

SECTION 321223 TRAFFIC PATTERNS XD® – DECORATIVE IMPRESSED ASPHALT PAVEMENT MARKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

1. Section [321216] - "Asphalt Paving" for new asphalt pavement.
2. Section {321723 – Plastic Pavement Markings

1.3 SUMMARY

- A. Decorative impressed asphalt shall consist of a durable impressed aggregate reinforced preformed thermoplastic pavement marking system (herein "System") that provides a textured, highly attractive and durable topical treatment to the surface of the asphalt pavement.
- B. The System is intended for use on asphalt pavements to create traffic calming solutions for decorative crosswalks, medians, and intersections. It is applied over pavement to create functional and decorative crosswalks and intersections, as shown on the Contract Drawings.
- C. All System materials shall be produced under a quality system as specified in this section and designed to provide durability, load carrying capacity and architectural compatibility with the environment. All raw materials shall be carefully graded for consistency and quality to obtain the highest standards.
- D. The System shall be installed to the existing substrate.
- E. Only accredited decorative impressed asphalt system installers authorized by the manufacturers of the decorative impressed asphalt product may perform this work.

1.4 UNIT PRICES

- A. Work of this Section is based on labor and materials per project.
- B. Method of Measurement: The work will be measured by the installed area of square feet, measured and accepted in place. No deduction will be made for the area(s) occupied by manholes, inlets, drainage structures, bollards or by any public utility appurtenances within the area.

- C. Basis of Payment: This work will be paid for at the Contract unit price per square foot for “Decorative Impressed Asphalt Pavement Marking” and accepted in place. Price shall include all materials, equipment, tools and labor incidental thereto. There will be no direct payment for surface preparation; but the cost of this work shall be considered as included in the general cost of the work.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site (Insert location)**.
- B. Conference shall consist of **Owner, Owners Representative, Engineer, Landscape Architect, Certified Applicator, manufacturer’s representative**.

1.6 DEFINITIONS

- A. “HMA pavement” is Hot Mix Asphalt pavement.
- B. “PCC pavement” is Portland Cement Concrete pavement.
- C. “Owner” means the Owner and refers to the representative person of the certified applicator who has decision making authority for the Work.
- D. “Accredited Installer” refers to a contractor authorized by the System manufacturer to install the decorative impressed asphalt (system).

1.7 SUBMITTALS

- A. Product Data: For each type of product per manufacturer’s offering.
- B. Manufacturer Data: System type and product type
- C. Samples for Initial Selection: For each type of product requiring color selection.

Samples for Verification: For each pattern and color in manufacturer's standard sizes.
- D. The Accredited Installer shall provide written proof of their accreditation.
- E. The Accredited Installer shall gain confirmation of correct stamping pattern(s) and colors from the **[Owner, Owners Representative, Engineer, Landscape Architect or certified applicator** prior to starting the Work.
- F. The Accredited Installer shall supply three references of work of a similar nature provided to a **[Owner, Owners Representative, Engineer, Landscape Architect] <insert other>** within the State of **<insert state>**.
- G. Construction of mock-up (shall be a minimum of a 6’x6’ section for each color and stamp pattern specified).

H. The System manufacturer must be ISO9001:2015 certified for design, development and manufacturing of preformed thermoplastic, and provide proof of current certification.

I. Shop Drawings:

Indicate impressed patterns, colors, and dimensions to adjacent work

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Impressed-asphalt manufacturer's authorized installer who is trained and approved for installation of impressed asphalt required for this Project.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of <Insert applicable standards> of <Insert name of state or local DOT> for impressed asphalt work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Proceed with impressed pavement only when air temperature is at least 45 deg F (7.2 deg C) and rising. Proceed only if no precipitation is expected. Ensure there is no moisture in the substrate prior to application. Ground should not have any frost or moisture present. High winds could also affect the installation of the impressed material.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturer -

Basis of Design – Ennis-Flint, Inc. TrafficScapes® - TrafficPatternsXD® impressed surface system

1. Contact www.ennisflintamericas.com

B. DECORATIVE IMPRESSED ASPHALT MATERIAL

1. Preformed Thermoplastic Material: Must be composed of an ester modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements. Pigments and anti-skid/anti-slip elements must be uniformly distributed throughout the material. The material conforms to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state, being non-reflective, and potentially being of a color different from white or yellow.

2. The System shall utilize a resilient, aggregate reinforced preformed thermoplastic product which contains a minimum of thirty percent (30%) intermixed anti-skid/anti-slip elements

and where the top surface contains anti- skid/anti-slip elements. These anti-skid/anti-slip elements must have a minimum hardness of 6 (Mohs scale).

3. The System must be resistant to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids, etc.
 4. Pigments:
 - a. White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.
 - b. Other Colors: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.
 5. Skid Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303.
 6. Slip Resistance: The surface of the material shall contain factory applied anti-skid/anti-slip elements with a minimum hardness of 6 (Mohs scale). Upon application the material shall provide a minimum static friction of coefficient of 0.6 when tested according to ASTM C 1028 (wet and dry), and a minimum static coefficient of friction of 0.6 when tested according to ASTM D 2047.
 7. Thickness: The material must be supplied at a minimum thickness of 150 mil (3.8mm).
 8. Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.
- C. DECORATIVE IMPRESSED ASPHALT MATERIAL STAMPING GRID: A wire rope grid is required in the execution of the System. The grid is used for impressing the defined patterns once the preformed thermoplastic has been applied. The wire rope diameter for the impressing template used for the specified pattern is 3/8 in. (9.5mm). The stamping grids are distributed by the System manufacturer.
- D. HEATING EQUIPMENT: System-specific reciprocating infrared heating equipment is designed specifically to elevate the temperature of the preformed thermoplastic material and asphalt pavement without adversely affecting it. The primary heating unit must employ a bank of propane-fired infrared heaters, mounted on a track device that allows the heater bank to reciprocate back and forth over a designated area, thereby allowing the operator to monitor the temperature of the preformed thermoplastic at all times during the pavement heating process.

A smaller, mobile infrared heater is designed specifically to heat areas such as borders and narrow areas that are inaccessible to the primary heaters. This secondary heater also allows the operator to monitor the temperature of the preformed thermoplastic at all times during the heating process.

- E. **MATERIALS SEALER:** A two-part epoxy sealer specified and distributed by the System manufacturer must be applied to the substrate prior to material application to ensure proper adhesion, and to provide reinforcement for larger areas of material.
- F. **MATERIALS AGGREGATE:** Supplemental anti-skid/anti-slip elements to be applied to the surface of the molten preformed thermoplastic as needed, if the factory applied anti-skid/anti-slip elements embed too deeply into the surface of the molten preformed thermoplastic material during the heating process. (Embedded aggregate is exposed upon wear for extended skid resistance.) The aggregate is distributed by the System manufacturer.
- G. **PATTERNS & COLORS**
 - 1. Patterns and colors are described below:
 - a. Decorative impressed asphalt - **Type A <insert use and/or location on drawings>**
Pattern: insert pattern design>
Color: (Standard) <insert color>
 - b. **<insert other color or design if required>**
 - 2. Contractor shall verify all colors and patterns with owner's representative prior to placement.
- H. **SHELF LIFE AND STORAGE** The shelf life of decorative impressed asphalt materials is two years provided it is protected from the weather, specifically UV degradation and rain. The materials are to be stored in their original packaging and kept dry under cover and or as per manufacturer's specifications

PART 3- EXECUTION

3.1 EXAMINATION

- A. Verify that pavement is dry and in suitable condition to begin the impressing process according to manufacturer's written instructions.
- B. Proceed with asphalt impressing only after unsatisfactory conditions have been corrected.
- C. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of impressed asphalt.

3.2 IMPRESSING ASPHALT

- A. General: Impress asphalt according to manufacturer's written instructions, using manufacturer's recommended equipment.
- B. **PRE-CONDITIONS:** Decorative impressed asphalt shall be installed over new pavement. The pavement must be firm, stable and in excellent condition; it must be free from defects such as cracks, settlement, visible seams, ruts, bird baths and spalling.

1. Cracking, settlement and other deficiencies of the substrate will likely reflect through the decorative preformed thermoplastic. Good and proper construction procedures for the installation of the substrate must be followed in order to mitigate cracking of decorative preformed thermoplastic.
2. Surfaces with a high degree of porosity should be avoided due to the problems associated with entrapped water.
3. Surfaces that may be subject to uncontrolled movement in either a horizontal or vertical direction shall be avoided as there may be a risk of reflective cracking through to the decorative preformed thermoplastic. Notify the engineer if these conditions are present before installing decorative preformed thermoplastic.

D. **PREPARING OF THE SUBSTRATE:** All pavement substrates must be of high quality and stable for the installation of decorative impressed asphalt.

This Section is to be used as a guide to ensure a high-quality pavement substrate is provided and ready for the installation of the decorative System. It does not supersede other specifications pertaining to this Work, nor does it replace recommendations made by the engineer of record for this Work.

1. The base and sub-grade over which new pavement is installed must be firm and stable.
2. The pavement mix must be designed for the intended use.
3. The pavement must be installed in accordance with proper placement practices and these specifications.
4. The asphalt pavement must be permitted to cure properly before installing decorative impressed asphalt.

E. **SURFACE PREPARATION:** The pavement surface shall be dry and clean: free of all dirt, debris, salts, concrete admixtures and any chemical residues.

1. Bituminous residue must be removed from new asphalt pavement surface prior to installation of decorative impressed asphalt.
2. Removal of contaminants may be done by brooming, compressed air, pressure washing (moisture must be removed and the surface dry as noted above) or, if necessary, light-grit blasting. Wire brush may be used to remove loose or powdery materials.

F. **INSTALLATION OF DECORATIVE IMPRESSED ASPHALT:** Decorative impressed asphalt System is to be installed only by an Accredited Installer.

1. The System must be able to be applied to asphalt surfaces without pre-heating the application surface to a specific temperature.
2. The System is applied to asphalt pavement primarily using reciprocating infrared heating equipment. An approved hand-held propane heat torch distributed by the System manufacturer shall be used to heat isolated areas of the preformed thermoplastic.
3. A specialized sealer dispensing gun, handheld finishing tool, aggregate and vibratory plate compactors are used as part of the installation process
4. The aggregate reinforced preformed thermoplastic is typically supplied in panels measuring 2 ft. x 2 ft. [$\pm\frac{1}{8}$ in.] (.61m x .61m [± 3 mm]).

5. The System is available in a variety of standard colors and patterns. Color can be used to create patterns within the crosswalk area to reflect the typical white 'continental' crosswalk bars for additional visibility and awareness.
6. The material must be able to be applied at ambient and road temperatures with a minimum temperature of 45°F (7°C) and rising.
7. A two-part epoxy sealer specified by the manufacturer must be applied to the substrate prior to preformed thermoplastic application. Immediately following sealer application, the panels of aggregate reinforced preformed thermoplastic are positioned properly on the asphalt substrate with the aggregate side facing up. The preformed thermoplastic is then heated to the required melting temperature. Additional aggregate may be applied to the preformed thermoplastic surface as needed following the melting process.
8. As the material cools to 160 degrees Fahrenheit, it is impressed with a stamping grid made from 3/8 in. (9.5 mm) flexible wire rope in the required design using a vibratory plate compactor.
9. The preformed thermoplastic material is then allowed to cool thoroughly before being opened to vehicle or pedestrian traffic. (Consult the manufacturer's published application procedures for complete information.) The timing of opening traffic will be subject to exterior temperature conditions. More time may be required in hot weather. The Accredited Installer can advise when the work is ready for traffic.
10. Install Premark® White 125mil preformed thermoplastic material with glass beads as the transverse lines on the outside areas of the installed TrafficPatternsXD® marking system as required to meet MUTCD requirements.
11. TrafficPatternsXD impressed surface system shall not be applied to Portland Cement Concrete.

G. PACKAGING:

1. The TrafficPatternsXD® preformed thermoplastic material shall be packaged in cardboard cartons with a plastic sheet between each layer of preformed thermoplastic. The cartons in which the TrafficPatternsXD marking system is packed shall be non-returnable and shall not exceed 25 in. (.64m) in length and 25 in. (.64m) in width. The cartons shall be labeled for ease of identification. The weight of the individual carton must not exceed seventy (70) pounds (32 kg). A protective film around the carton must be applied to protect the TrafficPatternsXD preformed thermoplastic material from rain or premature aging.

H. TECHNICAL SERVICES:

1. The successful bidder shall provide technical services as required.

END OF SECTION 321223 XD