28%	0.32	3.74

Mix thoroughly, then add coalescent.

(11)	Coalescent	1.00	11.7
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<u>Characteristics of Paint</u>	<u>Measurements</u>
VOC, grams per liter, ASTM Designation: D 6886	34
Flash Point, °F, ASTM D 3828	>215
Density, g/ml, ASTM Designation: D 1475	1.38 to 1.41
Pigment content, weight percent, ASTM Designation: D 3723	25.6 to 27.5
Nonvolatile content, weight percent, ASMT Designation: D 2369	57.0 to 60.0
Volume nonvolatile content, percent, ASTM Designation: D 2697	48.0 to 50.0
Fineness of grind, Hegman, ASTM Designation: D 1210	4 to 5
pH	6.5 to 7.5
Consistency, ASTM Designation: D 562, g (Equivalent KU)	200 to 300 (82 to 95)
High-shear viscosity, ATSM D 4287 0 to 5-P cone, shear rate 12 000 ^s ⁻¹	0.4 to 0.8 P

Characteristics of Paint

Measurements

Drying time at 25°C, 4 mil wet film, ASTM Designation: D 1640
set to touch, hours
dry through, hours

1 maximum
4 maximum

Material Ingredients of Paint:

- 1) Foamaster® AP (Cognis)
- 2) Rheology Modifier, Acrysol® RM-8W (Rohm and Haas)
- 3) Methocel® J12MS (Dow Chemical)
- 4) Pluronic® F-87 (BASF Wyandotte)
- 5) Halox® CW-491 (Halox Pigments) or InvoCor CI-3335 (Invotec)
- 6) Talc (Magnesium Silicate Hydroxide), specific gravity 2.7 to 2.85, oil absorption* 30 ± 2 , pH 9.5 ± 0.5 , fineness of grind, Hegman, 3.5 to 4.0, median particle size 6 to 7 μm , maximum 75 μm , platey particle shape, 99% passing a US Standard No. 325 sieve, dry brightness $87 \pm 2\%$.
- 7) Synthetic iron oxide, spheroidal particle shape, Fe_2O_3 98% minimum, oil absorption* 20 ± 3 , specific gravity 5.2 ± 0.1 , 99.9% passing a US Standard No. 325 sieve. Water-soluble matter 0.15% maximum, easy dispersible type recommended.
- 8) Sodium Nitrite (15% in water)
- 9) Proxel® BD20 (Zeneca) or CANGUARD® BIT-20 (Dow Chemical)
- 10) Haloflex® 202 (Zeneca)
- 11) Texanol® 2,2,4-Trimethylpentanediol-1,3-monoisobutyrate (Eastman)
- 12) Ammonium Hydroxide, ACS Reagent (28-30%)

*Oil absorption values determined according to ASTM Designation: D 281.

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 polypropylene or high-density polyethylene 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 2 to 4 mils. 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.