

# Special Specification 6159

## All-Weather Paint



### 1. DESCRIPTION

Furnish and install an all-weather reflective pavement marking system in accordance with this specification and to the dimensions and lines shown on the plans or required by the Engineer.

### 2. MATERIALS

Use materials conforming to the requirements of the following items:

- Item 502, "Barricades, Signs, and Traffic Handling,"
- Item 677, "Eliminating Existing Pavement Markings and Markers,"
- DMS 8200, "Traffic Paint," and
- Special Specification, "Mobile Retroreflectivity Data Collection for Pavement Markings."

2.1. **Waterborne Traffic Marking Paint.** Furnish waterborne high build traffic marking paint meeting the minimum requirements of DMS 8200.

2.2. **Traffic Beads.** Furnish a traffic bead system to meet the performance requirements of this specification.

### 3. EQUIPMENT

3.1. **General.** Use pavement marking application equipment that:

- is maintained in satisfactory condition,
- meets or exceeds the requirements of the National Board of Fire Underwriters and the Texas Railroad Commission for this application,
- uses an automatic bead dispenser attached to the pavement marking equipment, and
- can provide continuous mixing and agitation of the pavement marking material.

3.2. **Material Placement Requirements.** Pavement marking equipment must also meet the following requirements:

- Equipment must be able to produce varying widths and thickness of water base traffic stripes.
- Equipment must be a mobile, truck mounted and self-contained pavement marking machine.
- Equipment must be able to travel at a uniform, predetermined speed over variable road grades to produce uniform application of striping material, following straight lines and making normal curves in a true arc.
- Equipment must be capable of air-blasting the pavement, applying the stripe and immediately applying the drop-on glass beads in a single pass.
- Equipment must be capable of application of drop-on glass beads to the surface of the pavement marking by double drop application.
- The applicator for the drop-on glass beads must be equipped with an automatic cut-off control that is synchronized with the cut-off of the material.
- The applicator for the drop-on glass beads must be capable of delivering a uniform drop rate at variable application speeds.
- The drop-on glass beads are applied such that they appear uniform on the entire traffic stripe and markings.

### 3.3 Reflectometers.

- 3.3.1. **Mobile Retroreflector.** Use a mobile retroreflector approved by the Construction Division and certified by the Texas Transportation Institute Mobile Retroreflector Certification Program.
- 3.3.2. **Portable Retroreflector.** Use a portable retroreflector meeting the requirements of ASTM E1710 and ASTM E2832 and that has either an internal global positioning system (GPS) or the ability to be linked with an external GPS with a minimum accuracy rating of 16.4 ft. in accordance with the circular error probability (CEP) method (CEP is the radius of the circle with its origin at a known position that encompasses 50% of the readings returned from the GPS instrument); and can record and print the GPS location and retroreflectivity reading for each location where readings are taken.

## 4. CONSTRUCTION

- 4.1. **General.** Obtain approval for the sequence of work and estimated daily production. On roadways already open to traffic, place markings with minimum interference to the operations of that roadway. Use traffic control as shown on the plans or as approved. Protect all markings placed under open-traffic conditions from traffic damage and disfigurement.

Establish guides to mark the lateral location of pavement markings as shown on the plans or as directed and have guide locations verified. Use material for guides that will not leave a permanent mark on the roadway.

Apply markings on pavement that is completely dry and meets all temperature and humidity requirements of the manufacturer:

- using widths, colors, and at locations shown on the plans,
- in proper alignment with the guides without deviating from the alignment more than 1 in. per 200 ft. of roadway or more than 2 in. maximum,
- with uniform cross-section and thickness,
- with clean and reasonably square ends,
- using personnel skilled and experienced with installation of pavement markings,
- that are reflectorized, and
- that meet requirements in Tex-828-B.

Remove all applied markings that are not in alignment or sequence as shown on the plans or as stated in the specifications at the Contractor's expense in accordance with Item 677, "Eliminating Existing Pavement Markings and Markers," except for the "Measurement" and "Payment" articles.

- 4.2. **Surface Preparation** Apply markings on surfaces with a minimum surface temperature of 50°F, when measured in accordance with Tex-829-B.

Apply markings during good weather unless otherwise directed. If markings are placed at Contractor option when inclement weather is impending and the markings are damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the markings if required.

The liquid paint will be applied at 25 mil +/- 2 mil wet film thickness.

- 4.3. **Retroreflective Requirements.** Meet the minimum retroreflectivity values in Table 1 and Table 2 for edge line markings, center-line or no passing barrier-line, and lane lines when measured any time after 3 days but not later than 1 day after application.

For smooth, dense graded Asphalt Cement Concrete surfaces or Portland Cement Concrete surfaces, the initial retro-reflectance averaged over many installations will be at least the values in the following table:

**Table 1**  
**Retroreflectivity**  
 (mcd/ft<sup>2</sup>) {metric equivalent {mcd/lux/m<sup>2</sup>}}

	White	Yellow
Dry	350	275
Wet recovery (ASTM 2177)	350	275
Wet continuous (ASTM 2832)	100	75

For rough, open graded Asphalt Cement Concrete surfaces or Portland Cement Concrete surfaces, the initial retro-reflectance averaged over many installations will be at least the values in the following table:

**Table 2**  
**Retroreflectivity**  
 (mcd/ft<sup>2</sup>) {metric equivalent {mcd/lux/m<sup>2</sup>}}

	White	Yellow
Dry	250	200
Wet recovery (ASTM 2177)	250	150 (Direction of striping) 125 (Opposite direction of striping)
Wet continuous (ASTM 2832)	75	75

- 4.4. **Retroreflectivity Measurements.** Use a mobile retroreflectometer unless otherwise shown on the plans.
- 4.4.1. **Mobile Reflectometer Measurements.** Provide mobile measurements averages for every 0.1 mi. unless otherwise specified or approved by the Engineer. Take measurements on each section of roadway for each series of markings (i.e. edge-line, center skip line, each line of a double line, etc.) and for each direction of travel. Take all measurements in the direction of traffic flow, except on centerline on two-way roadways, take measurements in both directions. Furnish measurements in compliance with Special Specification 6040 unless otherwise approved by the Engineer. The Engineer may require an occasional field comparison check with a portable retroreflectometer meeting the requirements listed above to ensure accuracy. Use all equipment in accordance with the manufacturer's recommendations and directions. Inform the Engineer at least 24 hours in advance of taking any measurements.
- 4.4.2. **Portable Reflectometer Measurements.** When using a portable reflectometer to measure continuous wetting retroreflection take measurements in accordance with ASTM E2832.
- 4.4.3. **Traffic Control.** Provide traffic control, when taking retroreflectivity measurements after marking application. On low volume roadways (as defined on the plans), refer to the figure, "Temporary Road Closure" in Part VI of the Texas Manual on Uniform Traffic Control Devices for the minimum traffic control requirements. For all other roadways, the minimum traffic control requirements will be as shown on the standard plans TCP (3-1) and TCP (3-2). The lead vehicle will not be required on divided highways. The traffic control plan and traffic control devices must meet the requirements listed in Item 502, "Barricades, Signs, and Traffic Handling". Time restrictions that apply during striping application will also apply during the retroreflectivity inspections except when using the mobile retroreflectometer unless otherwise shown on the plans or approved.
- 4.5. **Performance Period.** All markings must meet the requirements of this specification for at least 30 calendar days after installation. Unless otherwise directed, remove pavement markings that fail to meet requirements, and replace at the Contractor's expense. Replace failing markings within 30 days of notification. All

replacement markings must also meet all requirements of this Item for a minimum of 30 calendar days after installation.

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**5. MEASUREMENT**

This Item will be measured by the foot. Each stripe will be measured separately.

This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

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**6. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "All-Weather Reflective Pavement Markings" of the type and color, shape and size specified as applicable. This price is full compensation for application of pavement markings, materials, equipment, labor, tools, and incidentals.

If the Engineer requires that markings be placed in inclement weather, repair or replacement of markings damaged by the inclement weather will be paid for in addition to the original plans quantity.