Note: The PROV implemented in July 2023 replaces OPSS 1715 COMMON, February 1991 with no technical content changes.

MATERIAL SPECIFICATION FOR PREFORMED PLASTIC PAVEMENT MARKING TAPE

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1715.01 SCOPE

This specification covers the requirements for reflective and non-reflective preformed plastic pavement marking tapes which are suitable for use onto concrete and bituminous pavements.

1715.02 REFERENCES

This specification refers to the following standards, specifications or publications:

Ontario Provincial Standard Specifications, Materials

OPSS 1750 Traffic Paint Reflectorizing Glass Beads

Canadian General Standards Board

CGSB 1-GP-12C-1983 Standard Paint Colours

American Society for Testing and Materials

ASTM D523-89 Method for Specular Gloss

ASTM D638-87b	Tensile Properties of Plastics
ASTM D713-87	Conducting Road Service Tests on Traffic Paint
ASTM D1000-88a	Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications
ASTM D4505-85	Preformed Plastic Pavement Marking Tape for Extended Service Life
ASTM D4592-86	Preformed Plastic Pavement Marking Tape for Limited Service Life
ASTM E97-82(1987)	Method for 45-deg., 0-deg. Directional Reflectance Factor of Opaque Specimens by Broad-Band Filter
ASTM E303-83	Measuring Surface Frictional Properties Using the British Pendulum Tester

United States Federal Standard

U.S. FED-STD-595B Dec. 15, 1989 Colours Used in Government Procurement

International Commission on Illumination

CIE 1976 - L^*,a^*,b^* Uniform Colour Space and Colour Difference Equation

1715.03 DEFINITIONS

For the purpose of this specification, the following definitions shall apply:

Compliance Certification means the procedure and requirements for establishing an approved source of materials.

Durable Preformed Plastic Pavement Marking Tape means preformed plastic pavement marking tape with extended service life period with a minimum service period of two years when placed according to the manufacturer's recommended procedures on pavement surfaces with an annual average daily traffic, AADT of about 20,000.

Fingerprinting means the testing of preformed plastic pavement marking tape by gas chromatographic method and other techniques for verification purposes.

Preformed Plastic Pavement Marking Tape means plastic material specifically designed and preformed into pliable rolls or ribbons of various lengths and width or into symbols either white, yellow, or black for use as pavement marking on concrete or bituminous pavement.

Reflectorization means a material, treatment, or process to enable incident light to be returned in high proportions in the general direction of the light source.

Service Test means the evaluation of pavement marking materials on a test deck and performance rating prior to compliance certification.

Temporary Preformed Plastic Pavement Marking Tape means preformed plastic pavement marking tape with a limited service life and a minimum service period of three months when placed according to manufacturer's recommended procedures on pavement surfaces with an annual average daily traffic, AADT of about 20,000.

1715.05 MATERIALS

1715.05.01 General

Only material properties which are necessary for proper installation and satisfactory performance of preformed plastic pavement marking tape are specified here. The material as supplied shall be free of cracks and have edges true, straight, and unbroken according to ASTM D4505. Preformed plastic pavement marking tape of all types shall have a uniform width and thickness.

The material used in the manufacture of preformed plastic pavement marking tape shall be of high quality so that the appearance will not change in service to impair the colour or the visibility of the delineation.

1715.05.02 Colour

The preformed plastic pavement marking tape shall be according to the following colour requirements:

White - CGSB 1-GP-12C white 513-301

Yellow - Shall match either the yellow traffic paint chip of the Ministry of Transportation, Ontario or U.S. Federal 595B, Yellow 33538

Black - CGSB 1-GP-12C black 512-301

The tolerance in colour allowed is as follows in CIE L^*, a^*, b^* Uniform Colour Space and Colour Difference Equation when calculated from instrumentally measured colour differences according to ASTM D2244:

White
$L^* = +2$ and -1.5 max
$a^* = +1.5$ and -1 max
$b^* = +4$ and -4 max

Yellow - MTO
$L^* = +2$ and -1.5 max
$a^* = +3$ and -1.5 max
$b^* = +7$ and -1.5 max

Yellow - U.S.
$L^* = -2$ and $+4$ max
$a^* = -6$ and $+4$ max
$b^* = -9$ and $+10$ max

1715.05.03 Adhesive

The preformed plastic pavement marking tape shall be either precoated with a factory applied adhesive at the base or supplied with a suitable adhesive and any other material such as a primer that is necessary for installation of the tape onto the pavement.

1715.05.04 Material Composition

The material composition of the preformed plastic pavement marking tape shall be at the discretion of the manufacturer and shall be certified by the Owner.

1715.05.05 Physical Property Requirements

The physical properties of the preformed plastic pavement marking tape submitted for compliance certification shall be according to Table 1.

Samples are required by the Owner for laboratory testing. The supplier shall submit with each test sample, one complete set of data on physical properties, application procedure, and material safety for preformed plastic pavement marking tape.

1715.05.06 Service Test

Preformed plastic pavement marking tape according to subsection 1715.05.06 and Table 1 shall be submitted for service test when requested by the Owner.

Preformed plastic pavement marking tape for extended service, durable preformed plastic tape shall be service tested according to the following:

a) Test deck location and time for installation shall be determined by the Owner.

b) The test strips shall be 10 cm in width and installed transversely across the lanes of the road. The installation of the preformed plastic pavement marking tape shall be made by personnel from the supplier/manufacturer or his agent using the pieces of equipment recommended by the manufacturer for installation.

c) A service test shall consist of installation of test stripes of pre-formed plastic pavement marking tapes, onto bituminous or a concrete pavement with about 20,000 AADT.

d) Ease of application and quality and nature of the stripes will be assessed.

e) The installed tape will be inspected periodically and its service performance will be rated by the Owner as specified in Table 2.

f) Approval will be given after two years of service rating of durable preformed plastic pavement marking tape, providing the material conforms to Table 2 and meets the conditions of subsection 1715.05.05.

Temporary preformed plastic pavement marking tapes of removable type shall be according to this specification and also to ASTM D4592 except that the required minimum service life is three months at about 20,000 AADT.

1715.07 PRODUCTION

1715.07.01 General

In order to qualify as a supplier of preformed plastic marking tape, a manufacturer must satisfy the following minimum requirements:

a) Adequate production facilities.

b) A laboratory sufficiently equipped and staffed to provide a quality control program which will ensure compliance with this specification.

c) Properly documented production, sampling, and testing procedures and methods.

1715.07.02 Quality Control

A manufacturer shall be responsible for carrying out a quality control program to ensure that the preformed plastic pavement marking tapes conform to this specification.

1715.08 QUALITY ASSURANCE

1715.08.01 Acceptance Criteria

The Owner may request samples to be taken from the shipments of preformed plastic pavement marking tape for quality assurance testing. Samples shall be taken from each batch produced for delivery to the Owner. Criteria for accepting the preformed tape include the following requirements and tolerances:

a) Composition as determined by fingerprinting and other tests shall not vary by more than ± 5% from that of the reference sample.

b) Colour difference, ΔE shall be within ± 1.5 of the value established on the reference sample.

c) Directional Reflectance, Y shall not vary by more than ± 3 and have a minimum value of 65 and 45 for white and yellow tapes respectively.

d) Retroreflectance shall not vary by more that ± 10 mcd/m^2/lux.

Viscosity and the infrared spectograph of any adhesive and/or primer shall match that obtained for the approved reference samples.

1715.08.02 Quality Control of Production Batches

a) One metre sections of each type and colour of the tapes, and a section of legends and/or symbols shall be supplied to the Owner for laboratory testing from each production batch.

b) 200 ml of primer or adhesive, if the use of such surface preparation material or adhesive is recommended by the manufacturer, from each production batch, to be supplied to the Owner.

1715.08.03 Storage

The preformed plastic pavement marking tape shall conform to this specification after storage.

1715.09 OWNER PURCHASE OF MATERIAL

1715.09.01 Certificate of Compliance

The manufacturer shall submit a certificate of compliance with tenders indicating that the physical properties, material composition, and installation characteristics of all of the manufacturer's production batches of preformed plastic pavement marking tapes for the Owner shall conform to this specification and shall not deviate from the allowable tolerances, unless approved by the Owner.

1715.09.02 Delivery and Packaging of Preformed Plastic Pavement Marking Tape

The delivery schedule, delivery location, colour, type, and quantity shall be as specified on the Owner's purchase order.

Each package of preformed plastic pavement marking tape shall be clearly identified with the following information:

a) Manufacturer's name and address.

b) Types and colour of preformed plastic pavement marking tape.

c) Manufacturer's code and batch numbers.

d) Dimension and length or numbers of legends and symbols.

e) Date of manufacture.

1715.09.03 Measurement and Payment

Measurement of preformed plastic pavement marking tapes shall be by metres.

For measurement purposes, a count shall be made of the number of legends and symbols.

Payment at the price specified in the purchasing order shall be for the supply of preformed plastic pavement marking tape.

TABLE 1
PHYSICAL PROPERTY REQUIREMENTS FOR
PREFORMED PLASTIC PAVEMENT MARKING TAPE

Property	Durable Preformed Plastic Tape		Temp. Preformed Plastic Tape		Test Methods	
	Min.	Max.	Min.	Max.	ASTM	Others
Directional Reflectance %					E97	
White	65		65			
Yellow	45		45			
Black Temporary				12		
Retroreflectance						Instrument
mcd/m^2/lux						Mirolux 12
White	**		**			
Yellow	**		**			
Black Temporary				**		
Tensile Strength MPa			7.5*		D638	
Elongation at Break %		50		50	D638	
Adhesion at						
10 °C	500		500		D1000	
24 °C	500		500		D1000	
g/25.4 mm of width						
60° Gloss					D523	
White		10		10		
Yellow		10		10		
Black Temporary				5		
Skid Resistance BPN Units	**		**		E303	

* This requirement is applicable to temporary preformed tape of removable type.

** Values to be established.

TABLE 2
PERFORMANCE REQUIREMENTS FOR SERVICE TEST AT ABOUT 20,000 AADT
FOR PREFORMED PLASTIC PAVEMENT MARKING TAPE

Property	Performance Requirements						
	Temp. Tape 3 mths	Durable Tape					Test Method
		1 yr	2 yr	3 yr	4 yr	5 yr	
Directional Reflectance %							
White	≥ 65	≥ 50	≥ 50	≥ 50	≥ 50	≥ 50	E97
Yellow	≥ 45	≥ 35	≥ 35	≥ 35	≥ 35	≥ 35	
Black Temporary	≤ 12						
Retroreflectance mcd/m^2/lux							
White	*	*	*	*	*	*	Instrument
Yellow	*	*	*	*	*	*	Mirolux
Black Temporary	*						12
Durability %	≥ 95	≥ 95	≥ 90	≥ 80	≥ 75	≥ 70	MTO**
Appearance	≥ 8	≥ 8	≥ 7	≥ 6	≥ 5	≥ 5	D713 & MTO ***

* Values to be established.

** Durability is calculated, first by estimating the % wear from the photographs/video images of stripes taken at test sites, and then deducting the value obtained from 100.

*** Rating 1 - 10; Perfect Score is 10.
Rating made on inspection of the markings by a panel of evaluators from the Owner.

PREFORMED PLASTIC PAVEMENT MARKING TAPE MATERIAL DATA FORM

A. MANUFACTURER'S NAME _____
ADDRESS _____
_____

TELEPHONE NO. _____

B. SAMPLE IDENTIFICATION
Commercial/Trade Name of Sample _____
Manufacturer's Code No. _____
Batch No. _____
Colour _____
Width _____
Thickness _____
Date of Manufacture _____

C. MATERIAL COMPOSITION
Resins and Conditioners wt % _____
Pigments and Fillers wt % _____
Beads wt, % _____

D. TEST DATA

1. Preformed Tape

a. Tensile strength, Mpa at 24 °C	ASTM D638 0.6 cm/min	_____
b. Elongation and Break %	ASTM D638 0.6 cm/min	_____
c. Adhesion at 10 °C g/25.4 mm at 24 °C	ASTM D1000	_____
Softening Point °C	ASTM E28	_____

2. Adhesive and Primer, if used separately

		Primer	Adhesive
Viscosity 25 °C	ASTM D562	_____	_____

E. MATERIAL SAFETY DATA

F. PROCEDURE FOR OVERLAY AND INLAY APPLICATION/INSTALLATION

1. Pavement Surface Preparation Procedure _____
_____
_____
_____

2. Pavement Temperature Range for Installation
   Minimum °C _____
   Maximum °C _____

3. Air Temperature
   Minimum °C _____

4. Humidity Maximum % _____

5. Adhesive Application Procedure _____
_____
_____
_____

6. Type of Pavement * where the application is recommended _____
_____

7. Equipment for Installation _____
_____
_____
_____

8. Any Other Relevant Information _____
_____
_____
_____

* Refers to the age of the pavement, the surface texture, e.g. OFC, DFC, and whether it is asphalt or concrete.

NOTE: This form must be completed in full and forwarded with tape sample. Samples submitted without a completed Data Form will not be considered.