Government Of Alberta

Transportation And Economic Corridors - Technical Standards Branch

Specification For White and Yellow Traffic Paint Coatings (TPC), 2025

A. SCOPE

This specification covers the production and supply of Water-Borne or Solvent-Borne white and yellow paint, to be applied by spray equipment to bituminous pavements, with "drop-on" or overlay reflectorizing beads, for the marking of traffic zones.

B. INTENT

It is the intent of this specification to approve standard traffic paints for use by Alberta Transportation and Economic Corridors' Contractors based on performance, with the composition of the paint being left up to the supplier. Performance shall take into account appearance, durability and night visibility (retro-reflectivity).

C. GENERAL

1. Notwithstanding anything else contained herein, the paint supplied shall be of the highest quality, and suitable for application using equipment typically employed by the Contractor.

2. All paint must be suitable for application, without the use of thinners, at a rate of 38 litre/km (for a solid 100 mm wide line), and with overlay beads applied at a rate of 0.6 kg/litre of paint.

3. All paint shall meet Environment and Climate Change Canada's regulation for Volatile Organic Compound (VOC) Concentration Limits.

D. APPROVAL TESTING (TEST DECK APPLICATION & LABORATORY TESTS)

1. Each supplier will be permitted to submit up to two samples of paint of each colour (2 white, 2 yellow) for test deck application, provided that the two samples of the same colour are of sufficiently different formulation. The testing of these samples will be used to prequalify the suppliers' paint for use on provincial highways.

2. Each sample submitted for testing shall comprise three 4-litre containers and five 1-litre containers of paint.

3. Samples shall be delivered prepaid to the designated address by the specified dates. For shipments originating outside of Canada, the sender shall be solely responsible for customs clearance and all associated costs.

4. Each container shall be clearly labelled with the statement "[Year] white traffic paint" or "[Year] yellow traffic paint", along with the supplier's name and a formulation number. Labels shall be fastened such that they may be readily removed.

5. A complete report of the paint properties and composition as determined by the supplier shall be submitted with the sample. This report will be held in confidence and is for the Department's use only.

E. SPECIFICATIONS

1. Requirements applicable to this specification may be found in the latest edition of the American Society for Testing and Materials (ASTM) Standards.

2. All paint samples shall meet the specifications as indicated herein, without the use of thinners.

3. Failure of the paint to meet the specifications shall be considered as cause for rejection.

4. The paint shall be homogeneous and well ground to a uniform and smooth consistency. It shall not skin, cake, liver, thicken, gel or settle extensively in the container when stored for up to one year. It shall be readily remixed to a uniform consistency within 15 minutes using a mechanical paint shaker.

5. The paint shall be free from dirt and/or other foreign matter.

6. The paint shall be suitable for application using typical pavement marking equipment, with or without the inclusion of glass beads.

7. During application, the paint shall flow evenly and smoothly, covering the pavement surface solidly in one coat, without running.

8. After drying, the paint shall have a pure white or yellow flat or semi-gloss finish and shall not darken or change colour appreciably with time. For yellow paint the Department requires a colour that matches the CGSB 505-308 colour chip or USA-AMS-STD-595a Color no. 33538. For white paint the Department requires a colour that matches the USA-AMS-STD-595a Color no. 37875 or Color no. 37925, or CGSB 1-GP-12C white 513-301.

9. The degree of settling exhibited by the paint after 6 months of storage (as measured by ASTM D869) shall have a minimum rating of 6 out of 10, using 500 mL containers.

10. The paint shall have a no pick-up time (ASTM D711, Method A or Method B) of less than 15 minutes, for wet paint applied at a rate of 38 litre/km (for a solid 100 mm wide line) at 25°C and 55% Relative Humidity (RH).

11. The paint shall exhibit “no bleeding” or “slight bleeding” when tested in accordance with ASTM D868 Procedure B.

12. The viscosity of the paint when tested at 25°C in accordance with ASTM D562 shall be between 80 and 100 Kreb units inclusive.

13. The particle coarseness of the paint shall not exceed 1.0% by weight (in accordance with ASTM D185).

F. SAMPLE EVALUATION, TESTING AND APPROVAL

1. The identity of the paint samples shall not be known to any person involved in the testing or evaluation, until such testing and evaluation is completed. Samples delivered to the Department will have all identifying labels removed and replaced with a code number for identification purposes.

2. All samples will be tested by a qualified testing laboratory, to determine their compliance with the specifications.

3. Samples meeting the specifications shall be road tested (ASTM D713) as follows:

    a. For each new paint formulation submitted, two transverse road stripes of 100 mm width and 3500 mm length will be applied to a clean, dry bituminous surface (the “test deck”) using spray equipment. Application rates for both paint and beads shall follow the specifications outlined in Section C.2. Warm-temperature formulations shall be applied when the ambient temperature is

10°C or higher, while low-temperature formulations shall be applied when the ambient temperature is above 0°C but below 10°C.

b. At the intervals specified in Table 1, the test stripes shall be evaluated by a panel of four qualified members—two from the Department and two from the consulting laboratory. The evaluation will assess the retro-reflectivity (ASTM E1710), general appearance (ASTM D713) and durability (ASTM D913) of each stripe.

c. In accordance with ASTM D713, the appearance rating shall be based on the impression of the observer of the general condition of the test lines when viewed without any detailed inspection, from a distance of at least 3 m (10 ft). It shall include a comparison of the color of the surface under consideration with the original color, taking into account changes due to yellowing, bleeding, darkening, fading, dirt collection, mold growth, etc. The determination shall be made in both the wheel path and in the skip line area and rated as either acceptable or unacceptable.

d. In accordance with ASTM D713 and D913, the durability rating shall be based on the percentage of material remaining on the pavement (when examined by the unaided eye). The percent of the paint marking remaining on the pavement shall be considered as the percent of the prescribed area of test stripe in which the substrate is not exposed. In accordance with ASTM D913, the evaluators may either: select an area as representative and base the relative performance of the pavement marking on this area or grade segments of the pavement marking and average the gradings.

e. Road stripes shall be evaluated either until failure occurs or for a maximum duration as indicated in Table 1. The initial assessment shall be conducted approximately fourteen (14) days following the application of paint stripes on the test deck. Subsequent evaluations will take place at regular two-month intervals thereafter, plus or minus seven (7) days to account for weather conditions.

f. Retroreflective data will be obtained by taking readings with a handheld device in the center of the wheel paths and in the area outside the wheel path. Readings will be taken with a 30-meter CEN geometry portable retroreflectometer in accordance with ASTM Test Method E1710. The retroreflectometer shall be oriented to face the direction of application when taking the reading. The retroreflectometer equipment shall be Mirolux 30, Road Vista StripeMaster 3, or equivalent equipment approved by the Department. In accordance with ASTM D713, readings will be taken in the wheel path and centerline areas and reported separately.

g. Photographs of each test stripe shall be taken at each scheduled evaluation. These photographs will be of sufficient clarity to demonstrate both the durability and appearance of the lines and shall be included in the final report.

h. Paints meeting the requirements in Table 1 and Table 2 shall be approved for use on Department projects at the end of the test deck inspection period. The Department reserves the right to modify the requirements in Table 1 and Table 2 at their sole discretion.

i. Approved paints will be placed on the Department's Products List for a period of two years. For the third year and beyond, the paint formulation must be retested to maintain approved status.

G. PRODUCTION

1. In order to qualify as a supplier of waterborne or solvent-borne traffic paints, a manufacturer shall have capacity to provide a quality control program which will ensure compliance with this specification. Manufacturers shall maintain documentation for their production, sampling and testing procedures and methods. They should have adequate facilities to produce a minimum batch size of 3,000 litres.

2. Each container shall be clearly marked as to the contents, batch number, date of production and company formulation number.

3. A complete report of the paint properties and composition as determined by the supplier, as well as batch number, date produced, batch size and destination, shall be submitted with each batch. This report will be held in confidence and is for the Department's use only.

H. TESTING, ACCEPTANCE AND REJECTION

1. Quality Control
    a. The paint manufacturer is responsible for carrying out a quality control program to ensure that the paint they are supplying for provincial highway projects conforms to this specification.

2. Quality Assurance
    a) The manufacturer is not required to send samples to the Department for each batch produced for provincial highway applications. However, the Department may request samples of select batches for random quality assurance testing, and these samples shall be provided by the manufacturer at their expense.

    b) The Department may also collect random samples from paint batches during application, using any of the sampling procedures outlined in the Department's *Best Practice Guidelines for Sampling of Traffic Paint*.

    c) The field samples collected by the Department, and the samples submitted on request by the manufacturer, may be subject to laboratory testing to ensure the batch produced meets the characteristics of the approved formulation, within reasonable tolerance limits as specified in Table 2.

    d) Paints not meeting the foregoing specifications, or failing to match the approved formulation, may be rejected at no cost to the Department. The test results on each batch of paint produced, whether for quality control testing conducted by the manufacturer or for quality assurance testing conducted by the Department, shall match the test results of the approved formulation within the tolerance limits specified in Table 2.

    e) For each quality assurance sample, the minimum laboratory tests shall include Specific Gravity and Viscosity. If the sample meets the required values for these tests, additional analyses—such as Non-Volatile Content, Pigment Content, No Pickup Time, and any further testing at the Department's discretion as outlined in Table 2—shall be conducted.

TABLE 1: Performance Requirements for Water-Borne or Solvent-Borne Traffic Paint

PROPERTIES	UNITS	MINIMUM PERFORMANCE REQUIREMENTS				TEST METHOD
		Two Weeks After Installation	Two Months After Installation	Four Months After Installation	Six Months After Installation	
Retroreflectance of White Stripe[1]	mcd/m^2/lux	225	175	125	100	Handheld Retroreflectometer ASTM E1710
Retroreflectance of Yellow Stripe[1]	mcd/m^2/lux	200	150	100	75	
Durability of White / Yellow Stripe	%	100	95	85	75	ASTM D913
Appearance of White / Yellow stripe		Satisfactory	Satisfactory	Satisfactory	Satisfactory	ASTM D713

Note:
1. Minimum Retroreflectance requirement before first snow ploughing of the season.

TABLE 2: Quantitative Requirements for Traffic Paints

TEST METHOD		QUANTITATIVE REQUIREMENTS FOR APPROVAL	TOLERANCE LIMITS FOR QUALITY ASSURANCE/ CONTROL TESTS IN COMPARISON TO THE VALUES OBTAINED AT APPROVAL TESTS	REMARKS
a.	Specific Gravity ASTM D1475	No Specific Value	Within ± 0.050 kg/L of value obtained during approval test	
b.	No Pick-Up Time ASTM D711	Within 15 minutes	Not to exceed 20% of value obtained during approval test	
c.	Viscosity ASTM D562	80-100 KU	Within ± 5 KU of value obtained during approval test	
d.	Pigment Content ASTM D4451 or ASTM D3723	No Specific Value	Within 2% of value obtained during approval test	
e.	Non-Volatile Content (Non-Volatile Vehicle) ASTM D2369	No Specific Value	Within 2% of value obtained during approval test	
f.	45° - 0° Directional Reflectance ASTM E313	No Specific Value	Allowable variation value obtained during approval test: BRIGHTNESS YELLOWNESS WHITE: - 5% + 10% YELLOW: - 5% - 10%	Using BYK Gardner spectrophotometer in conjunction with ASTM E313.
g.	Abrasion Resistance ASTM D4060	No Specific Value	From 90 - 120% of value obtained during approval test	Using Taber Abraser with 1000 cycles of Abrasion
h.	Water Resistance ASTM D870		Within 1 unit of approved formulation	Out of 10. Cure 48 hours, 75 microns (dry) thickness.
i.	Particle Coarseness ASTM D185	1% Max	Within ± 0.3% of approved formulation (% retained on 45 μm sieve) and not to exceed 1%.	
j.	Water content ASTM D7358 or ASTM D4017	No Specific Value	Within 0.2% of approved formulation (%)	
k.	Freeze-Thaw Resistance of Water-Borne Coatings ASTM D2243	Pass	Pass	Repeat procedures for 3 freeze-thaw cycles (ASTM D2243 Section 7.3). then visually examine the sample and note any signs of livering, hard settling, coagulating, lumps or coarse particles
l.	Hiding Power ASTM D6762	8.4 m2/l	Within 10% of approved formulation	Pfund cyptometer with #3.5 wedge

m.	Bleeding ASTM D868	No bleeding or slightly bleeding	No bleeding or slightly bleeding	
n.	Volatile organic content (VOC) ASTM D2369	Maximum 150 grams/liter	Plus 25 grams/liter but not exceeding 150 grams/liter, minus 25 grams/liter	Shall never exceed the concentration of 150 grams/liter
o.	Degree of Settling ASTM D869	Minimum 6 out of 10		Six month settling test
p.	**Other tests as considered suitable such as:** - Chemical Analysis - Handling Properties - Resistance to Handling - Flash Point, etc.			