SECTION 8-22, PAVEMENT MARKING
April 6, 2009

8-22.3(2) Preparation of Roadway Surfaces

This section is revised to read:

All surfaces shall be dry, free of any loose debris and within the proper temperature range prior to striping. When required by the pavement marking manufacturer's installation instructions, remove pavement markings from pavement surfaces that will adversely affect the bond of new pavement marking material to the roadway surface according to Section 8-22.3(6).

Remove all other contaminants from pavement surfaces that may adversely affect the installation of new pavement markings by sandblasting, shot-blasting, or sweeping. Air blast the pavement with a high-pressure system to remove extraneous or loose material.

Apply materials to new HMA that is sufficiently cured according to the manufacturer's recommendations. Typically, Type D material applied to new HMA pavement requires a pavement cure period of 21 days. This cure period may be reduced if the manufacturer performs a successful bond test and approves the reduction of the pavement cure period.

For new Portland Cement Concrete surfaces remove curing compounds and laitance by an approved mechanical means. Air blast the pavement with a high-pressure system to remove extraneous or loose material. Apply materials to concrete that has reached a minimum compressive strength of 2,500 psi and that is sufficiently cured according to the manufacturer's recommendations. Typically, Type D material applied to Portland cement concrete pavement requires a pavement cure period of 28 days. This cure period may be reduced if the manufacturer performs a successful bond test and approves the reduction of the pavement cure period.

After the pavement surface is clean and dry, apply primer as recommended by the manufacturer to the area receiving the pavement markings. Apply the primer in a continuous, solid film according to the recommendations of the primer manufacturer and the pavement markings manufacturer.

8-22.3(3) Marking Application

The content of this section is deleted. This section is supplemented with the following new sub-sections:

8-22.3(3)A Marking Colors

Lane line and right edge line shall be white in color. Center line and left edge line shall be yellow in color. Transverse markings shall be white, except as otherwise noted in the Standard Plans.

8-22.3(3)B Line Patterns

Solid line – a continuous line without gaps.

Broken line – a line consisting of solid line segments separated by gaps.

Dotted line – a broken line with noticeably shorter line segments separated by noticeably shorter gaps.

8-22.3(3)C Line Surfaces

Flat Lines – Pavement marking lines with a flat surface.

Profiled Marking – A profiled pavement marking is a marking that consists of a base line thickness and a profiled thickness which is a portion of the pavement marking line that is applied at a greater thickness than the base line thickness. Profiles shall be applied using the extruded method in the same application as the base line. The profiles may be slightly rounded provided the minimum profile thickness is provided for the length of the profile. See the Standard Plans for the construction details.

Embossed Plastic Line – Embossed plastic lines consist of a flat line with transverse grooves. An embossed plastic line may also have profiles. See the Standard Plans for the construction details.

8-22.3(3)D Line Applications

Surface line – a line constructed by applying pavement marking material directly to the pavement surface or existing pavement marking.

Grooved line – A line constructed by grinding or saw cutting a groove into the pavement surface and spraying, extruding or gluing pavement marking material into the groove. Groove depth is measured vertically from the bottom of a 2-foot or longer straight edge placed on the roadway surface to the ground surface. The groove depth is dependent upon the material used, the pavement surface and location. See these Standard Specifications, the project Plans and Special Provisions.

8-22.3(3)E Installation

Apply pavement marking materials to clean dry pavement surfaces and according to the following:

1. Place material according to the manufacture's recommendations;
2. Place parallel double lines in one pass;
3. The top of pavement marking shall be smooth and uniform;
4. Line ends shall be square and clean;
5. Place pavement marking lines parallel and true to line; and,
6. Place markings in proper alignment with existing markings.

When applying paint, Type A or Type C material, ensure that both the pavement surface and the air temperature at the time of application are not less than 50°F and rising. When applying Type B or Type D material, ensure that both the pavement surface and the air temperature at the time of application are not less than 40°F and rising.

Ensure that the Type A thermoplastic material meets the manufacturers temperature specifications when it contacts the pavement surface.

Two applications of paint will be required to complete all paint markings. The second application of paint shall be squarely on top of the first pass. The time period between paint applications will vary depending on the type of pavement and paint (low VOC waterborne, high VOC solvent, or low VOC solvent) as follows:

Pavement Type	Paint Type	Time Period
Bituminous Surface Treatment	Low VOC Waterborne	4-hours min., 48-hours max.
Hot Mix Asphalt Pavement	Low VOC Waterborne	4-hours min., 30-days max.
Cement Concrete Pavement	Low VOC Waterborne	4-hours min., 30-days max.
Bituminous Surface Treatment	High and Low VOC Solvent	40 min. min., 48 hrs. max.
Hot Mix Asphalt Pavement	High and Low VOC Solvent	40 min. min., 30-days max.
Cement Concrete Pavement	High and Low VOC Solvent	40 min. min., 30-days max.

Centerlines on 2-lane Highways with broken line patterns, paint or plastic, shall be applied in the increasing mile post direction so they are in cycle with existing broken line patterns at the beginning of the project. Broken line patterns applied to multi-lane or divided Roadways shall be applied in cycle in the direction of travel.

Where paint is applied on centerline on two-way roads with bituminous surface treatment or centerline rumble strips, the second paint application shall be applied in the opposite (decreasing mile post) direction as the first application (increasing mile post) direction. This will require minor broken line pattern corrections for curves on the second application.

8-22.3(3)F Application Thickness

Pavement markings shall be applied at the following base line thickness measured above the pavement surface or above the groove bottom for grooved markings in thousandths of an inch (mils):

Marking Material Application		HMA	PCC	BST	Groove Depth
Paint-first coat	spray	10	10	10	
Paint- second coat	spray	15	15	15	
Type A - flat/transverse & symbols	extruded	125	125	125	
Type A - flat/long line & symbols	spray	90	90	120	
Type A - with profiles	extruded	90	90	120	
Type A - embossed	extruded	160	160	160	
Type A - embossed with profiles	extruded	160	160	160	
Type A – grooved/flat/long line	extruded	230	230	230	250
Type B - flat/transverse & symbols	heat fused	125	125	125	
Type C-2 - flat/transverse & symbols	adhesive	90	90	NA	
Type C-1 & 2 - flat/long line	adhesive	60	60	NA	
Type C-1 - grooved/flat/long line	adhesive	60	60	NA	100

Type D - flat/transverse & symbols	spray	120	120	120	
Type D - flat/transverse & symbols	extruded	120	120	120	
Type D - flat/long line	spray	90	90	120	
Type D - flat/long line	extruded	90	90	120	
Type D - profiled/long line	extruded	90	90	120	
Type D – grooved/flat/long line	extruded	230	230	230	250

Liquid pavement marking material yield per gallon depending on thickness shall not exceed the following:

Mils thickness	**Feet of 4" line/gallon**	**Square feet/gallon**
10	483	161
15	322	108
18	268	89
20	242	80
22	220	73
24	202	67
30	161	54
40	122	41
45	107	36
60	81	27
90	54	18
90 with profiles	30	10
120	40	13
120 with profiles	26	9
230	21	7

Solid pavement marking material (Type A) yield per 50-pound bag shall not exceed the following:

Mils thickness	**Feet of 4" line/50# bag**	**Square feet/50# bag**
30 - flat	358	120
45 - flat	240	80
60 - flat	179	60
90 - flat	120	40
90 - flat with profiles	67	23
120 - flat	90	30
120 - flat with profiles	58	20
125 - embossed	86	29

125 - embossed with profiles	58	20
230- flat grooved	47	15

All grooved lines shall be applied into a groove cut or ground into the pavement. For Type A or Type D material the groove shall be cut or ground with equipment to produce a smooth square groove 4-inches wide. For Type C-1 material the groove shall be cut with equipment to produce a smooth bottom square groove with a width in accordance with the material manufacturer's recommendation. After grinding, clean the groove by shot blasting or a method approved by Engineer. Immediately before placing the marking material clean the groove with high pressure air.

8-22.3(3)A Glass beads

This section is renumbered as follows:

8-22.3(3)G Glass Beads

The second sentence in the second paragraph is revised to read:

For plastic pavement markings, glass bead type and application rate shall be as recommended by the marking material manufacturer.

8-22.3(4) Tolerances for Lines

This section is revised to read:

Allowable tolerances for lines are as follows:

Length of Line – The longitudinal accumulative error within a 40-foot length of broken line shall not exceed plus or minus 1-inch. The broken line segment shall not be less than 10 feet.

Width of Line – The width of the line shall not be less than the specified line width or greater than the specified line width plus ¼-inch

Lane Width – the lane width, which is defined as the lateral width from the edge of pavement to the center of the lane line or between the centers of successive lane lines, shall not vary from the widths shown in the Contract by more than plus or minus 4-inches.

Thickness – a thickness tolerance not exceeding plus 10-percent will be allowed for thickness or yield in paint and plastic material application.

Parallel Lines – the gap tolerance between parallel lines is plus or minus ½-inch.

8-22.3(5) Plastic Installation Instructions

This section's title is revised to read:

8-22.3(5) Installation Instructions

The following new sentences are inserted to follow the first sentence:

The instructions shall include equipment requirements, approved work methods and procedures, material application temperature range, air and pavement surface temperature requirements, weather limitations, precautions, and all other requirements for successful application and material performance. Do not use materials with incomplete or missing instructions.