CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

SPECIFICATIONS

FOR

2014 ASPHALT OVERLAY WITH RUBBER PACKAGE 5

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CITY OF SAN ANTONIO, TEXAS

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2014 ASPHALT OVERLAY WITH RUBBER – PACKAGE 5

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ITEM 241
Special Specification

EMULSION AGGREGATE SLURRY SEAL MIX

241.1 DESCRIPTION: This item shall govern for the asphalt emulsion aggregate slurry seal mix that will be used for pavement preservation. This item shall consist of a mixture of modified emulsified asphalt, ground tire rubber, mineral aggregate, and water. The slurry seal mix shall be produced in an approved centrally located facility and the mix shall be tested and certified by the producer to meet specifications prior to shipment to distribution location(s). The Slurry Seal mix shall be uniform and stable for placement the day of loading when proper agitation is maintained. The aggregates, emulsion, and water should form a creamy-textured slurry that, when spread, will flow ahead of the strike-off squeegee. When cured, the surface shall have a uniform appearance, fill cracks, and adhere to the existing pavement surface. Proportions shall be based on the mix design specifications herein.

241.2 MATERIALS:

A. AGGREGATE: The aggregate shall consist of sound and durable Trap Rock 100% crushed in accordance with these specifications. The aggregate shall be clean and free from vegetable matter, dirt, and other deleterious substances. The aggregate shall have a sand equivalent of not less than 45 percent when tested in accordance with ASTM D 2419. The aggregate shall show a loss of not more than 35 percent when tested in accordance with ASTM C 131. The sodium sulfate soundness loss shall not exceed 12 percent, or the magnesium soundness loss shall not exceed 20 percent after 5 cycles when tested in accordance with ASTM C 88.

The combined aggregate shall conform to the gradation shown in Table 1 when tested in accordance with ASTM C 136 and ASTM C 117.

TABLE 1

GRADATION OF AGGREGATES

Sieve Size	Precent by Weight Passing Sieve
No.4 (4.75 mm)	100
No.8 (2.36 mm)	75 – 85
No.16 (1.18 mm)	30 – 40
No.30 (600 micro m)	10 – 20
No.50 (300 micro m)	3 – 8
No.100 (150 micro m)	0 – 2
No.200 (75 micro m)	0 – 1
Emulsion content by dry weight of aggregate	14% - 17%
Ground tire rubber by dry weight of aggregate	5% Minimum

The mix formula (mix design) shall be run using aggregate within the gradation band shown in Table 1. Once the mix design has been submitted and approved, the aggregate used on the project shall be within the gradation bands in Table 1.

B. MINERAL FILLER: If mineral filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242 and shall be used in the amounts required by the mix design. The mineral filler shall be considered as part of the aggregate.

C. GROUND TIRE RUBBER: The material shall be granulated tire rubber specifically designed for use with the Slurry Seal mixes. The rubber shall have a specific gravity between 1.15 and 1.20. One hundred percent of the granulated tire rubber shall pass a No. 16 sieve, 95% shall pass a No. 20 sieve, and a maximum of 2 percent shall pass a No. 200 sieve.

D. POLYMER MODIFIER: Polymer modifier shall be latex and shall be added at a minimum of 2 percent polymer solids by weight of the emulsion.

E. WATER: All water used in making the slurry shall be potable and free from harmful soluble salts and chemicals.

F. EMULSION: The emulsion shall be a slow-set or a quick-set type of emulsion as approved by the Engineer. The emulsion shall contain ground tire rubber and polymer modifiers and shall conform to the following quality requirements as shown in Table 2:

TABLE 2

TESTS ON EMULSION

Emulsion Property	Test Procedure	Min	Max
Rotational viscosity at 77°F, cP	ASTM D 7226	200	2000
Uniformity	ASTM D 2939	Pass[1]	
Resistance to heat	ASTM D 2939	Pass[2]	
Resistance to water	ASTM D 2939	Pass[3]	
Wet flow, mm	ASTM D 2939	--	0
Residue by evaporation, % by weight	ASTM D 2939	33	--
Tests on residue from evaporation:			
Penetration, 77°F, 100 g, 5 sec.	ASTM D5	15	30
Flash point, Cleveland open cup, °F	ASTM D92	500	
Softening Point, °F [4]	ASTM D36	230	--

1. Product shall be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.
2. No sagging or slippage of film beyond the initial reference line.
3. No blistering or re-emulsification.
4. Cure the emulsion in the softening point ring in a 200°F ± 5°F oven for 2 hr.

241.3 COMPOSITION AND APPLICATION:

A. COMPOSITION: The slurry shall consist of a mixture of polymer emulsified asphalt, mineral aggregate, ground tire rubber, and water.

B. JOB MIX FORMULA: The Vendor shall submit to the Engineer for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory.

Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and emulsion that the Vendor will supply. The slurry seal mix shall be produced in an approved centrally located facility and the mix shall be pretested and certified to meet specifications by the producer prior to shipment to distribution location.

C. **APPLICATION RATE:** Unless otherwise specified, the slurry seal shall be applied to at the application rates of 10-15 pounds of mixture per square yard. The rate of application shall not vary more than +/- 2 pounds per square yard.

D. **CERTIFICATE OF ANALYSIS:** The producer of the Slurry Seal Mix shall make available a certificate of analysis (C of A) for the slurry seal mix supplied under the contract. The C of A shall indicate the proportions of aggregates, mineral filler, ground tire rubber, water and emulsion based on the dry aggregate weight. The main items of design in the Emulsion Slurry Seal are aggregate gradation, emulsion content and consistency of the mixture.

The Vendor shall submit to the Engineer for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory. Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and emulsion that the Vendor will supply.

241.4 MEASUREMENT: The Item will be measured by the square yard of Emulsion Aggregate Slurry Seal Mix installed and accepted.

241.5 Payment: The work performed and materials furnished in accordance this Item and measured as provided under "Measurement" will be paid for at the unit price bid for Emulsion Aggregate Slurry Seal Mix. This price shall be full compensation for furnishing and placing materials, surface preparation, and for all labor, tools, equipment and incidentals necessary to complete the work.

241.6 BID ITEM:
Item 241 - Emulsion Aggregate Slurry Seal Mix – per square yard

ITEM 250
Special Specification

SEAL COAT

250.1 DESCRIPTION:
This item shall consist of a single asphalt surface treatment composed of asphalt surface treatment composed of asphalt material covered with aggregate for the purposed of sealing existing pavements in accordance with these specifications.

250.2 MATERIALS:

A. AGGREGATE:
Aggregates shall be of the type as shown on the plans and shall meet all the requirements of the Texas Department of Transportation (TxDOT) Item No. 302, "Aggregate for Surface Treatments" and subsequent revisions thereto. Gradation requirements when tested by TxDOT Test Method Tex-200F, Part I, shall be as shown on the plans.

B. ASPHALTIC MATERIALS:
Asphalt cement, emulsified asphalts, other miscellaneous asphaltic materials, and latex additives shall conform to TxDOT Item No. 300, "Asphalt, Oils, and Emulsions" and subsequent revisions thereto.

250.3 EQUIPMENT

A. DISTRIBUTOR:
The distributor shall be a self-propelled pressure type, equipped with an asphaltic material heater and a distributing pump capable of pumping the material at the specified rate through the distributor spray bar. The distributor spray bar shall be capable of fully circulating the asphaltic material. The distributor spray bar shall contain nipples and valves so constructed that the nipples will not become partially plugged with congealing asphaltic material, in order to prevent streaking or irregular distribution of asphaltic material. Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and thermometer for reading the temperature of tank contents.

The distributor tank shall have been calibrated within three (3) years from the date it is first used on this project. The tank calibration procedure shall be in accordance with Test Method Tex-922-K, Part 1, and shall be signed and sealed by a registered professional engineer. Unless otherwise shown on the plans, the Contractor shall provide the tank calibration and shall furnish the Engineer an accurate and satisfactory calibration record prior to beginning the work. The Engineer may at any time verify calibration accuracy in accordance with Test Method Tex-922-K, Part II, and may perform the recalibration if the calibration is found to be in error.

B. AGGREGATE SPREADER:
A self-propelled continuous-feed aggregate spreader shall be used which will uniformly spread aggregate at the rate specified by the Engineer.

C. ROLLERS:
Approved rolling equipment shall be of the self-propelled type and shall be so designed such that a 12 ton load may be obtained by ballast loading. The roller shall be equipped with tires that will afford ground contact pressures to 90 psi or more. Individual tire inflation pressures shall be within 5 psi of each other. The operation load and tire air pressure shall be within the range of the manufacture's chart.

D. SWEEPERS:
A rotary, self-propelled power broom shall be acceptable for sweeping existing pavement surfaces.
Vacuum sweepers or other approved equally capable equipment shall be suitable for removing loose aggregate form compacted Seal Coat.

250.4 CONSTRUCTION METHOD:

Prior to Seal Coating, all dirt and other objectionable material shall be removed from the existing pavement by sweeping or other approved methods. All existing raised pavement markings shall be removed daily, as the work progresses, and as approved by the Engineer. All vegetation found in the existing pavement shall be destroyed by an approved chemical killer.
Building paper shall be place over all manholes, valve boxes, grates, etc., so as to protect the surfaces from Asphaltic materials. Asphaltic materials shall not be placed, lapped, or splashed onto adjacent structures.

Seal Coat shall not be applied when the air temperature is below 60^0F and is falling, but it may be applied when the air temperature is 50^0F and is rising, the air temperature being taken in the shade and away from artificial heat. Seal Coat shall not be applied when the roadway surface temperature is below 60^0F or when in the opinion of the Engineer, general weather conditions are not suitable. When latex modified asphalt cement is specified, Seal Coat shall not be applied when the air temperature is below 80^0F and is falling, but may be applied when the air temperature is above 70^0F and is rising and shall not be applied when the temperature of the surface on which the Seal Coat is to be applied is below 70^0F.

Asphalt and aggregate rates as shown on the plans are for estimate purposes only an may be varied as directed by the Engineer.

The width of each application of Asphaltic material shall be such to allow uniform application and immediate covering with aggregate. The contractor shall be responsible for uniform application of asphaltic material at the junction of distributor loads. Paper or other suitable material shall be used to prevent overlapping of transverse joints. Longitudinal joints shall match lane lines unless otherwise authorized by the Engineer. Application of asphaltic material will be measured as necessary to determine the rate of application. In those areas where the asphalt distributor is not accessible, hand spraying may be permitted as directed by the Engineer.

Aggregate shall be immediately and uniformly applied and spread in the same width as the application of asphaltic material. The entire surface shall then be broomed or raked as required by the Engineer.

The aggregate shall be rolled for its width with a minimum of two (2) pneumatic tires rollers which shall be maintained in good repair and operating condition. Rolling shall begin as soon as sufficient aggregate is spread to prevent pick-up and shall begin longitudinally at the outside edge of the mat and progress toward the center of the mat, uniformly lapping each preceding pass by at least 2 the width of the roller. Rolling shall continue until no more aggregate can be worked into the surface.

After all rolling, the finished surface shall be cleared of any surplus aggregate by the Contractor by sweeping. Until the work has been accepted, additional sweeping shall be required as often as necessary so that loose aggregate does not present a hazard to traffic.

The Contractor shall be responsible for the maintenance of the Seal Coat until the work is accepted by the Engineer. All holes or failures in the surface shall be repaired by use of additional asphalt and aggregate. All fat or bleeding surfaces shall covered with approved cover material in such a manner that the asphaltic material will not adhere to or be picked up by the wheels of vehicles.
All parkways, private property, and driveways adjacent to the work shall be cleaned of loose aggregate and other debris as produced from Seal Coat operations.

250.5 MEASUREMENT:

Seal Coat: will be measured by the square yard of completed and accepted work

250.6 PAYMENT:

The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Seal Coat", which price shall be full compensation for furnishing and placing all materials, sweeping, rolling, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

PAY ITEM NO. 250: SEAL COAT - per square yard.

ITEM 799
SPECIAL SPECIFICATION

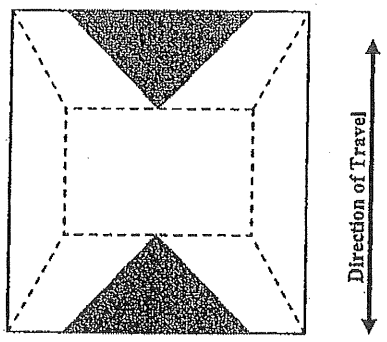
SPEED HUMPS, TYPE II
MODULAR RUBBER CUSHIONS

GENERAL:

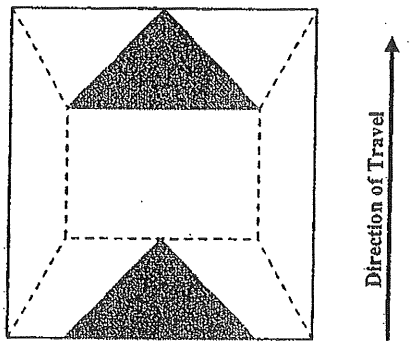
This specification sets forth the minimum acceptable requirements for modular rubber cushions for use at approved speed hump locations.

GENERAL REQUIREMENTS:

1. Pre-formed components manufactured from rubber
   All pre-formed rubber components shall be compatible and interchangeable with existing speed hump material in use by the City.
   - 1.1. Each component unit shall be 3" high
   - 1.2. The side gradient shall be between 1:4 and 1:8
   - 1.3. The ramp gradient shall be between 1:8 and 1:10
   - 1.4. The transition from the street shall not exceed ½ inch
   - 1.5. The cushion length shall be a minimum 78 inches
   - 1.6. The cushion width shall be 74 to 75 inches
   - 1.7. The cushions shall be black in color
   - 1.8. The markings shall be white in color, triangular in shape, and integral to the pre-formed rubber components
     - 1.8.1. Type A markings (not to scale)



     - 1.8.2. Type B markings (not to scale)



1.9. Cushion components including but not limited to the rubber cushions, hardware, angle iron, etc., shall be interchangeable with existing material currently in use on City of San Antonio streets.

1.10. Shore hardness shall be a minimum of 65. The manufacturer shall provide test data from an independent test lab confirming the product meets the minimum criteria with the bid submittal. Test data shall be provided for each shipment. An outline of the testing procedures shall be provided for review and approval with the bid submittal.

1.11. Tensile strength shall be a minimum of 500 psi. The manufacturer shall provide test data from an independent test lab confirming the product meets the minimum criteria with the bid submittal. Test data shall be provided for each shipment. An outline of the testing procedures shall be provided for review and approval with the bid submittal.

1.12. Deformation rate under compression shall be zero with 100% recovery.

1.13. The riding surface shall be smooth in texture for the duration of the warranty period, at a minimum, as determined by the City Inspector.

2. Rigid reinforcement perpendicular to the flow of traffic

3. Sufficient stainless/galvanized steel mounting bolts or hex head screws/fasteners per cushion
   3.1. Minimum 10mm x 100mm or equivalent

4. Plastic or nylon screw anchors
   4.1. Minimum 14mm x 75mm or equivalent

5. Metal washers
   5.1. Minimum 10mm or equivalent

6. Quick-set, two component epoxy/adhesive. Contractor shall submit manufacturer's material specifications for review and approval with the bid submittal.

7. Heavy duty rubber/nylon caps/plugs

WARRANTY:

The speed cushion and all associated equipment shall be fully warranted against defects and/or failure in design, material and workmanship in accordance with the manufacturer's standard warranty, or for a minimum of two (2) years from the date of final acceptance, whichever is greater. All material supplied shall have no less than one hundred percent (100%) of the manufacturer's standard warranty remaining on the date that the material invoices are submitted for payment. Any material with less than 100 percent (100%) of its warranty remaining will not be accepted by the City.

ITEM NO. 826 A
Valve Box Locate and Adjustments

826A.1 Description:
This item shall consist of locating covered valve boxes, cutting asphalt, replacing asphalt, and adjusting existing valve boxes in accordance with these applications and as directed by the Engineer.

826A.2 Materials:
The materials for valve boxes shall conform to the specifications contained within the latest revision of SAWS Material Specifications, Item 10-20 "Valve Boxes".

1. Construction Methods: Locate valve box using maps and metal detectors. Cut and replace asphalt as necessary. The valve box shall be placed in such a manner to prevent shock or stress from being transmitted to the valve. It shall be centered and plumb over the operating nut of the valve with the box cover flush with the surface of the finished pavement or at such other level as may be directed by the Engineer.

   Valve boxes located in streets or other area subject to vehicular traffic shall be provided with concrete collars as shown in the Standard Drawings DD-828 Series. Collars around such valve boxes shall be formed and finished off neatly and to a workmanlike manner. Valve box shall be located so that the valve operating nut is readily accessible for operation through the opening to the valve box. The valve box shall be set flush with the surface of the finished pavement or at such other elevations as may be specified. Pits shall be constructed to permit trainer valve repairs and to afford protection to the valve and pipe from impact where they pass through the pit walls.

2. Existing Valve Box: Existing covered valve boxes shall be defined as those boxes which are located within the right-of-way of the specified area of construction operations which are covered by asphalt. These boxes shall be adjusted to match proposed finished grades.

   Valve boxes installed as part of a new valve and mainline construction project are considered "new valves". Adjustments to "new valves" are incidental to the installation of the valve and are paid for as part of items 828, 830 or 832 of these Specifications. Separate pay shall not be given to adjust "new valves" to finished grade.

826A.3 Measurement:
Locating and adjusting of valve boxes will be measured by the unit of valve boxes located and adjusted to the finished grades.

826A.4 Payment:
Payment for "valve box locate and adjustment" shall be made at the contract unit price.

ITEM NO. 851-a
LOCATING AND ADJUSTING EXISTING MANHOLES

851.a. 1. DESCRIPTION: This item shall consist of the locating manholes, cutting asphalt, replacing asphalt, and adjustment of all existing manholes to include the replacing of existing manhole covers and rings regardless of type shown on the plans and in conformity with the provisions of these specifications.

851.a. 2. CONSTRUCTION: Locate manholes using maps and metal detectors. Cut and replace asphalt as necessary. Manholes shall be lowered below subgrade placing base materials and openings shall be protected by hatch covers. Existing manhole rings and covers which are determined by the SAWS inspector to be in an unacceptable condition, will be removed and replaced with new rings and cover. Contractor shall take all necessary measures to prevent damage to existing or new rings, cover, or cone from equipment and materials used in or taken through the work area. If no existing or new manhole cover, ring, or cone is damaged by the Contractor, it shall be replaces (as directed by SAWS inspector) by the Contractor at his expense. Manholes shall be adjusted after the base material has been laid and before placing of the surface course. Manholes that are going to be adjusted on an existing surface course not being replaced will be in accordance with City of San Antonio Utility Excavation Criteria Manual Standard Drawing No. 8.8. All manholes shall then be raised, or lowered a sufficient height so as to be level with the finished surface course. Adjustment in height will be made be addition or removal of "throat rings" above the manhole "cone" where feasible. A minimum of two and a maximum of six throat rings shall be used at each manhole. Material excavation from around the manholes shall be replaced with concrete in accordance with Standard Drawings, and select materials from the excavation (as shown on the plans or specified by the SAWS). All excess materials shall be disposed of by the Contractor at his own expense in an approved location.

851.a. 3. MEASUREMENT: Manholes located and completely adjusted, as prescribed above, will be measured by the unit of each manhole located and adjusted. The excavation and the amount of asphalt, concrete or reinforced concrete as necessary to fill the area excavated will not be measured for payment.

851.a. 4. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per manhole for "Locating and Adjusting Existing Manholes" which price shall be full compensation for all excavation, including saw cutting or surfaces as required, reinforced concrete and disposal of material excavated; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work.

ITEM NO. SP 100
Special Specification

DOOR HANGERS

DESCRIPTION: Contractor shall place Hangers with every business and resident within each segment of a project limit and at Inspector specified locations. The City of San Antonio is to provide template/verbage for the Door Hangers.

BID ITEM:
Item SP 100 – Door Hangers – lump sum

SPECIAL SPECIFICATION
Item SP500 Police Officer

Article SP500.1. Description. Provide uniformed off-duty police officers as directed where two-way traffic is to be maintained at major intersections.

Article SP500.2. Materials. N/A.

Article SP500.3. Construction. Coordinate with the inspector to determine the duration and locations where off-duty police officers will be deployed.

Article SP500.4. Measurement. Police officer services will be measured by the hour per officer.

Article SP500.5. Payment. The accepted quantity of man-hours shall be paid at the contract unit price for each hour.

Bid Item SP500 – Police Officer – Hour

SPECIAL SPECIFICATION
Item SP800 Project Signs

Article SP800.1. Description. Furnish, install, maintain, move and remove project information signs on each street whenever workmen, materials or equipment is present, or as directed. The project information signs will identify the construction as being a part of the 2014 SMP program of the City of San Antonio Public Works Street Department.

Article SP800.2. Materials. Furnish signs meeting the materials specifications of Item 531, the Barricade and Construction Standard details in the plans, and following the template of the layout, size, and legend to be provided by the City of San Antonio.

Article SP800.3. Construction. Erect all signs in conformance with the requirements of the TMUTCD and the Barricade and Construction Standard Details. It is the contractor's responsibility to see that all signs are properly installed and maintained at the job site. Erect project information signs at the locations directed by the Inspector, generally one sign facing each direction entering the project work area. Maintain the project sign so that no visual defect or graffiti is visible.

Article SP800.4. Measurement. Project signs will be measured by the number of project information signs that are deployed simultaneously on the various project sites.

Article SP800.5. Payment. The accepted quantity of signs shall be paid at the contract unit price for each sign, which shall be full compensation for furnishing all materials, labor, tools, equipment and supplies to construct the signs, mountings, installation at the various street sites, maintaining the signs, moving the signs from street to street, and removal of signs.

Bid Item SP800 – Project Signs – Each

ITEM NO. SP 2000
Special Specification

RAILROAD INSURANCE AND PERMIT

DESCRIPTION: Each Contractor is to include a $5,000 allowance for the SP RAILROAD INSURANCE AND PERMIT bid item. Contractor to secure all required railroad permits. All fees associated with such permits shall be included in this item.

BID ITEM:
Item SP 2000 – Railroad Insurance and Permit - lump sum

SPECIAL PROVISION TO ITEM 205
GROUND RECYCLED TIRE RUBBER MODIFIED ASPHALT BINDER

Revised: September 24, 2010

Description. This work shall consist of constructing Hot Mix Asphalt (HMAC) mixtures containing Ground Recycled Tire Rubber (GTR) modified asphalt binder. Work shall be according to City of San Antonio (COSA) Standard Specifications, except as modified herein.

Materials. Binder materials shall be according to COSA Standard Specifications, except as modified herein.

(A) Bituminous Material. The base asphalt binder shall be performance-graded (PG) binder meeting or exceeding PG 64-22.

(B) Ground Recycled Tire Rubber. The GTR shall be produced from processing automobile and/or light truck tires by the ambient grinding method. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. The GTR shall not exceed 2 mm (1/16 in.) in any dimension and shall contain no free metal particles or other foreign contaminating materials. Detection of free metal particles shall be determined by thoroughly passing a magnet through a 50 gram sample. Metal embedded in rubber particles will be permitted.

The GTR shall be stored in a dry location protected from the rain. The GTR shall have a maximum of 0.75% moisture by weight and shall be free flowing. When the GTR is combined with the asphalt cement, the moisture content of the GTR shall not cause foaming of the blend.

When tested in accordance to AASHTO T-27, *Sieve Analysis of Fine and Coarse Aggregates a* 50 gram sample of the GTR shall conform to the following gradation requirements:

Sieve Size	Percent Passing
2.36 mm (No. 8)	100
1.18 mm (No. 16)	98 ± 2
600 µm (No. 30)	95 ± 5
300 µm (No. 50)	> 20

A mineral powder (such as talc) meeting AASHTO M17, *Mineral Filler for Bituminous Paving Mixtures*, requirements may be added, up to a maximum of 4% by weight of GTR particles, to reduce sticking and caking of the GTR particles.

GTR shall have a specific gravity of 1.150 ± 0.050 when tested in accordance with ASTM D-1817, *Standard Test Method for Rubber Chemicals-Density.*

The GTR may be provided in bulk or in whole plastic containers. Plastic containers shall be made from low density polyethylene having a melting point

less than 240° F. The manufacturer shall ship along with the GTR, certificates of compliance which certify that all requirements of this specification are complied with for each production lot number or shipment.

(C) Polymer Additions. With approval of the Engineer, compatible polymers may be added to the GTR or to the asphalt-rubber blend during the process of blending and reaction of the asphalt binder with the GTR. The additional costs for the polymer additions shall be borne by the asphalt binder Supplier or the Contractor. The asphalt binder Supplier or the Contractor shall provide material product information along with usage rates for approval.

Preparation of GTR Modified Asphalt Binder. The GTR shall be blended with the PG-graded base asphalt binder, forming a consistent, homogeneous blend, using the Terminal Blend method, where the GTR is blended and reacted with the asphalt binder at the asphalt production facility. The asphalt-rubber blend shall consist of a minimum of 10% GTR (by dry unit weight of asphalt binder).

(A) Blending Requirements

(1) A separate agitated shipping / storage tank, with continuous mixing and recirculation of the asphalt-rubber blend, shall be required to react the GTR with the asphalt binder and to maintain the homogeneous blend of asphalt binder and GTR. This tank shall be heated and capable of maintaining the temperature of the homogeneous blend of asphalt binder and GTR at 325°F to 375°F (163°C to 191°C). The GTR shall be reacted with the asphalt binder for a minimum of 6 hours at a temperature of 325°F to 375°F.

(2) Terminal blended GTR asphalt binder may be stored at 300°F to 350°F with continuous mixing and/or recirculation, to maintain the homogeneous blend. Full Specification Compliance testing shall be repeated every 30 days on previously certified material held in storage.

(3) A dedicated storage tank for "terminal blended GTR asphalt binder" shall be provided at the HMAC plant. This tank must be capable of providing continuous mixing and/or recirculation of the GTR asphalt binder. This tank shall be heated and capable of maintaining the temperature of the homogeneous blend of asphalt binder and GTR at 300°F to 350°F. The maximum storage time of the GTR asphalt binder at the HMAC plant shall be 3 days maximum, unless approved by the Engineer.

(B) Asphalt-rubber Blend Characteristics. Asphalt-rubber blend must be homogeneous, but may contain visible particles of tire rubber.

GTR Modified Binder Compliance Testing. When the asphalt binder and GTR have reacted and form a homogeneous blend, test samples shall be obtained and submitted for testing. COSA personnel may also collect samples at any time. The GTR asphalt binder shall meet the requirements shown in Table 1.

Table 1. Requirements for GTR Asphalt Binder		
Test	**Value**	**Test Method**
Flash Point, Min, °C	230	T 48
Viscosity, Max, 3.0 Pa· s, temperature, °C	135	T 316
Softening Point, ° F, min.	135	T 53
Elastic Recovery @77°F, (25°C), 100mm elongation, 5cm/min., cut immediately, % min.	65	ASTM D6084 Procedure A

(A) The supplier of the GTR asphalt binder shall certify and provide the following documentation:

(1) Certificate of Analysis with the accompanying Producer's Sequence Number of the base asphalt binder.

(2) The composition of the GTR.

(3) The material product information and usage rates for any polymer additions, and

(4) The characteristics and test results of the final GTR asphalt binder.

(B) The final GTR asphalt binder shall be referred to using the PG grade of the base asphalt binder, GTR, and the minimum percent of GTR required (example: 64-22 GTR 10).

HMAC Mixture Design. The mixture design shall be according to COSA Standard Specifications.

Construction Requirements. The GTR Modified AC HMAC shall be placed according COSA Standard Specifications with the following additions.

(A) The GTR asphalt binder HMAC mixtures shall be delivered at a temperature of 300° F to 325° F. The mixture shall not be placed when the ambient (or surface) temperature is below 55°F, during wet weather, or when local conditions indicate rain is imminent, unless approved by the Engineer.

(B) Breakdown compaction should be done while the mat is between 265°F and 300°F (130°C and 149°C). Finish compaction should be completed before the mat reaches a temperature of 240°F (115°C).

(C) Pneumatic-tired rollers will not be permitted.

(D) The addition of a non-foaming detergent to the roller water will be allowed to prevent sticking, if necessary.

Opening to Traffic. Traffic shall not be permitted on the new surface until the temperature of the mat has dropped below 140° F (60° C).

Payment. Use of GTR modified asphalt binder will be paid for at the contract unit price per square yard (SY) under COSA Item 205 or Item 260.

ITEM 315
Special Provision

FOG SEAL

For this project, Item 315 "Fog Seal", of the TxDOT Standard Specifications, is hereby amended as follows:

1) Delete in its entirety Article 315.5, Measurement.

2) Add Article 315.5 Measurement:

   This Item will be measured by the square yard (SY) of accepted emulsified asphalt used in the emulsified asphalt and water mixture.

3) When referenced in the Item 315, "Fog Seal" specification, Item 300, "Asphalts, Oils and Emulsions," of the TxDOT Standard Specifications is hereby amended with respect to the clauses cited below.

Article 300.2. Materials D. Emulsified Asphalt., is supplemented by the following:

D. Emulsified Asphalt. Emulsified asphalt must be homogeneous, not separate after thorough mixing, and meet the requirements for the specified type and grade in the Table 11A for TRMSS.

Table 11A

Hazardous Materials Identification System (HMIS) ratings:

HMIS	Rating
Health	1
Flammability	0
Reactivity	0
Protective Equipment	E

American Society for Testing and Materials (ASTM):

TEST METHOD	PROPERTY	REQUIREMENT
ASTM D 562	Viscosity, Kreb Unit (KU)	35 to 65
ASTM D 2939.07	Weight/Gallon	8.3 – 8.6
ASTM D 2939.08	Residue by Evaporation %	>33.0
ASTM244 (sec. 44-47)	Sieve Analysis	0.1 max
ASTM D 93	Flash Point (of residue)	>500
ASTM D 2939.05	Emulsion Uniformity	Pass
ASTM D 2939.14	Resistance to Heat	Pass
ASTM D 2939.15	Resistance to Water	Pass
ASTM D 2939.19	Wet Flow	Pass
Performance Criteria Testing*		
ASTM G 154	Accelerated Weathering Test **	Pass

Asphalt Cement Certificate of Compliance ***		
Certificate of compliance	Ground Whole Tire Rubber %	10 min
ASTM D 5	Penetration 77˚F, 100g, 5sec, dmm	15-55
ASTM D 36	Softening Point, ˚F	> 140
ASTM D 2042	Solubility % (3 set average)	>98.0

* TRMSS, ready to use.
** 1,000 hours. UVA-340 lamp, 0.77 W/m^2(V1.0 calibration), 8 hours UV light @ 50˚C, 5min. Spray, 3.55 hours condensation @ 50˚C.
*** Ground whole tire rubber modified asphalt cement.

International Slurry Surfacing Association (ISSA):

TEST METHOD	**PROPERTY**	**REQUIREMENT**
Performance Criteria Testing*		
ISSA TB-100	Wet track Abrasion, %****	<5.0%

* TRMSS, ready to use.
**** Calculated weight loss, percentage of original Volume, 1 hour soak.

SPECIAL PROVISION
Item 502 Concrete Sidewalks

For this project, Item 502 "Concrete Sidewalks" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 502.4. Construction. G. Curb Ramps. This paragraph is void and replaced with the following:

Curb ramps must include a detectable warning surface and conform to the details shown on the plans. Confirm that abrupt changes in sidewalk elevation do not exceed ¼ inch, sidewalk cross slope does not exceed 2%, curb ramp grade does not exceed 8.3%, and flares adjacent to the ramp do not exceed 10% slope.

Construct curb ramps to include the following provisions (no separate pay):

- Construct detectable warning surface with truncated domes conforming to the City of San Antonio Wheelchair Ramp Standards sheet.
- Remove existing flatwork in accordance with the specification for Item 103, except measurement and payment.
- Construct new curb in accordance with the specification for Item 500, except measurement and payment.
- Construct concrete retaining wall (combination type), up to a maximum height of 6 inches, in accordance with the specification for Item 506, except measurement and payment.
- Adjust or relocate existing signs as directed.
- Contractor shall not leave the ramp unattended more than 1 day.
- Concrete work shall be maintained free from graffiti of any kind.
- Relocate irrigation systems in accordance with the specification for Item 552, except measurement and payment.
- Contractor shall deliver flyers at least 2 days in advance.
- Relocate landscape as directed.
- Avoid damage to the property of others. Contractor will be held liable for damage.

Article 502.5. Measurement. This article is void and replaced with the following:

Sidewalks will be measured by the square yard of surface area at the depth specified.

Curb ramps will be measured by each unit. "Each unit" will consist of one curb ramp of the type specified in the plans, removal of existing curb and flatwork, one landing and up to two wings, one detectable warning surface, new curb up to 24 feet in length, concrete retaining wall (combination type up to 6" in height), concrete surfaces up to a maximum of 13 square yards, sign adjustment or relocation, irrigation relocation, landscape relocation, and graffiti removal. Type I and Type III as per City of San Antonio Wheelchair Ramp Standards shall be measured as 2 EA of this item.

Article 502.6. Payment. This article is void and replaced with the following:

For Sidewalks – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid per square yard for "Concrete Sidewalks – Conventionally Formed". This price is full compensation for surface preparation of base; materials; excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals.

For Curb Ramps – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for a the unit price bid for "Curb Ramps". This price is full compensation for removal and disposal of existing concrete; surface preparation of base; materials, excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals. Concrete surface for a curb ramp exceeding 13 SY will be paid as Concrete Sidewalk per square yard. New concrete curb installation for a curb ramp exceeding 24 feet in length will be paid as Curb Item 500.

Article 502.7. Bid Item. This article is void and replaced with the following:

Item 502.1 – Concrete Sidewalks – Conventionally Formed – per SY
Item 502.1A – Curb Ramps – EA

SPECIAL PROVISION
Item 503 Asphaltic Concrete, Portland Cement Concrete, and Gravel Driveways

For this project, Item 503 of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Delete in its entirety:
Section 503.6 Payment

Add:

Section 503.6 Payment:
The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Portland Cement Concrete Driveway", Portland Cement Concrete Driveway – Commercial", "Asphaltic Concrete Driveway", or "Gravel Driveway", which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

SPECIAL PROVISION
Item 533 Cleaning and Removal of Pavement Markings and Markers

For this project, Item 533 "Cleaning and Removal of Pavement Markings and Markers" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements of the Item are waived or changed hereby.

Article 533.3. Equipment. This paragraph is void and replaced with the following:

All equipment shall be of sufficient capacity to clean the roadway surface to the specified cleanliness. Equipment shall be power driven and in good operating condition.

Article 533.4. Construction. The first paragraph is void and replaced with the following:

Unless otherwise shown on the plans, acceptable methods of removal for asphaltic pavements include heat scarification, blasting, and mechanical methods. Blasting and mechanical are the only acceptable methods for removal or cleaning of a Portland cement concrete surfaced pavement.

If truck mounted equipment is unable to achieve acceptable results in accordance to this specification, hand operated, power driven equipment, or equivalent, shall be used.

Article A. is void and replaced with the following:

A. Removal of Existing Pavement Markings/Markers.

1. Existing markings or markers to be removed shall be removed to the extent that the pavement marking or marker and its adhesive compound is/are either completely removed or obliterated.
2. Widths, lengths, and shapes of the cleaned surface shall be of sufficient size to include the full area of the specified pavement marking to be placed or removed.
3. Eliminate existing pavement markings and markers on both concrete and asphaltic surfaces in such a manner that color and texture contrast of the pavement surface will be held to a minimum. Repair damaged areas on asphaltic surfaces in excess of 1/8" inch in depth. Repair consists of milling and overlaying new asphaltic material in accordance to the appropriate San Antonio Standard Specifications. Width and length of the repair will be as directed by the Engineer.

4. Blasting or mechanical method on Portland cement concrete surfaces shall be sufficient to remove old pavement markings and all other contaminants. Damage to the roadway surface shall be avoided.
5. Very small particles of tightly adhering existing markings may remain in place if complete removal of the small particles will result in pavement damage.

Article 533.5. Measurement and Payment. This paragraph is void and replaced with the following:

Removal of existing pavement markings shall be measured by the length of satisfactorily removed line, in feet, or as appropriate, the number of symbols or words which are satisfactorily removed. The accepted quantities shall be paid at the contract unit price, which shall be full compensation for furnishing all materials, labor, tools, equipment and supplies to remove the marking and any raised markers. Removal of raised pavement markers shall not be measured or paid for directly but shall be considered subsidiary to the various items. Cleaning of new or existing pavements prior to installing new pavement markings or markers, and removal of incorrectly installed pavement markings and/or markers, shall not be paid for directly, but shall be considered subsidiary to the new pavement marking or marker.

Article 533.6. Bid Item. This paragraph is void and replaced with the following:

Bid Items:
533-A – Eliminate Existing Pavement Markings and Raised Markers (4”) – LF
533-B – Eliminate Existing Pavement Markings and Raised Markers (8”) – LF
533-C – Eliminate Existing Pavement Markings and Raised Markers (12”) – LF
533-E – Eliminate Existing Pavement Markings and Raised Markers (24”) – LF
533-F – Eliminate Existing Pavement Markings and Raised Markers (SYMBOL) – EA
533-G – Eliminate Existing Pavement Markings and Raised Markers (WORD) – EA
533-H – Eliminate Existing Pavement Markings and Raised Markers (RR-Xing) – EA

SPECIAL PROVISION
Item 535 Hot Applied Thermoplastic Pavement Markings

For this project, Item 535 "Hot Applied Thermoplastic Pavement Markings" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 535.7. Bid Item.

The following items are added:

Item 535.22 – White Sharrow (Bike Shared Lane) – Each, includes one bicycle symbol and two chevrons

Item 535.23 – White Arrow (Right, Left, or Straight) – Each

SPECIAL PROVISION
Item 712 Cleaning and Sealing Joints and Cracks (Asphalt Concrete)

For this project, Item 712 "Cleaning and Sealing Joints and Cracks (Asphalt Concrete)" of the TxDOT Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements of the Item are waived or changed hereby.

Article 712.2. Materials. This paragraph is void and replaced with the following:

Furnish a hot-applied, single component polymer/rubber modified asphalt material meeting the specifications of Crafco Asphalt Rubber 541 or approved equivalent.

CRAFCO INC
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PRODUCT DATA SHEET

ASPHALT RUBBER 541

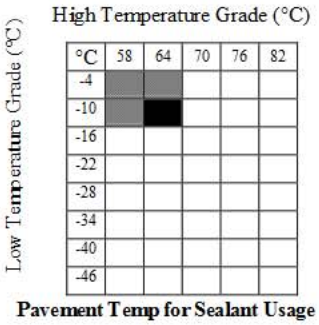
PART NO. 34541

JANUARY 2008

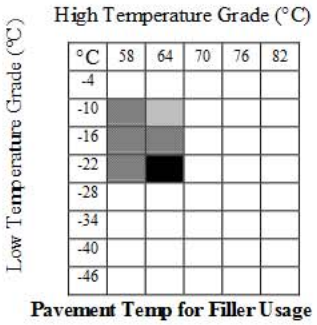
READ BEFORE USING THIS PRODUCT

GENERAL Crafco Asphalt Rubber 541 is a hot-applied asphalt based product used to seal and fill cracks and joints in asphalt or portland cement concrete pavements in moderate to warm climates. Asphalt Rubber 541 is supplied in solid form which when melted and properly applied forms an adhesive and flexible compound that resists cracking in the winter and resists flow at summer temperatures. Asphalt Rubber 541 is used in highway, street, airfield and parking lot pavements and is applied to pavement cracks and joints using pressure feed melter applicators. At application temperature, Asphalt Rubber 541 is a higher viscosity, non self-leveling product. Asphalt Rubber 541 contains virgin rubber, vulcanized granulated crumb rubber, and selected paving asphalt. Asphalt rubber 541 is produced to meet requirements of the Texas Highway Department for Rubber Asphalt Crack Sealer. VOC = 0 g/l.

USAGE GUIDELINES Asphalt Rubber 541 pavement temperature performance limits are 64-10 for crack sealing and 64-22 for crack filling. Usage recommendations are shown in Crafco pavement temperature grade charts shown at the right. Refer to Crafco Product Selection Procedures to determine sealant or filler use and pavement temperature grades.



Pavement Temp for Sealant Usage



Pavement Temp for Filler Usage

SPECIFICATION CONFORMANCE Crafco Asphalt Rubber 541 meets all requirements of State of Texas Department of Highways for Rubber Asphalt Crack Sealer (Texas SDHPT Item 300.2 Class B) and exceeds requirements of ASTM D5078.

Test	Texas SDHPT 300.2 Class B Limits
Minimum Application Temperature	380°F (193°C)
Maximum Heating Temperature	400°F (204°C)
Cone Penetration, 77°F (25°C)	30-50
Cone Penetration, 32°F (0°C), 200 g 60 sec.	12 min.
Softening Point (ASTM D36)	170°F (77°C) min.
Flash Point, modified C.O.C.	400°F (204°C) min.
Virgin Rubber Polymer, % by wt.	2% min.
Granulated vulcanized rubber, % by wt.	13-17%
Bond@20°F (-7°C), 50% ext	Pass 3 cycles.

INSTALLATION Prior to use, the user must read and follow Installation Instructions for Hot-Applied RoadSaver, PolyFlex, Parking Lot and Asphalt Rubber Products to verify proper product selection, heating methods, pavement preparation procedures, application geometry, usage precautions and safety procedures. These instructions are provided with each pallet of product.

PACKAGING Packaging consists of individual boxes of product which are palletized into shipping units. Boxes contain a non-adherent film which permits easy removal of the product. Each pallet contains 72 boxes which are stacked in six layers of 12 boxes per layer. The weight of product in each box does not exceed 40 lbs. (18kg) and pallet weights do not exceed 2,880 lbs. (1310kg). Pallets of product are weighed and product is sold by the net weight of product. Product boxes are manufactured from double wall kraft board producing a minimum bursting test certification of 350 psi (241 N/cm^2) and using water resistant adhesives. Boxes use tape closure and do not contain any staples. Boxes are labeled with the product name, part number, lot number, specification conformance, application temperatures and safety instructions. Palletized units are protected from the weather using a three mil thick plastic bag, a weather and moisture resistant cap sheet and a minimum of two layers of six month u.v. protected stretch wrap. Pallets are labeled with the product part number, lot number and net weight. Installation Instructions are provided with each pallet in a weather resistant enclosure.

WARRANTY CRAFCO, Inc. warrants that CRAFCO products meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing or filling are beyond our control as are the use and application of the products; therefore, Crafco shall not be responsible for improperly applied or misused products. Remedies against Crafco, Inc., as agreed to by Crafco, are limited to replacing nonconforming product or refund (full or partial) of purchase price from Crafco, Inc. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by Crafco, Inc. whichever is earlier. There shall be no other warranties expressed or implied. **For optimum performance, follow Crafco recommendations for product installation.**

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INSTALLATION INSTRUCTIONS
HOT-APPLIED ROADSAVER, POLYFLEX , PARKING LOT AND ASPHALT RUBBER PRODUCTS

JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL: These products are hot-applied, single component polymer/rubber modified asphalts supplied in solid form used to seal or fill cracks or joints in asphalt concrete or Portland cement concrete pavements. These products are not fuel resistant, and should not be used in fuel or oil spill prone areas. To use, product is removed from the package, heated in a melter and applied to the pavement. Details on product specifications, climate and usage suitability, and product selection are contained in Product Data Sheets.

MELTING AND APPLICATION: These products must be melted in jacketed double boiler melters with effective agitation that meet requirements of Appendix X1.1 of ASTM D6690. Crafco Supershot, EZ Series 2, and EZ Pour melters are recommended. Do not use direct fired or air heated machines. Heat transfer oil should not exceed 525°F (274°C). The melter must be capable of safely heating product to 400°F (204°C). **CAUTION:** Stop agitation when adding product to prevent splashing. Product is heated to between the minimum application temperature and the maximum heating temperature which are shown on product containers and Product Data Sheets. These products are most effectively applied with pressure feed wand systems. RoadSaver, PolyFlex and Parking Lot products can also be applied using gravity feed pour pots (Part No.40200 and 40201).

APPLICATION LIFE: Application life when heated to application temperature is approximately 12 to 15 hours and may be extended by adding fresh product as quantity in the melter decreases. Product shall be agitated during installation. Product may be reheated once to application temperature, after initial heat up. When application life has been exceeded, RoadSaver and Parking Lot products will thicken, become "stringy" and may then gel. If this occurs, product should immediately be removed from the melter and discarded. Asphalt Rubber and PolyFlex products will soften when overheated or heated for too long.

PAVEMENT TEMPERATURES: Apply product when pavement temperature exceeds 40°F (4°C). Lower temperatures may result in reduced adhesion due to presence of moisture or ice. If pavement temperature is lower than 40°F (4°C), it may be warmed using a heat lance (Part No. 45650) that puts no direct flame on the pavement. If installing at lower pavement temperature than 40°F (4°C), extreme care should be used to insure that cracks or joints are dry and free from ice and other contaminants. Product temperature should be maintained at the maximum heating temperature. If installing product at night, assure that dew is not forming on the pavement surface. Applied product should be checked by qualified personnel to assure that adhesion is adequate.

TRAFFIC CONTROLS: Place traffic controls in accordance with Part 6, Temporary Controls, of the FHWA Manual on Uniform Traffic Control devices (MUTCD) to protect the work site for the duration of the repairs.

CRACK / JOINT CLEANING: For appropriate adhesion, cracks or joints must be thoroughly clean and dry immediately prior to product installation. After widening or debris removal, and just prior to product installation, final cleaning shall use high pressure 90 psi (620kpa) minimum, dry, oil free compressed air to remove any remaining dust. Both sides of the crack or joint shall be cleaned. Surfaces should be inspected to assure adequate cleanliness and dryness.

ASPHALT PAVEMENT CRACK SEALING: Crack sealing consists of installing extensible sealants into routed reservoirs in working cracks in pavements in good condition.

Reservoir Cutting: Based on the 98% LTPPBIND temperature range (difference from high to low), cracks are to be routed as follows:

Temperature Grade Range	Reservoir Width	Reservoir Depth
80°C or less	½" (12 mm)	¾" (19 mm)
86°C	¾" (19 mm)	¾" (19 mm)
92°C	1 1/8" (28 mm)	½" (12 mm)
98° or greater	1 ½" (38 mm)	½" (12 mm)

Reservoir width should not exceed 1 ½" (38 mm). Cutting should remove at least 1/8" (3 mm) from each side and produce vertical, intact surfaces with no loosely bonded aggregate. The pavement should be sound enough to resist significant spalling during cutting. Final reservoir width should not exceed twice the cutter width or 1 ½" (38 mm) maximum.

Installation and Finishing: After cleaning, sealant at the required temperature is installed in the reservoir. Sealant can be installed with up to a 3/8" (10 mm) underfill, flush fill, or with an overband cap that does not exceed 1/16" (1.5mm) above the pavement surface, and not greater than a 2" (50 mm) width beyond crack edges, depending on project specifications. These configurations are achieved using appropriate wand tips, shoes or squeegees. To reduce surface tack, Crafco DeTack or other approved material may be applied.

ASPHALT PAVEMENT CRACK FILLING: Crack filling consists of installing flexible, traffic resistant product into prepared, cleaned, non-working pavement cracks. Filler can be installed in routed or unrouted cracks or in surface overbands.

Routed Reservoir – Routed reservoirs are recommended for longest life. Guidelines for determining reservoir use are:

1. Crack density should not exceed approximately 20% (linear feet of cracks per square feet of pavement area).
2. Pavement should be sound enough to resist significant spalling during cutting. (Final reservoir width should not exceed double the cutter width, or 1 ½"(38 mm) maximum

Reservoir Dimensions – Determined as follows:

1. The cut should remove at least 1/8" (3mm) from each side of the crack and cut back to sound pavement.
2. Minimum width is ½"(12 mm), maximum is 1 ½"(38 mm).
3. Recommended cut depth is ¾" (19 mm).
4. Reservoirs are then cleaned with compressed air.

Cleaned Unrouted Cracks – Cracks may be cleaned and filled without reservoirs, but longer life is achieved with reservoirs. Cleaning consists of using high-pressure dry, clean compressed air, brushing, or vacuum techniques to remove debris.

Surface Overbands – Product can be applied in overbands after crack cleaning with compressed air. Overbands should not exceed 1/16" (1.5 mm) high above the pavement surface and not extend greater than 2" (50 mm) beyond each crack edge.

Filler Installation and Finishing – Same as sealant installation and finishing.

PORTLAND CEMENT CONCRETE PAVEMENT JOINT SEALING AND RESEALING: Joint sealing and resealing consist of

installing extensible sealants into sawn and cleaned joint reservoirs in PCC pavements.

Reservoir Sawing – New concrete should be cured for at least 7 days prior to sawing the joint reservoir. Joint spacing should be at the design dimension, generally from approximately 12 to 20 ft. (3.7 to 6.2m). Joints shall be at least ¼" (6mm) wide, and should not exceed 1½" (38mm). For new pavements designed with narrow joints using the initial narrow saw cut as the reservoir, spaced at 15 ft (5m) maximum, and when using low modulus type sealants, joint width may be as narrow as 1/8 inch (3mm). Contact Crafco for more details. Reservoir depth should allow a sealant depth to width ratio of 1:1 to 2:1, sufficient depth for backer rod, and the specified surface recess. Reservoirs shall be cut no deeper than required. When resealing, old sealant can be removed by knives, plows or sawing. Sawing shall slightly widen the joint by 1/8 to ¼ inch (3-6mm) to remove all traces of old sealant and produce clean, intact vertical surfaces. Maximum joint width is 1 ½ inch (38mm).

Reservoir Cleaning – After sawing, joints shall be flushed with water to remove sawing slurry and allowed to dry. Just prior to installing sealant, both joint surfaces shall be cleaned using sandblasting, brushing or other means to remove any remaining of sawing residue. Final cleaning is then done with high-pressure (minimum 90 psi, 62N/cm2) clean, dry, oil free compressed air the same day that sealant is installed. Moisture and oil traps are required on the compressor. Joints must be inspected to assure cleanliness by rubbing a finger along each face to spot dust or other contaminants. If found, recleaning should occur until joints are completely clean and dry. The objective of sawing and cleaning is to provide vertical, intact, clean concrete bonding surfaces free from all contaminants and are dry.

Backer Rod – After cleaning, heat resistant backer rod (ASTM D5249, Type I) approx. 25% larger than the joint width shall be installed to the required depth without damage or punctures. Punctures or damage to backer rod may cause sealant bubbling.

Sealant Installation – Concrete should be cured at least 7 days prior to installing sealant. Sealant heated to required temperature is installed per project specifications. Typical installations include a recess up to ¼ inch (6mm), flush, or with a surface overband (maximum 1/16" (1.5mm) above the surface, and 2" (50 mm) maximum beyond each joint edge).

INSTALLATION PRECAUTIONS: In certain situations, additional consideration needs to be given to product selection and application geometries.

Parking lots and other areas subjected to slow moving traffic and pedestrians: Product used must be stiff enough at hot summer temperatures to resist pick up and should not be applied on top of the pavement surface. Product should have a high temperature grade at least one step above the LTPPBIND grade for the climate. For even better pick-up resistance, increase by two grades.

Pavement to receive an Overlay, Surface Treatment, or Seal Coat: Product will be subjected to overlay heat effects and carriers for surface treatments and seal coats. If product is applied on top of the pavement, and an overlay is then placed, bumps may occur during compaction. Refer to "Bump Formation & Prevention in Asphalt Concrete Overlays Which Have Been Crack Sealed" (www.crafco.com) for more information. Solvents or other carriers in surface treatments may soften product. Prior to placing a surface treatment or seal coat, a test strip should be placed to verify compatibility of the product and treatment.

High Severity Cracked Areas: Highly cracked areas (fatigue cracks in wheel paths) should not be treated by covering cracks because pavement friction may be affected. These cracks can be filled if followed by a surface treatment or overlay to restore friction.

Fuel or Oil Spill Areas: These products should not be used in fuel or oil spill areas due to softening of the sealant that may occur. Sealant will not adhere to asphalt or concrete pavements surfaces that are contaminated with oil spills.

Crack Sealing or Filling in Pavements with Surface Treatments: When crack sealing or filling pavements with chip seals, slurry seals, and open graded friction courses, routing should be deep enough to extend through the surface treatment layer into the underlying asphalt concrete. This anchors product into solid pavement for better bonding.

CLEAN OUT: If melters used require clean out, follow manufacturer's instructions. If solvent is used, insure it does not contaminate product because dilution and flash problems may occur.

STORAGE: Pallets of product are protected with a weather resistant covering. During storage, this covering must be intact to prevent boxes from getting wet. If wet, boxes may lose strength and crush. Rips in the pallet covering should be repaired to maintain packaging integrity. Pallets should be stored on a dry, level surface with good drainage. Pallets should not be stacked because crushing of bottom boxes may occur. Product properties are not affected by packaging deterioration.

SAFETY PRECAUTIONS: Since these products are heated to elevated temperatures, it is essential that operations be conducted safely. All personnel need to be aware of hazards of using hot applied materials and safety precautions. Before use, the crew should read and understand product use and safety information on the box and the product MSDS. User should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C).

HAZARDS ASSOCIATED WITH HOT-APPLIED MATERIALS: Skin contact with hot materials causes burns. Over exposure to fumes may cause respiratory tract irritation, nausea, or headaches. Precautions are to be taken to prevent contact with hot material and to avoid inhalation of fumes for everyone in the vicinity. Safety precautions should include:

1. Protective clothing to prevent skin contact with hot material.
1. Care when adding product to melters to reduce splashing.
3. Careful operation of wands or pour pots that apply product.
4. Traffic and pedestrian control measures which meet or exceed MUTCD requirements to prevent access to work areas while product is in a molten state.
5. Avoidance of material fumes.
6. Proper application configurations with a minimum amount of material excess.
7. Appropriate clean up of excessive applications or product spills.

ADDITIONAL INFORMATION: Additional information regarding these products is available by contacting your distributor or Crafco, Inc. This information includes:

1. Product Data Sheets
2. Material Safety Data Sheet,
3. Safety Manual
4. Sealing Cracks and Joints in Parking and Pedestrian Areas
5. "Bump Formation & Prevention In Asphalt Concrete Overlays Which Have Been Crack Sealed"
6. Sealant Selection Guide