



**CITY OF  
SWIFT CURRENT**  
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**SECTION 07000  
PAVEMENT MARKINGS**

**DECEMBER 2015**



## CONSTRUCTION SPECIFICATIONS

### SECTION: 07000 PAVEMENT MARKINGS

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## 1 GENERAL

### 1.1 DESCRIPTION

- 1.1.1 This section includes the installation of pavement markings within areas required by the City.

### 1.2 RELATED SECTIONS

- 02010 Site Preparation and Grading
- 02015 Sub – Grade Preparation
- 03001 Aggregates General
- 03005 Granular Base Course
- 03010 Granular Sub – Base
- 04000 Asphalt Pavement Crack Routing and Sealing
- 04001 Asphalt Pavement Crack Sealing
- 04015 Asphalt Concrete
- 04025 Prime, Tack and Fog Coats
- 04070 Asphalt Concrete Pavement Milling
- 12000 Flexible Guide Posts and Delineators
- 10000 Regulatory Roadway Signs

### 1.3 INSPECTION AND TESTING

- 1.3.1 If requested by the City, submit the following material sample quantities at least four (4) weeks prior to commencing work.
- Two (2) 1 L samples of each type of paint.
  - One (1) 1 kg sample of glass beads.
  - Sampling to CGSB 1-GP-71.
- 1.3.2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

## 2 PRODUCTS

### 2.1 PAINTED MARKINGS

- 2.1.1 To CGSB 1-GP-74M, alkyd traffic paint.
- 2.1.2 Colour: to CGSB 1-GP-12C, yellow 505-308, white 513-301.
- 2.1.3 Thinner: to CAN/CGSB-1.5.

## 2.2 PERMANENT MARKINGS

- 2.2.1 The use of other permanent marking materials that do not meet the following requirements will be subject to approval by the City. Acceptance during the warranty period will be based on the following:
- not lift from the pavement,
  - exhibit no material loss within four (4) weeks of installation,
  - not deteriorated by contact with sodium, calcium chloride, or traffic residue,
  - show no appreciable deformation or discolouration under exposure to traffic and road temperatures between  $-40^{\circ}\text{C}$  and  $40^{\circ}\text{C}$  and,
  - maintain their original dimension and placement without chipping or cracking.
- 2.2.2 Cold Plastic Marking: two-component, cold-extruded and cold-curing, having a specific gravity of 1.9 minimum at  $25^{\circ}\text{C}$ .
- 2.2.3 Hot Thermoplastic Marking: hot-extruded, having a specific gravity of 2.0 minimum at  $25^{\circ}\text{C}$ , having a softening point of  $90^{\circ}\text{C}$  minimum according to ASTM E28.
- 2.2.4 Both cold and hot plastic markings shall conform to the following:
- Water Absorption: 0.5% maximum by mass retained water after twenty-four (24) hour immersion, according to ASTM D570 Procedure A.
  - Impact Resistance: minimum 1.13 J at  $25^{\circ}\text{C}$  when material is cast into bar of 25 mm<sup>2</sup> cross-section by 75 mm long, with 25 mm extending above vice jaws in a cantilever beam (Izod type) tester using the 2.82 J scale, according to ASTM D256 Method C.
  - Abrasion Resistance: maximum weight loss of 0.50 g when subjected to 200 revolutions on Taber abrader at  $25^{\circ}\text{C}$  using H-22 Calibrade wheels weighted to 500 g with sample kept continuously wet with distilled water. Prepare test sample with representative material placed on 100 mm square plate,  $3 \pm 0.1$  mm thick.
  - Chemical Resistance: Test samples of 50 mm square, no degradation after exposure to:
    - 24 hours immersion in 5% NaCl.
    - 24 hours immersion in 5% CaCl.
    - 1 hour spot test with mineral oil.
  - No deterioration when in direct contact with asphalt cement in asphalt materials, or with sodium chloride, calcium chloride or other de-icing chemicals.
  - Non-toxic and not harmful to persons or property when in hardened state.
  - No discolouration from sunlight ultraviolet exposure and no bond failure for warranted life of material.

- 2.2.5 Glass Beads: minimum 80% true spherical shape; clear of cloudiness, dark inclusions, trapped air, or other defects; and conforming to the following:
- Index of Refraction: 1.5 minimum when tested in liquid immersion at 25°C according to CGSB 1-GP-71 Method 49.1.
  - Gradation of glass beads for mixing with and for surface application on thermoplastic material, tested according to ASTM D1214:

Sieve Size (µm)	% Passing by Mass
850	90 – 100
300	15 – 50
180	0 – 10

2.2.6 Premarking Paint: as reviewed by the City.

2.2.7 Groove Filler: LRS 424 or approved equal.

### 2.3 MIX FORMULATION

2.3.1 Glass Sphere Content: minimum 20%, maximum 30% by mass of thermoplastic material.

2.3.2 White Colour: brilliant white, 70% minimum when measured with the Gardner Multi-Purpose Reflectometer 0, 45° daylight luminous directional reflectance, with a green filter.

2.3.3 Yellow Colour: conforming to CGSB Colour #505-308 or U.S. Federal Standard 595a, Colour Chip 33538, 45% minimum when measured with the Gardner Multi-Purpose Reflectometer 0, 45° daylight luminous directional reflectance, with a green filter. Colour tolerance to be within limits of U.S. Department of Transport Yellow Tolerance Chart PR#1 December 1972.

2.3.4 No formulation change unless approved by the City. Any significant change will be subject to field trials.

## 3 EXECUTION

### 3.1 EQUIPMENT REQUIREMENTS

3.1.1 Paint applicator to be an approved pressure type distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

3.1.2 Grooving machine subject to the City's approval.

### 3.2 CONDITIONS OF SURFACES

3.2.1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease, and other foreign materials.

3.2.2 Remove conflicting markings.

### 3.3 TRAFFIC CONTROL

3.3.1 Conduct all traffic control to the requirements as specified.

### 3.4 PAINT APPLICATION

- 3.4.1 Lay out pavement markings and review with the City.
- 3.4.2 Apply paint only when air temperature is above 10°C, wind speed is less than 60 km/h and no rain is forecast within next four (4) hours.
- 3.4.3 Apply traffic paint evenly at rate of 3.0 m<sup>2</sup>/L.
- 3.4.4 Paint lines to be of uniform colour and density with sharp edges.
- 3.4.5 Thoroughly clean distributor tank before refilling with paint of different colour.

### 3.5 COLD PLASTIC APPLICATION

- 3.5.1 Mix components and apply cold plastic marking according to manufacturer's surface application procedure, to a thickness of 2 mm minimum and 3.0 mm maximum.
- 3.5.2 Apply when ambient temperature is between -10°C and 30°C.
- 3.5.3 Apply glass beads to surface of extruded material before it has set, at a rate of 140 to 250 g/m<sup>2</sup>.
- 3.5.4 Let marking cure into a hardened state.

### 3.6 HOT THERMOPLASTIC APPLICATION

- 3.6.1 Cut groove into pavement surface to designated width and depth. Remove grindings and haul to designated location. Sweep or air blast groove clean and dry.
- 3.6.2 Heat material and apply according to manufacturer's hot extrusion process.
- 3.6.3 Fill groove with hot molten material. Do not overfill more than 3.0 mm above pavement surface.
- 3.6.4 Apply glass beads to surface of extruded material while it is still molten at a rate of 140 to 250 g/m<sup>2</sup>.
- 3.6.5 Trim surplus material to give clean straight edges.
- 3.6.6 Let marking cool to a hardened state.

### 3.7 PROTECTION AND CLEANUP

- 3.7.1 Do not permit traffic over applied markings until they have adequately hardened.
- 3.7.2 Protect surrounding areas and structures from disfiguration and damage. Repair any damage as directed by the City.
- 3.7.3 On completion of work, clean up and leave site free of debris and waste matter.

### 3.8 TOLERANCE

- 3.8.1 Painted Marking:
  - Paint markings to be within plus or minus 12 mm of dimensions indicated.
  - Remove incorrect markings.

3.8.2 Cold Plastic Marking:

- Measurement: The quality assurance laboratory will measure suspect markings with a surface micrometer. The average of five (5) measurements will represent 300 m of marking, or one job site, whichever is less.
- Thickness Deficiencies: Where a significant number of deficiencies occur in the work, involving average thicknesses greater than 3.0 mm or less than 1.8 mm, the City may order removal and replacement, or application of additional material.
- If surface dishing deeper than 0.5 mm occurs, the City may order removal and replacement.
- The quality assurance laboratory will determine the width of suspect markings by the average of 5 measurements representing 300 m of marking, or one job site, whichever is less.

3.8.3 Hot Thermoplastic Marking:

- Measurement: The quality assurance laboratory will core suspect markings. The average thickness of 3 cores will represent 300 m of marking, or one job site, whichever is less.
- Overfill Thickness: That portion of marking above pavement surface will receive no additional payment. If overfill exceeds 3.0 mm, the City may order removal and replacement of marking.
- Groove Thickness Deficiencies: Where a significant number of deficiencies occur, involving average thicknesses less than 70% of that specified, the City may order removal and replacement.
- If surface dishing deeper than 0.5 mm occurs, the City may order removal and replacement. Variations in asphalt surface profile may be taken into consideration.
- The quality assurance laboratory will determine the groove width of suspect markings by average measurement of three (3) cores representing 300 m of marking, or one job site, whichever is less.

3.8.4 Width Deficiencies:

- Where a significant number of deficiencies occur greater than 10 mm in average widths of cold plastic, or in average groove widths of hot thermoplastic, the City may order removal and replacement.

**3.9 PROTECTION OF COMPLETED WORK**

3.9.1 Protect pavement markings until dry.

## **4 MEASUREMENT AND PAYMENT**

### **4.1 MEASUREMENT**

- 4.1.1 Measurement shall be based on lineal meters (m) or square meters (m<sup>2</sup>) of actual work completed, as specified in the unit rate schedule of the contract.

### **4.2 PAYMENT**

- 4.2.1 Payment shall be based on the measured quantity multiplied by the unit rate specified in the unit rate schedule of the contract.
- 4.2.2 Payment shall be compensation in full for transportation, supply of materials specified, equipment, tools and labour, and all other incidentals necessary to complete the work.

**END OF SECTION**