SECTION 02620 - RUNWAY AND TAXIWAY MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Provision of the contract, including the General Provisions for Construction Projects (2016), Special Provisions, and General Requirements of the Specifications, apply to the work specified in this section. This Section shall be in accordance with FAA Specification Item P-620: Runway and Taxiway Markings, as included as an attachment to this Section.

1.2 DESCRIPTION OF WORK

A. This Section shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runway and taxiways, in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals.

1.4 REFERENCES

A. FAA Advisory Circular (AC) 150/5340-1M, Standards for Airport Markings.

B. Federal Aviation Administration (FAA)

1. FAA Specification Item P-620: Runway and Taxiway Markings.

1.5 SUBMITTALS

A. Submit in accordance with Section 01300 – Submittals.

B. Manufacturer's certified test reports for all materials shipped to the project shall be submitted in accordance with FAA Specification Item P-620, paragraph 620-2.1.

C. Contractor certification of surface preparation shall be submitted in accordance with FAA Specification Item P-620, paragraph 620-3.3.

D. Copy of paint manufacturer's application and surface preparation requirements shall be submitted in accordance with FAA Specification Item P-620, paragraph 620-3.3.

PART 2 - PRODUCTS

2.1 Paint: in accordance with FAA Specification Item P-620, paragraph 620-2.2.a.

2.2 Reflective media: in accordance with FAA Specification Item P-620, paragraph 620-2.2.b.

PART 3 - EXECUTION

3.1 Construction methods shall be in accordance with FAA Specification Item P-620.

PART 4 - MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Method of measurement and payment shall be in accordance with FAA Specification Item P-620, paragraph 620-4.1a, 4.1b, and 4.1c.

4.2 BASIS OF PAYMENT

A. Basis for payment shall be in accordance with FAA Specification Item P-620, paragraph 620-5.1 and paragraph 620-5.2.

PART 5 - ATTACHMENTS

5.1 FAA Specification Item P-620 Runway and Taxiway Marking.

Item P-620 Runway and Taxiway Marking

DESCRIPTION

620-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of the runway and taxiways in accordance with these specifications and at the locations shown on the plans, or as directed by the Resident Project Representative (RPR). The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

MATERIALS

620-2.1 Materials acceptance. 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. This certification along with a copy of the paint manufacturer's surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Resident Project Representative (RPR) prior to the initial application of markings. The reports can be used for material acceptance or the RPR may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the RPR upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the RPR.

620-2.2 Marking materials.

Table 1. Marking Materials

Paint[1]					Glass Beads[2]	
Type	**Color**	**Fed Std. 595 Number**	**Full Application Rate Maximum**	**Half Application Rate[3]**	**Type**	**Application Rate Minimum**
Waterbourne Type II	White	37925	115 ft^2/gal	230 ft^2/gal	Type II	10 lbs./gal
Waterbourne Type II	Yellow	33538 or 33655	115 ft^2/gal	230 ft^2/gal	Type II	10 lbs./gal
Waterbourne Type II	Black	37038	115 ft^2/gal	N/A	No beads	No beads

[1] See paragraph 620-2.2a

[2] See paragraph 620-2.2b

[3] Half Application Paint does not receive glass beads

a. Paint. Paint shall be waterborne in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. TT-P-85 or TT-P-110 shall not be used on bituminous pavements. Waterborne black paint shall be used to outline a border at least 6 inches wide around markings as shown on Plans.

Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type III.

Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment.

Glass beads shall not be used in black paint.

Glass beads shall not be used in half-application markings.

CONSTRUCTION METHODS

620-3.1 Weather limitations. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 Equipment. Equipment shall include the apparatus necessary to properly clean the existing surface, equipment used to permanently obliterate existing markings (rotary grinding and water blasting), a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 Preparation of surfaces. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminates that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the RPR. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.

a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the RPR to remove all contaminants and minimizing damage to the pavement surface.

b. Preparation of pavement to remove existing markings (marking obliteration). Existing pavement marking areas to be obliterated are identified on the Contract Plans and shall be removed in their entirety by rotary grinding or by other methods approved by the RPR minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to

eliminate ghost markings. After removal of existing markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings in existing pavement areas not affected by new pavement markings.

c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the RPR. After removal, the surface shall be cleaned of all residue or debris.

Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the RPR prior to the initial application of markings.

620-3.4 Layout of markings. The proposed markings shall be laid out in advance of the half and full paint application. All markings shall receive an application of glass beads, with the exception of half application markings and black markings.

620-3.5 Application. A period of **30** days shall elapse between placement of surface course or seal coat and application of the full application paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the RPR.

The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch or less	±1/2 inch
greater than 36 inch to 6 feet	±1 inch
greater than 6 feet to 60 feet	±2 inch
greater than 60 feet	±3 inch

The application rate for half application markings shall be 230 ft^2/gal. max. Glass beads shall not be applied to half application markings. For full application markings, the paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.

Glass beads shall be distributed upon the marked areas to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Reflective media shall not be applied using hand application, only mechanical application devices may be used. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 Application--preformed thermoplastic airport pavement markings. Not Used.

620-3.7 Control strip. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 Retro-reflectance. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 readings shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m^2/lux		
	White	**Yellow**	**Red**
Initial Type I	300	175	
Initial Type III	600	300	

620-3.9 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the RPR. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

620-3.7 Control strip for Marking Obliteration. Prior to obliterating of airfield markings, the Contractor shall prepare a control strip in the presence of the RPR. The Contractor shall demonstrate the obliteration methods to be used on the project. The obliteration equipment must achieve the desired removal of markings and the placement of fog seal or seal coat application as described within Section 620-3.3. Prior to acceptance of the control strip for marking obliteration, markings must be evaluated during daytime hours to ensure no paint remains and no ghost markings upon application of fog coat or seal coat placement.

METHOD OF MEASUREMENT

620-4.1a The quantity of surface preparation on existing and new pavements shall not be measured for payment.

620-4.1b The quantity of marking obliteration on existing pavements shall not be measured for payment.

620-4.1c The quantity of half application and full application pavement markings shall not be measured for payment.

620-4.1d The quantity of reflective media shall not be measured nor paid for separately and shall be considered incidental to and included in the bid prices for Specification Item 02620.2 Pavement Markings – Full Application.

BASIS OF PAYMENT

620-5.1 All work under this section shall be paid by the lump sum.

Payment will be made under:

Item No.	Description	Unit
02620.1	Obliteration of Existing Pavement Markings	Lump Sum
02620.2	Pavement Markings – Full Application	Lump Sum
02620.3	Pavement Markings – Half Application	Lump Sum

620-5.2 No payment shall be made for reflective media and work will be incidental to the pavement marking work as specified herein.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D7585	Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
ASTM E303	Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
ASTM E1710	Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2302	Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer

ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

Code of Federal Regulations (CFR)

40 CFR Part 60, Appendix A-7, Method 24
Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings

29 CFR Part 1910.1200 Hazard Communication

Federal Specifications (FED SPEC)

FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective

FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking, Waterborne

FED STD 595 Colors used in Government Procurement

Commercial Item Description

A-A-2886B Paint, Traffic, Solvent Based

Advisory Circulars (AC)

AC 150/5340-1 Standards for Airport Markings

AC 150/5320-12 Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces

END OF ITEM P-620

--------END OF SECTION 02620--------