

## **PAVEMENT MARKING SPECIFICATIONS**

### **ITEM P-620**

#### **PAVEMENT MARKING DESCRIPTION using WATERBORNE PAINT**

620-1.1 This item shall consist of preparing the surface and the painting of numbers, markings and stripes on the surface of runways, and taxiways in accordance with these specifications and at the locations shown on the drawings, or as directed by the Engineer.

#### **MATERIALS – WATERBORNE PAINT**

620-2.1 The Contractor shall furnish manufacturer's certified test reports for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. The reports can be used for material acceptance or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall ship materials in sealed containers and notify the Engineer upon arrival of a shipment of materials to the site. The Engineer shall draw 1 quart samples of each batch, including glass beads, directly from the material guns on the equipment to be used. The samples should be retained for the warranty period and stored in accordance with manufacturer's recommendations.

620-2.2 Paint shall meet the requirements of Federal Specification TT-P-1952E, Type I, II, or III.

Type I can be used in situations where fast drying is not a concern. Expect “no track” times of 10 to 30 minutes depending on humidity and temperature.

Type II is to be used in environments with high humidity and/or high traffic where tracking of the paint is a concern. Expect “no track” times of 1 to 15 minutes depending on temperature and humidity.

Type III can be used at either standard application rates, or it can be used as a durable high build coating at different application rates as specified in Section 620-3.5. The thicker the coating, the slower the “no track” time as well as the cure time.

620-2.3 Glass beads shall meet the requirements of Federal Specification TT-B-1325D, Type I (low index 1.5 IOR), III (high index 1.9 IOR) or Type IV (low index 1.5 IOR - "big beads"). If Type IV beads are specified, they must be used in conjunction with TT-P-1952E, Type III that can be applied up to 55 SF/gal. TT-P-1952E, Type I or II should not be applied below 100 SF/gal, as the coating is susceptible to cracking at heavier rates.

#### **CONSTRUCTION METHODS**

620-3.1 The painting shall be performed only when the surface is dry and when the surface temperature is above 45 degrees F and rising. A lower temperature based on paint manufacturer's printed recommendations may be permitted when approved by the Engineer. Do not paint when wind displaces paint spray or glass beads or when surface is damp.

620-3.2 All equipment for the work shall be approved by the Engineer and shall include the apparatus necessary to properly clean the pavement surface, a mechanical marking machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job. (See Surface Preparation – 3.3)

The mechanical marker shall be an atomizing spray-type or airless-type marking machine suitable for application of traffic paint, and shall be capable of applying markings from six inches to three feet wide in a single pass. An even and uniform wet film thickness from 12-18 mils with uniform cross-sections and clear-cut edges shall result from the marking operation without running or spattering and without over spray. A wind screen or shroud shall be used on the machine to prevent displacement of materials by wind.

### 620-3.3 SURFACE PREPARATION

Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, rubber, saw cuttings, loose paint, or other foreign material which would reduce the bond between the paint and the pavement. The area to be painted shall be cleaned by water blasting, sandblasting or other mechanical means to be followed by vacuuming, sweeping or blowing with compressed air to remove all loose particles. In areas where existing pavement markings do not conform to the new layout, existing markings shall be removed in accordance with Item S-190 or per the Engineer's instructions.

620-3.4 If the existing markings to be repainted are not properly aligned per plans and specifications, the affected markings shall be laid out as shown on the drawings. Control points shall be spaced at such intervals as will ensure accurate location of all markings. The Contractor shall provide an experienced technician to supervise the location, alignment, layout, dimensions and application of the paint. Conflicting markings shall be removed in accordance with Item S-190 or per the Engineer's instructions.

620-3.5 Paint shall be applied at the locations and to the dimensions and spacing shown on the drawings. Paint shall not be applied until the Engineer has approved the layout and condition of the surface. The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate of 115 square feet per gallon, producing a uniform film thickness of 15 wet mils. Glass beads shall be applied at a minimum rate of 7 pounds per gallon of paint for Type I beads or 10 pounds per gallon of paint for Type III beads. If TT-P-1952E, Type III paint is to be applied at 60 SF per gallon (producing a uniform wet film thickness of 25-30 mils), glass beads conforming to TT-B-1325D, Type III should be used at a rate of 5 lb. per gallon. The addition of thinners will not be permitted. A period of time to allow adequate curing of the pavement surface shall elapse between placement of a bituminous surface course and application of the permanent paint. This curing period shall be as recommended in writing by the manufacturer of the paint, generally a minimum of 30 days. Temporary markings can be applied to new asphalt pavement within the curing period at half coverage rate (230 SF/gal) without glass beads, both to seal the pavement and to provide markings for airport operations. The edges of the markings shall not vary from a straight line more than 1/2 inch in 50 feet, and the dimensions shall be within tolerances as outlined in the table below.

#### Dimension and Spacing Tolerance

36 inches (910 mm) or less	+/- 1/2 inch (12 mm)
greater than 36 inches to 6 feet (910 mm to 1.85 m)	+/- 1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	+/- 2 inches (51 mm)
greater than 60 feet (18.3 m)	+/- 3 inches (76 mm)

Glass beads shall be distributed upon the marked areas immediately after application of the paint. A dispenser shall be furnished which is properly designed for attachment to the marking

machine and suitable for dispensing glass beads. Glass beads shall be applied at the specified rate. Bead dispensers shall be calibrated at the beginning of the project to the proper flow rate and monitored throughout the course of the project to ensure proper bead coverage.

Retroreflectivity readings shall be taken at the beginning of each day on markings applied the previous day.

Type I glass beads should yield a minimum of 300 millicandelas per square meter per lx ( $\text{mcd}/\text{m}^2/\text{lx}$ ) for white and 175  $\text{mcd}/\text{m}^2/\text{lx}$  for yellow.

Type III glass beads should yield a minimum of 600  $\text{mcd}/\text{m}^2/\text{lx}$  for white and 350  $\text{mcd}/\text{m}^2/\text{lx}$  for yellow.

Type IV glass beads should yield a minimum of 475  $\text{mcd}/\text{m}^2/\text{lx}$  for white and 250  $\text{mcd}/\text{m}^2/\text{lx}$  for yellow.

All performance criteria for retroreflectivity established herein should be achieved after twenty-four hours from installation. Glass beads shall adhere to and be properly embedded in the cured paint or all marking operations shall cease until corrections are made. A night inspection of the markings is advisable to check for uniform reflectivity of the markings. All emptied containers shall be returned to the paint storage area for checking by the Engineer. The containers shall not be removed from the airport or destroyed until authorized by the Engineer.

**620-3.6 DEFECTIVE WORKMANSHIP OR MATERIAL** When any material not conforming to the requirements of the specifications or drawings has been delivered to the project or incorporated in the work, or any work performed is of inferior quality, such defective material or work shall be corrected as directed by the Engineer, at the expense of the Contractor. Contractor shall provide a one-year warranty on all pavement markings applied.

## METHOD OF MEASUREMENT

620-4.1 The quantity of surface preparation performed shall be paid per square foot.

620-4.2 The quantity of permanent pavement markings to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the Engineer. If some of the markings are to be non-reflective, a separate line item should be added.

620-4.3 The quantity of temporary pavement markings to be paid for shall be the number of square feet of painting performed in accordance with the specifications and accepted by the Engineer.

## BASIS OF PAYMENT

620-5.1 Payment shall be made at the contract unit price per square foot for surface preparation performed prior to the application of the pavement markings. This price shall be full compensation for furnishing all equipment and disposal costs associated with this item.

620-5.2 Payment shall be made at the contract unit price per square foot for pavement marking. This price shall be full compensation for furnishing all materials, including glass beads, and for all labor, equipment, tools and incidentals necessary to complete the item.

620-5.3 Payment shall be made at the contract unit price per square foot for temporary pavement marking. This price shall be full compensation for furnishing all materials, and for all labor, equipment, tools and incidentals necessary to complete the item.

Payment will be made under:

Item P-620-5.1 Surface Preparation .....per square foot

Item P-620-5.2 Pavement Markings .....per square foot

Item P-620-5.3 Temporary Markings .....per square foot

#### MATERIAL REQUIREMENTS

Federal Specification TT-P-1952 Paint, Traffic and Airfield Marking, Waterborne

Federal Standard 595 Colors used in government procurement

Federal Specification TT-B-1325 Glass Beads