

**SECTION 32 17 23
PAVEMENT MARKING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The provisions of the general Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section.

1.2 SUMMARY

- A. Provide labor, materials, services, and equipment necessary to furnish and install painted instructions, symbols, and lines on concrete and bituminous surfaces used by vehicular, bicycle, and pedestrian traffic.
- B. The term “pavement marking” shall generically apply to lines, symbols, messages, and any other type of guidance information painted on pavement.

1.3 REFERENCES

- A. (FDOT) - Standard Specifications for Road and Bridge Construction excluding measurement and payment provisions
- B. (FDOT) - Qualified Products List (QPL), most recent edition
- C. (FHWA) - Manual on Uniform Traffic Control Devices
- D. ASTM D476 - Standard Specification for Dry Pigmentary Titanium Dioxide Pigments
- E. ASTM D562 - Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
- F. ASTM D1155 - Standard Test Method for Roundness of Glass Spheres
- G. ASTM D1210 - Standard Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage
- H. ASTM D1475 - Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
- I. ASTM D2369 - Standard Test Method for Volatile Content of Coatings
- J. ASTM D3723 - Standard Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Manufacturer Data: Submit copies of manufacturer’s specifications and installation instructions for items required. Include data substantiating that materials comply with specified requirements. Indicate that installer has received copy of manufacturer’s instructions.

1.5 QUALITY ASSURANCE

- A. A Contractor who has a minimum of 5-year successful experience with similar projects must perform installation of pavement markings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide products as listed in the FDOT, QPL.
- B. Use approved paint manufacturers listed in FDOT, QPL.
- C. This information is available on the Internet website maintained by FDOT.

2.2 PACKAGING AND LABELING

- A. Provide materials in strong containers that are plainly labeled with the following information:
 - 1. Weight in pounds per gallon
 - 2. Volume in gallons
 - 3. Color

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4. User information
5. Date of manufacture
6. Batch and DOT Code Number
7. Manufacturer name and address
8. Statement regarding percentage composition of pigment and proportion of pigment to vehicle
9. Special handling and use information or precautions

2.3 HAZARD CLASSIFICATION

- A. Use paint classified as non-hazardous, in accordance with Sub-article C rules as defined in the Resource Conservation and Recovery Act (RCRA).
- B. Paint shall contain less than 150 g/L of volatile organic compounds.

2.4 MATERIALS

- A. Paint: Utilize paint that meets one of the following criteria:
 1. Fast Dry Solvent Traffic Paint:
 - a. Fast dry solvent traffic paints shall be single packaged and ready mixed.
 - b. When cured, these materials shall produce a reflective, adherent pavement marking which resists deformation by traffic.
 2. Fast Dry Water Borne Traffic Paint:
 - a. Fast dry water borne traffic paints shall be single packaged and ready mixed.
 - b. When cured, these materials shall produce a reflective, adherent pavement marking which resists deformation by traffic.
 - c. It will be possible to clean and flush this material from striping machines with regular tap water and any required rust inhibitors.
 3. Hot-Applied Standard Thermoplastic:
 - a. Reference FDOT Standard Specification Section 711, Thermoplastic Pavement Markings
- B. These paints will meet the following composition requirements:
 1. Total Solids, by weight (ASTM D2369) – 75% minimum
 2. Pigments by weight (ASTM D3723) – 57% minimum
 3. Vehicle solids, percent on vehicle – 40% minimum
 4. TiO₂, Type II Rutile (white paint only) (ASTM D476) – 1.5 lb/gal
- C. Set to bear traffic time shall be two minutes, maximum, for these paints.
- D. These paints will match the following physical appearance standards (reflectivity per Fed Std. 141a and Color per Fed Std 595a):
 1. Black – Color No. 37038 – No reflectivity standard.
 2. Yellow – Color No. 33548 – Reflectivity minimum 43%. Yellow pavement markings shall also satisfy FDOT requirements for chromaticity coordinates.
 3. White – Color No. 37875 – Reflectivity minimum 87%
 4. Red – District Standard – No reflectivity standard
 5. Blue – ADA Approved Blue – No reflectivity standard
- E. Sharp Silica Sand: This sand, when specified for longitudinal lines and bicycle lane symbols, will meet the following criteria:
 1. Percent passing 20-mil sieve – 100%
 2. Percent passing 50-mil sieve – 0 to 10%
 3. Density (ASTM D1475) – 13.5 lb/gal (+/- 0.37 lb/gal)
 4. Consistency at 170°F (ASTM D562) – 80 KU to 100 KU
 5. Fineness of grind (ASTM D1210) – 65 microns to 75 microns
 6. Dry Opacity (Fed Std. 141a, Method 4121) – 0.96

7. Bleed Ratio (Fed Spec TT-P-85D) – 0.95
8. Flexibility (Fed Spec TT-P-115D) – Pass
9. Abrasion Resistance 961-10.6.3 – Pass
- F. Glass Spheres: Glass spheres, when specified for enhanced night visibility without modification of daytime visibility, shall meet the requirements of AASHTO M 247 and be included in the QPL, and the following characteristics;
 1. Roundness (ASTM D1155) – 70% true spheres, min
 2. Refractive Index (Becke Line Method) – 1.5, min

PART 3 EXECUTION

3.1 PAINT STORAGE

- A. Stored paint which hardens or livers to the extent that remixing will not produce a smooth, uniform consistency, shall be rejected and not used in the Work.

3.2 PAINT MIXING

- A. All paint delivered to the work site shall arrive completely mixed.
- B. Do not use gasoline as paint thinner under any circumstances.

3.3 APPLICATION EQUIPMENT

- A. Use equipment that will produce continuously uniform dimensions for stripes and markings or varying widths.
- B. The equipment shall be capable of traveling at a uniform, pre-determined rate of speed and capable of following straight lines and making normal curves.
- C. When glass spheres are specified, use equipment that automatically dispenses the spheres.
- D. Use equipment with a mechanical paint agitator that applies the paint at the required thickness without thinning the paint.
- E. Use spray nozzles equipped with automatic cut-off valves to automatically apply broken lines.

3.4 PAINT APPLICATION

- A. Prepare surfaces for painting.
 1. Remove of existing pavement markings, if necessary.
 - a. Repair all scars or other surface blemishes cause by removal of existing markings so they do not interfere with new paint application or visually interfere with the new pavement markings.
 2. Remove any other material that would conflict with proper application of the new pavement markings.
 3. Establish tack lines for aligning stripes.
- B. Apply paint for pavement markings.
 1. Thoroughly mix paint prior to pouring paint into application equipment.
 2. Apply paint on dry surfaces when the air temperature is at least 40°F and rising, or per more stringent paint manufacturer instructions.
 3. Apply paint only when wind speed will not interfere with application or produce spray dust.
 4. All markings shall have well defined edges.
 5. The Architect and Owner may conduct field-testing in accordance with FM 5-541 or other criteria.
 - a. The Architect and Owner reserve their right to determine, at their sole discretion, if the completed painting activity is satisfactory and compliant with these specifications and the normal standard of performance.
 6. Remove and replace all defective painting Work at no additional cost to the Owner.
- C. Paint application rates shall be:

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1. 6" solid stripe – 25 gal/mi
 2. 6" skip stripe – 6.2 gal/ gross mi
 3. Other stripes shall be applied in direct proportion to the above.
- D. The required wet film thickness will be 15 mils.
- E. Use black paint to provide contrast on concrete or light asphalt pavement when so directed by the Architect.
- F. Dimensions and alignment:
1. Skip striping shall be applied in 10' sections with a 30' gap between sections.
 - a. Length tolerance is ± 12 " and over tolerance, lengths must balance under tolerance lengths to maintain gross application rates.
 2. Line width tolerance is ± 1 " for stripes not applied with one pass of the painting equipment.
 - a. Maintain gross application rates, as above.
 3. Apply longitudinal stripes at least 2" away from parallel construction joints in pavement.
 4. Striping shall meet the following tolerances:
 - a. Curves of 1° or less – Allowable alignment deviation, 1" maximum
 - b. Curves greater than 1° – Allowable alignment deviation, 2" max.
 - c. Linear – Neither less than 2" nor more than 4" from the edge of pavement without noticeable breaks or deviations
 - i) Not more than 1" in 40' deviation from tack line.
- G. Correction rates for pavement markings that do not meet dimensional tolerances shall be:
1. Width correction – Not more than $\frac{1}{2}$ " per 10 linear feet
 2. Alignment correction – Not more than 1" per 25 linear feet
- 3.5 GLASS SPHERE APPLICATION
- A. Apply the glass spheres, when specified for enhanced night visibility, at the rate of 6 lb/gallon of pigmented paint material.
- 3.6 NEW PAINT PROTECTION
- A. Protect new paint from traffic until sufficiently dry so crossing vehicles will not damage pavement markings.

END OF SECTION