

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Traffic lines, legends and markings on asphalt and concrete surfaces.
 - 2. Waterborne Traffic Paint.
 - 3. Thermoplastic Pavement Markings.
 - 4. Glass beads.
- B. Related Sections:
 - 1. Section 32 12 16 - Asphalt Paving.
 - 2. Section 32 13 13 - Concrete Paving.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
 - 1. AASHTO M247 - Standard Specification for Glass Beads Used in Traffic Paint.
- B. SCDOT Standard Specifications:
 - 1. Standard Specifications for Highway Construction, 2007, published by the South Carolina Department of Transportation.

1.3 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to road surface forming smooth continuous film one minute after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires within 10 minutes after application.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit paint formulation for each type of paint and glass beads if required.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Submit instructions for application temperatures, eradication requirements, application rate, line thickness, and application of glass beads if required.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with Division 600 of SCDOT Standard Specifications.
- B. Maintain one copy of document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum 5 years experience.
- B. Applicator: Company specializing in performing work of this section with minimum 5 years experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Invert containers several days prior to use when paint has been stored more than two months. Minimize exposure to air when transferring paint. Seal drums and tanks when not in use.
- C. Where glass beads are required, store glass beads in cool, dry place. Protect from contamination by foreign substances.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer or:
 - 1. Waterborne Paint: Apply when ambient air temperature and surface temperature is minimum 40 degrees F and rising and a maximum of 160 degrees F.
 - 2. Thermoplastic: Do not apply until ambient air temperature and temperature of the pavement is 50 degrees F or higher.
- C. Do not apply materials during rain or snow when relative humidity is outside humidity ranges or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Volatile Organic Content (VOC). Do not exceed State or Environmental Protection Agency maximum VOC on traffic paint.

PART 2 PRODUCTS

2.1 PAINTED PAVEMENT MARKINGS

- A. Manufactures:
 - 1. Ennis Paint Co., (ennispaint.com).
 - 2. Franklin Paint Company (franklinpaint.com).
 - 3. EZ-Liner Industries (ezliner.com).
 - 4. TAPCO, Inc. (tapconet.com).
 - 5. Pervo Paint Company (pervo.com).
 - 6. Substitutions: Equal per Section 01 60 00 – Product Requirements.
- B. Furnish materials in accordance with Division 600 of SCDOT Standard Specifications.
- C. Waterborne Paint: Ready mixed, fast dry waterborne traffic paints, lead-free, non-toxic, suitable for roadway or parking lots.
- D. Thermoplastic: Alkyd based ready mixed, fast dry, lead free, non toxic, for roadways.

- E. Glass Beads: AASHTO M247, Type 1, coated to enhance embedment and adherence with paint.

2.2 EQUIPMENT

- A. Roadway Application for Continuous Longitudinal Lines: Use equipment with following capabilities.
 1. Dual nozzle paint gun to simultaneously apply parallel lines of indicated width in solid or broken patterns or various combinations of those patterns.
 2. Pressurized bead-gun to automatically dispense glass beads onto painted surface, at required application rate.
 3. Measuring device to automatically and continuously measure length of each line placed, to nearest foot.
 4. Device to heat paint to manufacturer's temperature recommendation for fast dry and thermoplastic applications.
- B. Machine Calibration: Calibrate machines to meet specified tolerances.
- C. Other Equipment: For application of crosswalks, intersections, stop lines, legends and other miscellaneous items by walk behind strippers, hand spray or stencil trucks, apply with equipment meeting requirements of this section. Do not use hand brushes or rollers. Optionally apply glass beads by hand.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Do not apply paint to concrete surfaces until concrete has cured for 28 days.

3.2 PREPARATION

- A. Maintenance and Protection of Traffic:
 1. Provide short term traffic control in accordance with Section 01 50 00 - Temporary Facilities and Controls.
 2. Prevent traffic from interrupting or driving on newly applied markings before markings dry.
 3. Maintain roadway travel lanes between 7:00 a.m. to 9:00 a.m. and between 4:00 p.m. and 6:00 p.m.
 4. Maintain access to existing businesses and other properties requiring access.
- B. Surface Preparation.
 1. Clean and dry paved surface prior to painting.
 2. Blow or sweep surface free of dirt, debris, oil, grease, or gasoline.
 3. Spot location of final pavement markings as specified and as indicated on Drawings by applying pavement spots 25 feet on center.
 4. Notify Engineer after placing pavement spots and minimum three days prior to applying traffic lines.

3.3 EXISTING WORK

- A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with black paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.
- B. Clean and repair existing or remaining lines and legends.

3.4 APPLICATION

- A. Agitate paint for 1-15 minutes prior to application to ensure even distribution of paint pigment.
- B. Dispense paint at temperature recommended by manufacturer to wet-film thickness of 15 mils.
- C. Dispense thermoplastic at temperature recommended by manufacture to thickness of:
 - 1. 120 mils for center lines, skip lines, transverse markings, and legends.
 - 2. 90 mils for edge lines diagonals and arrow symbols.
- D. Apply glass beads at rate of 1 to 3 pounds per gallon of paint.
- E. Apply markings to indicated dimensions at indicated locations.
- F. Prevent splattering and over spray when applying markings.
- G. Unless material is track free at end of paint application convoy, use traffic cones to protect markings from traffic until track free.
- H. When vehicle crosses a marking and tracks it or when splattering or overspray occurs, eradicate affected marking and resultant tracking and apply new markings.
- I. Collect and legally dispose of residues from painting operations.

3.5 APPLICATION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Wet Film Thickness: 1 mil.
- C. Maximum Variation from Wet Paint Line Width: Plus or minus 1/8 inch.
- D. Maintain cycle length for skip lines at tolerance of plus or minus 6 inches per 40 feet and line length or plus or minus 3 inches per 10 feet.
- E. Maximum Variation from Specified Application Temperature: Plus or minus 5 degrees F.

3.6 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect for incorrect location, insufficient thickness, line width, coverage, retention, uncured or discolored material, and insufficient bonding.
- C. Repair lines and markings which after application and curing do not meet following criteria:

1. Incorrect Location: Remove and replace incorrectly placed patterns.
 2. Insufficient Thickness, Line Width, Paint Coverage, Retention or Glass Bead Coverage (where required): Prepare defective material by acceptably grinding or blast cleaning to remove substantial amount of beads and to roughen marking surface. Remove loose particles and debris. Apply new markings on cleaned surface in accordance with this Section.
 3. Uncured or Discolored Material, Insufficient Bonding: Remove defective markings in accordance with this Section and clean pavement surface one foot beyond affected area. Apply new markings on cleaned surface in accordance with this Section.
- D. Replace failed or defective markings in entire section of defective markings within 30 days after notification when any of the following exists:
1. Marking is discolored or exhibits pigment loss and is determined to be unacceptable by visual comparison with beaded color plates.
 2. If glass beads are used, the average retro-reflectivity is less than 375 mcd/m²/1x for white pavement markings and 250 mcd/m²/1x for yellow pavement markings.
- E. When eradication of existing paint lines is necessary, eradicate by shot blast or water blast method. Do not gouge or groove pavement more than 1/16 inch during removal. Limit area of removal to area of marking plus 1 inch on all sides. Prevent damage to transverse and longitudinal joint sealers, and repair any damage according to requirements in Section 32 12 16 or Section 32 13 13.
- F. Maintain daily log showing work complete, results of inspections or tests, pavement and air temperatures, relative humidity, presence of any moisture on pavement, and any material or equipment problems. Make legible entries in log in ink, sign, and submit by end of each work day. Enter environmental data into log prior to starting work each day and at two additional times during day.

3.7 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect painted pavement markings from vehicular and pedestrian traffic until paint is dry and track free. Follow manufacturer's recommendations or use minimum of 30 minutes. Consider barrier cones as satisfactory protection for materials requiring more than two minutes dry time.

3.8 SCHEDULES

- A. Pavement Markings:

Items	Location
4 inch white paint	Parking lot lines
4 inch yellow paint	Parking lot lane lines
24 inch white thermoplastic	Stop line
4 inch yellow thermoplastic	Roadway center lines
4 inch white thermoplastic	Roadway edge lines

END OF SECTION