

PAVEMENT TEXTURING SPECIFICATION

SECTION 02760 STREETPRINT™ High Performance Pavement Texturing System

PART 1 – GENERAL

1.1 DESCRIPTION

- A. **StreetPrint** is defined as a proprietary pavement texturing system, which treats the surface of Hot Mixed Asphalt (HMA) pavement by imprinting stable, fully compacted HMA pavement with "grid style" or other styles of depressions to replicate, in relief, the concrete grout depressions common to hand-laid brick or cobblestone, or any other design as shown on the drawings or described in the specifications, and coating the imprinted pavement surface using the **StreetBond Surfacing System**.
- B. **StreetPrint** is highly suitable for virtually anywhere a decorative pavement solution is required. Paved entranceways, parking lots, residential driveways, sidewalks, plazas, medians, and cross-walks are some examples of successful applications of **StreetPrint**.
- C. The **StreetBond Surfacing System** is a proprietary multi-layer, multi-coating system specifically designed for application to textured HMA pavement substrates. The optimal combination of **StreetBond** coatings and layers is a function of application and region as outlined in this specification.
- D. **StreetBond** coatings are specifically formulated for application to HMA pavement and possess a balance of performance properties for a durable and color-fast finish.
- E. A variety of imprint pattern designs and **StreetBond** coating colors are available. Please refer to www.streetprint.com to view these. Custom designs and colors are available upon request.
- F. Certain colors of the **StreetBond Surfacing System** have an SRI greater than 29 and therefore qualify for the LEED program under Section SS Credit 7.1 Heat Island Effect: Non-Roof.
- G. Qualifications. Only **Accredited StreetPrint applicators** may bid for and perform this work. Please refer to **Section 1.4 DEFINITIONS**.
- H. **StreetPrint** is a registered Trademark product. U.S. patent number 5,215,402.

1.2 RELATED SECTIONS:

- A. Section 02230 Site Clearing
- B. Section 02330 Sub-grade and Roadbed Preparation
- C. Section 02720 Unbound flexible base courses
- D. Section 02740 Flexible Pavement

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1.3 REFERENCES

- A. ASTM D-4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Tester.
- B. ASTM D-4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
- C. ASTM D-2697 Standard Test Method for Volume of Nonvolatile Matter in Clear or Pigmented Coatings.
- D. ASTM D522-93A Standard Test Method for Mandrel Bend Test of Attached Organic Coatings.
- E. ASTM D1653 Standard test method for water vapor transmission or organic film coatings.
- F. ASTM G-154 QUV Accelerated Weathering Environment. Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.
- G. ASTM D 2369 Weight Solids Standard test method for Volatile Content of Coatings.
- H. ASTM D 1475 Standard Test method for Density of Paint, Varnish, Lacquer, Other related products.
- I. ASTM D-2240 (2000) Standard Test Method for Rubber property – Durometer hardness.
- J. ASTM D-5895 Standard Test Method of drying or curing during film formation of organic coatings using mechanical recorders.
- K. ASTM D-570 Standard Test Method for water absorption of plastics.

1.4 DEFINITIONS

- A. “**HMA pavement**” is Hot Mix Asphalt pavement.
- B. “**Accredited StreetPrint Applicator**” is a licensed **StreetPrint** applicator who holds a Level 1 or higher certificate of accreditation as offered by Integrated Paving Concepts, Inc. (Tel. 800-688-5652). **StreetPrint** applicators are reviewed on an annual basis and certificates are valid only for the calendar year. All **StreetPrint** applicators have a foreman, supervisor or lead-hand that has successfully completed a StreetPrint Level I or Level II Training Program.
 - **Level 1** accreditation indicates that the **Accredited StreetPrint Applicator** has completed Level 1 training and typically completes a minimum of 20,000 SF of **StreetPrint** per year.
 - **Level 2** accreditation indicates that the **Accredited StreetPrint Applicator** has completed both Level 1 and Level 2 training and typically completes a minimum of 30,000 SF of **StreetPrint** per year.
 - **Level 3** accreditation indicates that the **Accredited StreetPrint Applicator** has completed both Level 1 and Level 2 training and

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typically completes a minimum of 80,000 SF of **StreetPrint** per year. Level 3 applicators typically employ a crew leader and crew who are committed full time to **StreetPrint** installations.

- C. “**Owner**” means the Owner and refers to the representative person who has decision making authority for the Work.
- D. “**Imprinting HMA pavement**” is defined as pressing flexible metal templates into fully compacted, heated HMA pavement to create the appearance of grout lines or patterns in the HMA pavement surface.
- E. “**Textured HMA Pavement**” is HMA pavement that has been subjected to imprinting or stamping in a specific pattern.
- F. “**Non-textured HMA pavement**” is HMA pavement that is unstamped and is sometimes referred to as “flatwork”.
- G. “**Scuffing**” of HMA pavement is a “tear” of the HMA pavement caused by an external force. Stationary vehicle tires turning on the pavement surface is a typical cause.

1.5 SUBMITTALS

Submittals to be made available to the Owner upon request are as follows:

- A. HMA pavement mix design.
- B. A copy of the current year Level 1, 2 or 3 accreditation certificate as provided by Integrated Paving Concepts, Inc. to the **Accredited StreetPrint Applicator**.
- C. Confirmation of the name of the certified supervisor who will be performing the on-site work on behalf of the accredited **StreetPrint** Applicator.
- D. ASTM Properties and test results of the **StreetBond** coating materials.
- E. Confirmation of coating color(s).

PART 2 – PRODUCTS

2.1 MATERIALS – STREETBOND COATINGS

The **StreetBond Surfacing system** is comprised of a specific combination of the following **StreetBond** coatings and additives made available by Integrated Paving Concepts, Inc. (Tel. 800-688-5652). These coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long lasting color and texture to HMA pavement surfaces. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties.

StreetBond coatings are environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).

- A. **StreetBond CemBase 150** is a high-performance cementitious, epoxy modified, acrylic based, waterborne surfacing product designed for application on textured HMA pavements only. **CemBase 150** fortifies HMA

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pavement and as shown in Section 3.6 Table 3 of this specification, is used as the base coat in some **StreetBond** surfacing systems where a top coat(s) of **StreetBond SP150E** coating is applied over it. **CemBase 150** is not to be used on non-textured HMA pavement.

- B. StreetBond SP150E** is an epoxy modified, acrylic, waterborne coating specifically designed for application on HMA pavements. It has a balance of properties to ensure good adhesion and movement on flexible pavement, while providing good durability. **StreetBond SP150E** is highly durable in a wet environment and may be used as a top coat over **CemBase 150** or may be applied directly to the pavement surface.
- C. StreetBond Colorant** is a highly concentrated, high quality, UV stable pigment blend designed to be added to **StreetBond SP150E** and **CemBase 150** coating system to provide color to the coating. The colors to be used shall be specified on the drawings or specifications. The same **StreetBond Colorant** shall be used in each coating layer applied to the pavement surface. One pint of colorant shall be used with one pail of **StreetBond** coating material.
- D. StreetBond Primer** is formulated to enhance the adhesion of **StreetBond** coatings to pre-existing HMA pavement and/or previously coated HMA pavements. The accredited applicator can determine if **StreetBond Primer** is necessary or not for the application. **StreetBond primer** is not required for new HMA pavement and it does not provide film thickness.

2.2 SPECIFICATIONS FOR WATER-BORNE COATINGS:

The following tables outline the physical and performance properties of the StreetBond Coatings. Certificates of Compliance are available upon request for each of these properties. Please call Integrated Paving Concepts at 1-800-688-5652 to obtain your copy.

TABLE 1: Physical Properties of “StreetBond Water-borne Coatings”

Characteristic	Test Specification	Typical Requirement for Coating	
		CEMBase 150	SP150E
Solids by Volume	ASTM D-2697	60.27%	55%
Solids by Weight	ASTM D-2369	73.94%	68.9%
Density	ASTM D-1475	14.19 lbs/gal (1.70 kg/l)	13.34 lbs/gal (1.599 kg/l)

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TABLE 2: Performance Properties of “StreetBond Water-borne Coatings”

Characteristic	Test Specification	Typical Requirement for Coating		
		CEMBASE 150	SP150E	
Dry time (To re-coat)	ASTM D-5895 23°C; 37% RH	45 min	35 min	
Taber Wear Abrasion Dry H-10/ 1000g	ASTM D-4060 g/1000 cycles 7 days cure	0.41	0.98	
Taber Wear Abrasion Wet H-10/ 1000g	ASTM D-4060 g/1000 cycles 7 days cure	6.92	3.4	
QUV E Accel. Weathering environment.	ASTM G-154 Delta E 1,500 hours	9.16	0.53	
Hydrophobicity Water absorption	ASTM D-570	10.2% (7 days immersion)	8.3% (9 days immersion)	
Shore hardness	ASTM D-2240	33 Type D	63 Type D	
Mandrel Bend	ASTM D522- 93A	3/8" @ 21°C	1/4" @ 21°C	
Permeance	ASTM D1653	13.43g/m ² /24hr/mm Hg (55mils)	3.45 g/m ² /hr (52 mils)	
Adhesion to Asphalt	ASTM D-4541	Substrate Failure	Substrate Failure	
Friction Wet	ASTM E-303 British Pendulum Tester		WP* coated	64
			WP* uncoated	57
			AC** coated	73
			AC** uncoated	60

*WP – test conducted on asphalt in wheel path

**AC – test conducted on asphalt adjacent to curb

2.3 EQUIPMENT

The following equipment is proprietary and is an integral part of the proper execution of the **StreetPrint** process. This equipment is available only from Integrated Paving Concepts Inc. and can only be used by **Accredited StreetPrint applicators** that have been properly trained to use this equipment.

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- A. **Templates** are used to imprint the desired pattern into the HMA pavement. Templates are manufactured by cutting and welding highly specialized flexible wire rope into the patterns as detailed on the drawings.
- B. Integrated Paving Concepts offers three mobile, proprietary pieces of equipment designed specifically to elevate the temperature of the HMA pavement without adversely affecting it. Two of these, the **SR-120 and SR-60 Reciprocating Infra-Red Heaters (SR-120, SR-60)** each employ a bank of propane-fired heaters mounted on a track device such that these can reciprocate back and forth over a designated area thereby allowing the operator to monitor the temperature of the HMA pavement at all times during the heating process. The nominal heat area of the **SR-120** is 130SF and the nominal heat area for the **SR-60** is 60SF.
- C. The third mobile re-heat device is the **SR-20 Infrared Heater (SR-20)**. The **SR-20** is designed specifically to heat areas such as borders and narrow areas that are inaccessible to the **SR-120** and **SR-60** heaters. Similar to the **SR-120 and SR-60**, the **SR-20** allows the operator to monitor the temperature of the HMA pavement at all times during the heating process.
- D. The **Rapid Sprayer II** is a proprietary coating sprayer supplied by Integrated Paving Concepts Inc. and is capable of applying the coating material to the asphalt surface in a thin, controlled film which will optimize the drying and curing time of the coating.
- E. The **StreetHeat Portable Jet Heater** is a hand-held portable heating device to be used to heat isolated areas of the HMA pavement.
- F. The **StreetBond Coatings mixer** is a motorized mixing device designed exclusively for use with **StreetBond coatings**.
- G. Two **finishing tools** are offered to enable the applicator to finish imprinting in areas that cannot be completed when using the templates (e.g. when imprinting next to a curb or wall). The **finishing bit** is a specialized metal bit designed to be attached to a power hammer device. Alternatively, the **hand-held finishing tool** may be used for this purpose as well.
- H. Vibratory Plate Compactors shall be used for pressing the wire templates into the heated asphalt to create the specified pattern. Please note that Integrated Paving Concepts does not supply Vibratory Plate Compactors.

PART 3 - EXECUTION

3.1 GENERAL

The **StreetPrint** system shall be supplied and installed by an **Accredited StreetPrint Applicator** in accordance with the plans and specifications or as directed by the Owner. In any circumstance, do not begin installation without confirmation of Applicator certification.

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3.2 PRE-CONDITIONS

A high quality, highly stable HMA pavement is a pre-requisite for the installation of the **StreetPrint** system.

This Section 3.2 is to be used as a guide towards achieving a high quality HMA pavement. It does not supersede other specifications pertaining to this Work, nor does it replace recommendations made by the engineer of record for this Work.

3.2.1 Pre-requisites for new HMA pavement:

- stable sub-grade or base over which the HMA concrete is laid.
- proper mix design.
- proper placement and compaction practices.

3.2.1.1 Sub-grade: The sub-grade must be stable and should be inspected to identify any areas of soft or yielding soil that are too weak to properly support the paving equipment. These soft spots must be over-excavated and re-compacted to meet the engineer's requirements. Prior to paving, the sub-grade and base courses must be thoroughly and uniformly compacted, properly graded and constructed in accordance with the engineer's specifications. Please refer to the related sections for more exact requirements of this work.

3.2.1.2 Guidelines for HMA pavement mix design.

A durable, stable mix design is a pre-requisite for all long-lasting HMA pavement surfaces, especially those that will experience vehicle traffic. The application of **StreetPrint** does not change this requirement. **Generally, the HMA pavement mix design for roadways as prescribed by the local jurisdiction will be sufficient for the application of StreetPrint.** Failure to use a stable mix design may lead to premature failure of the HMA pavement such as raveling, rutting or segregation. The appropriate pavement structure is not within the scope of this specification; however, this specification can offer some general guidelines as follows:

- A. Stability** is a good general guide: generally, if the surface course design has a minimum Marshall Stability of 10 kN (about 2250 lbs) and design densities are achieved during compaction, the pavement should perform adequately.
- B.** The mix design should include a **nominal maximum aggregate size** of 12.5mm (1/2"). For clarity, SuperPave defines **nominal maximum aggregate size** as "one sieve size larger than the first sieve to retain more than 10 percent of the material".
- C.** For locations that will not experience any vehicle traffic, a more "tender" mix design can be used.
- D.** If a more stable mix design than is offered by the locally prescribed surface course is required, contact the HMA producer, the engineer of record or

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Integrated Paving Concepts Inc. for suggestions as to how to increase stability.

3.2.1.3 Placement of New HMA Pavement

- A. Successful placement of HMA pavement includes compacting the mix when it is hot and compacting the mix to the minimum densities required in order to achieve the specified air voids. Generally, the first pass of the rollers is to be done when the asphalt mixture is at minimum 230°F (110°C); the compaction process must be **completed** before the **in-place** temperature of the mixture cools to 185°F (85°C) or higher depending on the type of asphalt and/or modifiers used. For applications that will experience vehicle traffic and wherever it is possible, compaction is to be completed using a paving machine and a self-propelled roller.
- B. **Handwork**, which includes placing and spreading by hand and the use of hand operated compaction equipment, should be restricted to areas that cannot be accessed by the paving machine or the self-propelled rollers. Compaction must be completed when the pavement is hot as described above. Handwork is to be done carefully and the material distributed uniformly so there will be no segregation.
- C. The pavement must be smooth, without seams and graded to achieve proper drainage.
- D. Note that additional compaction of the HMA pavement will not be achieved through the application of the **StreetPrint** process.

3.2.2 Pre-requisites for existing pavement

Depending upon the condition and age, existing HMA pavement may or may not be suitable for the successful application of **StreetPrint**. The **Accredited StreetPrint Applicator** can advise whether the HMA pavement is suitable or not.

3.2.3 Mill & Fill: recommended guidelines.

A tack coat must be applied to ensure proper adhesion of the new HMA material to the old pavement substrate. A durable, stable mix design is a pre-requisite for all Mill & Fill applications - especially those that will experience vehicle traffic. The application of the **StreetPrint** process does not change this requirement. A minimum lift thickness of two inches is recommended. Due to the thin lift thickness placed over a cool substrate, it is especially critical to ensure that the HMA concrete is compacted when it is hot. It is generally recommended to not proceed with a Mill & Fill pavement application when the outside air temperature is less than 50°F (10°C).

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3.2.4 Pavement Marking Removal: recommended guidelines

Pavement markings may be removed by sandblasting, water-blasting, grinding, or other approved mechanical methods. The removal methods should, to the fullest extent possible, cause no significant damage to the pavement surface. The Owner shall determine if the removal of the markings is satisfactory for the application of **StreetBond** coatings. Work shall not proceed until this approval is granted.

3.2.5 Surface Preparation.

The HMA pavement surface shall be dry and free from all foreign matter, including but not limited to dirt, dust, de-icing materials, and chemical residue.

3.3 LAYOUT

Layout of the pattern for imprinting into the surface of the HMA pavement shall be as per the drawings and specifications and in accordance to the methods prescribed by the applicator in conjunction with the **Owner**.

3.4 HEATING THE HMA PAVEMENT

The Applicator shall follow the latest Application Procedures as issued by Integrated Paving Concepts Inc. Primary heating of the pavement surface is accomplished by the **Accredited StreetPrint Applicator** using the **SR-120** or **SR-60** reciprocating heaters.

- A. Pavement temperature.** The optimal pavement temperature for imprinting the template is dependent upon mix design, modifiers used in the mix, and the age of the pavement. Typically, the surface temperature of the pavement should not exceed 325°F as determined by an infra-red thermometer reading taken after the **SR-120** or **SR-60** heaters pass over the pavement surface.
- B.** In order to achieve the proper depth of imprint it is important to elevate the HMA pavement temperature to a minimum depth of 1/2 inch (12.5mm) without burning the pavement surface.

3.5 SURFACE IMPRINTING

Once the HMA pavement has reached imprinting temperature, the templates shall be placed in position and pressed into the surface using vibratory plate compactors. The top of the template is to be flush with the surrounding HMA pavement and can then be removed. Areas that have an imprint depth less than 3/8 inch shall be re-heated and re-stamped prior to applying the coatings. In areas difficult to get at with the template, or areas that have light print, the **finishing bit** or hand held finishing tool may be used to complete the imprint process.

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3.6 APPLICATION OF STREETBOND COATINGS

The selection of the appropriate **StreetBond** coatings and the required number of layers of each is dependent upon the climatic zone and the application as outlined below in **TABLE 3**. Only **Accredited StreetPrint applicators** are authorized to apply **StreetBond** coatings.

TABLE 3: COATING SYSTEMS



APPLICATION	RECOMMENDED COATING SYSTEM FOR TEXTURED HMA PAVEMENT		
	Dry Climate zone	Wet Climate zone, scuff [^] concern	Wet Climate zone, no scuff [^] concern
Pedestrian only - no vehicles (e.g. sidewalks, plazas)	3 layers SP150E	3 layers SP150E	3 layers SP150E
Residential driveway	1 layer SP-150E over 2 layers Cem-Base 150	1 layer SP-150E over 2 layers Cem-Base 150	1 layer SP-150E over 2 layers Cem-Base 150
Vehicle traffic (e.g. parking lots, X-walks, level medians)	2 layers SP-150E over 2 layers Cem-Base 150	2 layers SP-150E over 2 layers Cem-Base 150	4 layer SP-150E

Notes:

1. [^] Stationary vehicle tires turning on the pavement surface is a typical cause of scuffing.
2. A maintenance program may be required for applications exposed to:
 - scuffing;
 - abrasive materials (such as salt and sand);
 - abrasive equipment (such as snow removal equipment).
3. Do not apply Cem-Base to non-textured HMA pavement. Substitute with SP-150E to achieve recommended number of coating layers.

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3.6.1 Application Guidelines.

- A.** The **Accredited StreetPrint Applicator** shall use the **Rapid Sprayer II** to apply the **StreetBond** coatings.
- B.** The HMA pavement surface shall be completely dry and thoroughly cleaned prior to application of the coatings.
- C.** Subject to its age, pre-existing HMA pavement may require **StreetBond primer**. The **Accredited StreetPrint applicator** can assess if primer is required or not.
- D.** The coating application shall proceed as soon as practical upon completion of the imprinting of the HMA pavement.
- E.** The first layer of coating shall be spray applied then broomed to work the material into the pavement surface. Subsequent applications shall be sprayed then broomed or rolled. The recommended coating coverage and thickness is as described in Table 3 below. Each application of coating material shall be allowed to dry to the touch before applying the next layer.
- F.** The **Accredited StreetPrint Applicator** shall apply the **StreetBond** coatings only when the air temperature is at least 50° F and rising, and will not drop below 50° F within 8 hours of application of the coating material. There should be no precipitation expected within 2 hours after the final layer of **StreetBond SP150E** is dry to touch.

3.6.2 Coating Coverage and Thickness

Recommended coating coverage and thickness is as outlined in **TABLE 4** below. Actual coverage may be affected by the texture of the HMA pavement substrate and the imprint pattern selected. There will be less coverage with the first layer and higher coverage with subsequent layers.

TABLE 4: COATING COVERAGE AND THICKNESS

# OF LAYERS	COVERAGE (approx.)		THICKNESS (approx.)			
	TEXTURED (Offset brick) SF/pail	NON-TEXTURED SF/pail	WET		DRY	
			mm	mil	mm	mil
3	200	225	0.65	25.7	0.36	14.1
4	150	175	0.87	34.3	0.48	18.9

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3.7 NON-TEXTURED HMA PAVEMENT

Only use **SP150E** and/or **StreetBond Primer** when applying StreetBond coatings to non-textured HMA pavement. **CemBase 150** is designed only to be used for textured HMA pavement.

3.8 OPENING TO TRAFFIC

Minimally, the surface coating must be 100% dry before traffic is permitted. The following table is a guide:

TABLE 5: COATING DRY TIMES (TYPICAL)

Air Temperature	Relative Humidity	Time to dry (approx.)
60°F (15°C)	80%	8 hours
81°F (27°C)	57%	4 hours
120°F (49°C)	5%	2 hours

Substrate temperature, wind and humidity can also affect dry times. Generally, warm and dry conditions decrease the time required for the coatings to dry.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

The measured area is the actual area of HMA pavement that has received the **StreetPrint**, measured 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.

4.2 PAYMENT

Payment will be full compensation for all work completed as per conditions set out in the contract. For unit price contracts, the payment shall be calculated using the measured area as determined above.