

53.20 PAINTED ROADWAY LINES

53.20.1 GENERAL

The Work consists of supplying paint and painting roadway lines on pavement surfaces. The various configurations of roadway lines are shown on drawing TEB 2.25.

53.20.2 MATERIALS

53.20.2.1 Paint and Glass Beads

The Contractor shall supply the paint and glass bead materials from the list of approved products shown in the Special Provisions. The Contractor shall be responsible for ensuring that the quality of the paint and beads supplied meets the requirements specified.

The Contractor shall provide the Engineer with the following information prior to commencing the Work:

- Names and mailing addresses of the suppliers and manufacturers.
- Paint formulation to be supplied.
- Written confirmation from the manufacturer that the materials to be supplied meet all specified requirements.

The Contractor shall advise the Engineer of any change in paint formulation.

The Contractor shall verify that all materials delivered and used in the Work are the type ordered.

No paint formulation shall be diluted or mixed with a different formulation or with any other material without the specific approval of the Engineer.

The Contractor shall take all necessary steps to prevent contamination of the materials. Paint shall be protected from freezing.

53.20.3 EQUIPMENT

The Contractor shall supply all equipment necessary to complete the Work.

53.20.3.1 Painting Truck

The painting truck shall be self-propelled and equipped to meet or exceed the following requirements:

- Two paint tanks each having a minimum capacity of 270 litres feeding three lines for a simultaneous two-colour application (two yellow directional dividing lines and one white edgeline).
- Painting controls capable of adjusting the paint application for the length of dashed line required. Each spray gun shall have independent controls and adjustment mechanisms and shall be operated from the operator's compartment.

- The compressors shall have a minimum rated capacity of 4.25 cubic metres per minute.
- Bead dispensers shall be electrically controlled, air operated, gravity fed with controls to adjust the bead flow. The bead dispensers shall be fed from tanks capable of holding a minimum of 45 kilograms of beads.
- A television vehicle guidance or a vehicle guidance system mounted on a retractable A-frame with a guide wheel and pointer system, to assist the operator in maintaining alignment on the existing lines.
- A minimum of six spray guns and six bead dispensers mounted in the following configuration:
 - Three spray guns and three bead dispensers mounted on an independently-controlled boom located on the left side of the truck to paint the directional dividing lines. The outer two spray guns and bead dispensers shall be in a configuration that will produce two lines of equal width with the distance between the two lines equal to the width of one line (100 mm). The inner spray gun and bead dispenser shall operate independently and shall be used to apply the directional dividing line where only a single directional dividing line is required. When a 300 mm wide line is required, the 3 guns shall be used simultaneously.
 - Three spray guns and three bead dispensers mounted on an independently controlled boom on the right side of the truck to apply the right edge line. When a 300 mm wide line is required the 3 guns shall be used simultaneously.
- Equipped to apply white or yellow paint from the three spray guns mounted on the lefthand side of the paint truck and to switch from one colour to the other during operation.
- Control of both independent booms, all spray guns, bead dispensers and painting controls from the operator's compartment(s).

The Engineer may allow the use of alternate equipment, provided the Contractor demonstrates that such equipment is capable of achieving the desired end product.

53.20.3.2 Safety Equipment

The painting truck and the pilot truck shall each be equipped with the following:

- A two-way radio for voice communication.
- An overhead revolving beacon with an amber lens a minimum of 180 mm high and 180 mm wide. The beacon shall be mounted on the top of the vehicle fully visible to traffic approaching from both front and rear.
- A sequential arrowboard meeting the following specifications:
 - Minimum size 0.75 metres x 1.52 metres.
 - 12 volt solid state circuitry.
 - Minimum 25 amber sealed beam, hooded lamps.
 - Fully adjustable light intensity on all arrowboard lights.
 - Operating modes which include:
 - (1) sequential left arrow or chevron

- (2) sequential right arrow or chevron
 - (3) sequential double arrow or chevron
 - (4) horizontal bar
 - (5) all four lamps in the extreme corners of the panel flashing simultaneously at 35-50 flashes per minute with the flashing light lit 50% of the time.
- The arrowboard shall be controlled from a console located in the vehicle cab.
 - The arrowboard display shall be visible to traffic approaching the rear of the trucks.
- A "slow moving vehicle" sign. The sign shall be mounted at the rear of the vehicle and be visible to the public only when the painting truck is applying paint.
 - A warning sign, mounted at the rear of the truck, stating "wet paint keep off". The sign shall have standard warning colours with letters having a minimum height of 150 mm and shall be visible to the public only when the truck is applying paint.

53.20.4 PROCEDURE

53.20.4.1 General

All painting shall be carried out during hours of daylight between 1/2 hour after sunrise and 1/2 hour before sunset. Generally the Contractor may paint lines during any day of the week but is cautioned that traffic volumes are usually higher on all highways on Friday, Saturday and Sunday. Line painting on highways with relatively high traffic volumes shall be performed between Monday and Thursday inclusive if so directed by the Engineer.

Operation of the painting truck against the flow of traffic shall not be permitted.

Loading glass beads or paint onto the painting truck is not permitted on the travel lanes of a roadway surface.

53.20.4.2 Pilot Truck Operation

The Contractor shall operate the pilot truck in conjunction with the painting truck during the painting of all longitudinal lines. The pilot truck shall follow behind the painting truck as follows:

- Under good "sight distance" conditions:
 - On a 4 Lane Highway, the pilot truck shall be driven in the same travel lane as the paint machine, following it at a constant distance of between 100 and 150 metres.
 - On a 2 Lane Highway with a minimum 3 metre shoulder, the pilot truck shall be driven along the right shoulder, not straddling the right edge line and following the painting truck at a constant distance of between 100 and 150 metres.

- On a 2 Lane Highway with less than a 3 metre shoulder, the pilot truck shall travel from approach road to approach road and stop until the paint machine has cleared the next approach road. Approach road in this context includes local roads, farm entrances, field entrances, etc. The pilot truck, when stopped in an approach road, shall sit parallel to the highway in order that the signs and arrowboard are fully visible to traffic approaching from the rear.
- In restricted sight distance areas, the pilot truck shall stop on the road shoulder, and remain visible to traffic approaching from the rear until the paint truck has moved out of the restricted sight distance area. For example, on a vertical curve the pilot truck shall stop on the crest of the hill until the paint truck has proceeded down the other side of the hill into an area with unrestricted sight distance.
- On Single Lane Roads (for example on interchange ramps) the Pilot Vehicle shall be driven in the travel lane to keep traffic from passing the painting truck.
- Pilot truck operators shall not attempt to direct traffic from inside the vehicle.

53.20.4.3 Arrowboard Message

The pilot truck and the painting truck are to display the same message at all times. The message shall be one of the following:

- On 2 Lane Highway - a bar (6 horizontal lights flashing) is preferred but if a bar cannot be shown on the type of arrowboard used, the 4 corner lights flashing is an acceptable alternative.
- On a 4 Lane Highway - a right arrow when operating in the left lane and a left arrow when operating in the right lane.
- On a Single Lane Road (for example the exit leg of an interchange) - four flashing corner lights or a bar.

53.20.4.4 Areas to be Painted

The Contractor shall paint lane lines, continuity lines, edge lines and directional dividing lines on the highway sections, interchanges or intersections specified, as well as the lines through towns, at truck turnouts, rest areas, points of interest and weigh scale turnouts. At minor intersections of highways and secondary highways, local roads or farm entrances, the Contractor shall only paint the shoulder lines on the primary highway to a point corresponding to the edge of the intersecting shoulder line or as directed by the Engineer.

The Contractor shall ensure that painted lines match the existing lines exactly unless otherwise directed by the Engineer. When painting is required in areas where there are no existing lines or where revisions to the existing lines are required, these areas will be identified and laid out or spotted by the Engineer.

53.20.4.5 Pavement Surface and Atmospheric Conditions

Painting shall not be performed during the following conditions:

- When the temperature is below 0°C.
- When wind conditions cause overspray.
- When the visibility is less than 700 metres.
- During periods of rainfall.

Areas to be painted shall be clean and dry during the application of paint.

Areas to be painted shall be inspected by the Contractor to ensure they are clean, free of sand and debris, and suitable for painting.

The Contractor shall immediately notify the Engineer of any areas that in his opinion are unsuitable for painting. Sweeping, when required, shall be performed by the Contractor.

53.20.4.6 Paint and Bead Application and Unit Price Adjustments

All painted lines shall be applied at a uniform application rate of 38.0 ℓ/km of solid, 100 mm wide line. Glass beads shall be applied immediately following the paint application at a uniform application rate of 600 g/ℓ of paint. Painted lines initially applied at an application rate of less than 38.0 ℓ/km but greater than or equal to 36.0 ℓ/km of solid, 100 mm wide line shall be subject to the following price adjustments:

Daily “Bulk” amount of paint (ℓ/km of solid 100 mm wide line)	Unit Price Reduction (%)
to 38.0	Nil
< 38 - 37.5	5
< 37.5 - 37	10
< 37 - 36.5	15
< 36.5 - 36	20

Unit price reductions shall be applied to the total volume of work represented by the “daily bulk” amount.

Painted lines initially applied at an application rate of less than 36.0 ℓ/km of solid, 100 mm wide line shall be repainted at the Contractor's expense.

53.20.4.7 Removal of Incorrectly Painted Lines

All lines that are incorrectly painted by the Contractor or painted where no lines are specified shall be removed by the Contractor at his own expense and to the satisfaction of the Engineer. The method and equipment used by the Contractor to remove incorrectly painted lines will be subject to the approval of the Engineer.

53.20.5 SAMPLING AND TESTING

The Contractor shall supply the Engineer with the manufacturer's quality control test results and a quality assurance sample for each batch of material as it is delivered to the Work. Quality Control results shall include a minimum of Specific Gravity, Hiding Power, Dry to Traffic and Viscosity results. Samples for quality assurance shall be obtained from the manufacturer or taken from drums as delivered to the storage site.

If the Contractor obtains quality assurance samples at the time of delivery to his storage facility, sampling and minimum frequency of testing shall be as described in the Alberta Transportation and Utilities Test Methods TLT-636, Sampling Traffic Paint and TLT-601, Sampling Glass Beads From 205 Litre Drums or as directed by the Engineer. When glass beads are supplied in bags, a minimum of one 25 kilogram bag may be selected from each project.

All materials will be subject to further inspection, sampling and testing by the Department and the Contractor shall

provide safe, convenient access, acceptable to the Engineer, for inspection and sampling of the materials, and shall cooperate in the inspection and sampling process when requested to do so. Paint products shall meet the testing requirements as shown in the Special Provisions.

53.20.6 TIME TO COMPLETE

In urgent situations, the Contractor shall complete the Work within 10 calendar days of the issuance of the Work Order. In all other cases, the Contractor shall complete the Work within 60 calendar days of the issuance of the Work Order.

53.20.7 MEASUREMENT AND PAYMENT

Measurement will be made in kilometres of the length of painted line. The space between "dashed lines" will not be measured for payment.

Payment will be made at the unit price bid per line-kilometre (subject to the specified unit price adjustments) for "Painted Roadway Lines" for the width of line specified. This payment will be full compensation for inspecting the areas to be painted, supplying and applying the paint and glass beads, traffic accommodation and signing, and all labour, materials, equipment, tools and incidentals necessary to complete the Work.

In urgent situations where the Contractor is required to complete the Work within 10 calendar days of the issuance of the Work Order, an additional payment will be made at the unit price bid per occurrence for "Line Painting - Premium". This payment will be full compensation for complying with the accelerated scheduling required to complete the Work.

Measurement and payment for sweeping will be made in accordance with Specification 53.17, Roadway Sweeping.

Measurement will also be made of the number of intersections (per side of road) and the number of interchanges painted.

When painting lines at intersections or interchanges is required, an additional payment will be made at the unit price bid per side for "Line Painting - Intersections" or at the unit price bid per interchange for "Line Painting - Interchanges." This payment will be full compensation for the additional time required to paint lines at these locations.

Premium payments for intersections will only be made for those intersections where the Contractor is required to paint additional lane lines (turning lanes or acceleration/deceleration lanes) and will be made based on the number of roadway sides of the intersection requiring line painting. For example, additional line painting required on both sides of a two lane undivided highway would be considered two sides.

The premium payment for interchanges will be full compensation for the additional time required to paint all interchange lines regardless of the size or configuration of the interchange.

53.20.8 WARRANTY

The warranty period for this Work shall be 60 days.