

December 2, 2011

Permanent Pavement Markings

Section 624

624.1 Description

Apply durable permanent markings to roadways designated in the Plans or Special Provisions. Apply lines at the widths and patterns shown in the Plans or as indicated in the Standard Drawings. For resurfacing projects, the existing markings may be used as a guide for placement of the new markings.

624.2 Materials

624.2.1 Permanent Pavement Marking Materials

Use one of the following three binder materials: thermoplastic, epoxy or polyurea. Apply thermoplastic or epoxy markings which meet the binder material requirements of Section 626, Epoxy Pavement Markings, and Section 627, Thermoplastic Pavement Markings, of the Standard Specifications. Apply polyurea pavement marking materials from the following approved suppliers: Epoplex - LS 90, 3M - Stamark LPM Series 1200, or other manufacturer's materials under project specific, conditional approval.

624.2.2 Drop-on Glass Beads

Use drop-on glass beads for thermoplastic and epoxy markings meeting the material requirements of Sections 626 and 627 of the Standard Specifications for AASHTO Type I beads, respectively. Use drop-on glass beads for polyurea pavement markings meeting the material requirements of Section 626 for AASHTO Type I beads.

In addition to the material requirements of Sections 626 and 627 of the Standard Specifications for AASHTO Type I beads, the following additional requirements shall be met:

- Drop-on glass beads shall not contain more than 200 ppm (total) arsenic, 200 ppm (total) antimony or 200 ppm (total) lead when tested to EPA methods 3052 and 6010B.
- 20% by volume of the Type I drop on glass beads shall have a refractive index of 1.9 or greater. The beads may be applied to the permanent marking in a uniform blend or using a double drop application.

Ensure that all beads have the appropriate performance enhancing coatings recommended by the bead manufacturer for the type of binder material selected.

624.3 Equipment

Use equipment to apply the permanent pavement markings that meets the requirements of the following Sections of the Standard Specifications:

- Section 626.3 - Epoxy and Polyurea
- Section 627.3 - Thermoplastic

624.4 Construction

624.4.1 Application of Permanent Pavement Markings

Apply the permanent pavement markings in accordance with the requirements of the following Sections of the Standard Specifications:

- Section 626.4.2 - Epoxy and Polyurea
- Section 627.4.4 and 627.4.5 - Thermoplastic

Do not apply thermoplastic pavement markings on portland cement concrete surfaces.

Immediately before the application of the new pavement marking material, clean the rumble strips with a broom and/or jet of compressed air. Ensure that the pavement surface is free of all dust, dirt and any other loose material immediately prior to marking application.

624.4.2 Application of Drop-on Glass Beads – Permanent Markings

Use a single drop application of AASHTO Type I glass beads for all marking materials.

Mechanically apply Type I beads to the surface of the pavement marking material immediately after the material is applied to the pavement surface and while the marking material is still wet or, in the case of thermoplastic, in a molten state. Ensure that the beads are held by, and mechanically embedded in, the surface of the marking material. Make certain that the beads are uniformly distributed over the entire surface of the marking using a single drop application. Uniformly apply the Type I glass beads at a rate of 8 to 10 lbs. per 100 square feet of marking.

For epoxy markings, consider application of additional AASHTO Type III or IV beads meeting the material requirements of Section 626 of the Standard Specifications using a double drop method to aid in reducing no track time. If using a double drop method, uniformly apply the large beads first at a rate of 8 to 10 lbs. per 100 square feet of marking immediately followed by the application of the small beads. Make sure that all beads are properly embedded at 60% of their diameter. When using this double drop large/small bead combination is, the 20% by volume mix of high index beads requirement of Section 624.2.2 will be waived.

Ensure that all beads have the appropriate performance enhancing coatings for the type of material selected.

624.5 Retro-Reflectivity Requirements

Measure marking retro-reflectivity using a Delta Light and Optics LTL-2000 or LTL-X hand held retroreflectometer.

Ensure that the markings achieve the initial minimum retroreflectance values shown in the following table. Make certain that these values are obtained within 30 days of marking placement, as measured with a LTL 2000 or LTL-X Retroreflectometer. Mark certain that the finished markings are uniformly retro-reflective as determined by visual inspection.

Supplemental Specification

	Retro-reflectivity (mcd/lux/m2)	
	White	Yellow
Single Drop	375	250

Ensure that the markings maintain the minimum retroreflectance values shown in the following table for a period of 180 days. Take measurements within 30 days of the end of the observation period.

	Retro-reflectivity (mcd/lux/m2)	
	White	Yellow
Single Drop	325	200

The retro-reflectivity requirements do not increase if a double drop system is used to aid in reducing the no-track time of epoxy marking

624.6 Measurement

Measurement of permanent pavement markings is on a linear foot basis of actual line applied for each individual line.

624.7 Payment

Payment for the accepted quantities of permanent pavement markings will be on a linear foot basis for the width of lines listed in the bid item "Permanent Pavement Markings. Payment for symbols or work messages will be on a per each basis. See following table for pay items:

Supplemental Specification

Item Number	Pay Item	Unit
6241005	4" WH.BRKNLINE PERM.PAVEMENT MARKING	LF
6241007	6" WH.BRKNLINE PERM.PVMT.MARKING	LF
6241010	4" WH SLD LNE PVT EL PERM.PVMT.MARKING	LF
6241012	6" WH SLD LNE PVT EL PERM.PVMT.MARKING	LF
6241015	8" WH. SLDLNES PERM.PVMT.MARKING	LF
6241020	12" WH.SLDLNES PERM.PVMT.MARKING	LF
6241023	12INX18IN WH.TRIANG.YIELD BAR PERM.PVMKG	LF
6241025	24" WH SLDLNES PERM.PVMT.MARKING	LF
6241030	WHITE SGL ARROWS PERM.PVMT.MARKING	EA
6241031	WH.SGL.FISH-HOOK PERM.PVMT.MARKING	EA
6241035	WH.WORD MESS"ONLY"-PERM.PVMT.MARKING	EA
6241036	WH.MESS"STOP AHEAD"PERM.PVMT.MARKING	EA
6241037	WH.WORD MESS. -"SCHOOL"-PERM.PVMT.MARKNG	EA
6241038	WH.WRD.MESS."LANE ENDS-FT"-PERM.PVMT.MKG	EA
6241039	WH.WORD MESS"STOP"-PERM.PVMT.MARKING	EA
6241040	WH.COMBO.ARROWS PERM.PVMT.MARKING	EA
6241041	WH.COMBO.FISH-HK.PERM.PVMT.MARKING	EA
6241043	WH.LANEDROP ARRW PERM.PVMT.MARKING	EA
6241045	R.R.CROSS.SYMBOLS-PERM.PVMT.MARKNG	EA
6241050	HANDICAP SYMBOL-PERM.PVMT.MARKING	EA
6241064	4" YEL.BRKN.LINES.PERM.PVMT.MARKING	LF
6241066	6" YEL.BRKN.LINES.PERM.PVMT.MARKING	LF
6241074	4"YEL.SLD.LNES.- PERM.PVMT.MARKING	LF
6241076	6"YEL.SLD.LNES.- PERM.PVMT.MARKING	LF
6241078	8"YEL.SLD.LNES.- PERM.PVMT.MARKING	LF
6241079	12"YEL.SOLID LNE PERM.PVMT.MARKING	LF
6241080	24"YEL.SOLID LNE PERM.PVMT.MARKING	LF