



Paul R. LePage  
GOVERNOR

STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION  
16 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0016

David Bernhardt  
COMMISSIONER

March 10, 2016  
Subject: Milling/Overlay, Bridge  
Work with Drainage & Safety  
Improvements  
State WIN: 018987.00 & 020369.00  
Location: **Farmington & Strong  
Amendment No. 1**

Dear Sir/Ms:

Make the following change to the Bid Documents:

**REMOVE** pages 17 thru 21, "Schedule of Items" dated 3/2/2016 and **REPLACE** with the attached revised "Schedule of Items" 5 pages, dated 3/9/2016.

**REMOVE** pages 41 thru 45, "Construction Notes" dated 3/4/2016 and **REPLACE** with the attached revised "Construction Notes", 5 pages, dated 3/8/2016.

**INSERT** attached, "SPECIAL PROVISION, SECTION 400, Pavements (Emulsified Asphalt Seal Coat, Applied)", 3 pages, dated 04/03/2013 after page 84.

**INSERT** attached "SPECIAL PROVISION, SECTION 424, FIBER REINFORCED LOW MODULUS OR FIBER MODIFIED ASPHALT CRACK SEALER", 6 pages, dated 03/20/2015 before page 85.

**INSERT** attached "SPECIAL PROVISION, SECTION 606, GUARDRAIL (Removed and Reset)", 1 page, dated 3/8/2016 after page 88.

Consider this change and information prior to submitting your bid on **March 30, 2016**

Sincerely,

George M. A. Macdougall P.E.  
Contracts & Specifications Engineer



PRINTED ON RECYCLED PAPER

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018987.00

Project(s): 018987.00, 020369.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: \_\_\_\_\_

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0010	202.202 REMOVING PAVEMENT SURFACE	13,800.000 SY	_____	 _____	_____	 _____
0030	403.2081 12.5 MM POLYMER MODIFIED HOT MIX ASPHALT	250.000 T	_____	 _____	_____	 _____
0070	403.213 HOT MIX ASPHALT 12.5 MM BASE	388.000 T	_____	 _____	_____	 _____
0080	409.15 BITUMINOUS TACK COAT - APPLIED	9,410.000 G	_____	 _____	_____	 _____
0120	508.14 HIGH PERFORMANCE WATERPROOFING MEMBRANE	LUMP SUM		LUMP SUM	_____	 _____
0130	518.50 REPAIR OF UPWARD FACING SURFACES - TO REINFORCING STEEL < 7.9 IN.	50.000 SF	_____	 _____	_____	 _____
0140	518.51 REPAIR OF UPWARD FACING SURFACES - BELOW REINFORCING STEEL < 7.9 IN.	10.000 SF	_____	 _____	_____	 _____
0150	520.245 BRIDGE JOINT MODIFICATION TYPE 5	2.000 EA	_____	 _____	_____	 _____
0160	526.301 TEMPORARY CONCRETE BARRIER TYPE I	LUMP SUM		LUMP SUM	_____	 _____
0170	527.34 WORK ZONE CRASH CUSHIONS	2.000 UN	_____	 _____	_____	 _____
0420	643.72 TEMPORARY TRAFFIC SIGNAL	LUMP SUM		LUMP SUM	_____	 _____

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018987.00

Project(s): 018987.00, 020369.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: \_\_\_\_\_

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0430	202.203 PAVEMENT BUTT JOINTS	1,300.000 SY	_____	 _____	_____	 _____
0440	403.209 HOT MIX ASPHALT 9.5 MM (SIDEWALKS, DRIVES, INCIDENTALS)	250.000 T	_____	 _____	_____	 _____
0450	403.210 HOT MIX ASPHALT 9.5 MM	12,600.000 T	_____	 _____	_____	 _____
0460	403.211 HOT MIX ASPHALT (SHIMMING)	6,500.000 T	_____	 _____	_____	 _____
0470	410.151 EMULSIFIED ASPHALT SEALCOAT, APPLIED	6,300.000 SY	_____	 _____	_____	 _____
0480	411.10 UNTREATED AGGREGATE SURFACE COURSE (TRUCK MEASURE)	250.000 CY	_____	 _____	_____	 _____
0490	424.3331 ASPHALT LOW MODULUS CRACK SEALER, APPLIED	1,000.000 LB	_____	 _____	_____	 _____
0500	603.179 18 INCH CULVERT PIPE OPTION III	280.000 LF	_____	 _____	_____	 _____
0510	603.199 24 INCH CULVERT PIPE OPTION III	150.000 LF	_____	 _____	_____	 _____
0520	605.12 15 INCH UNDERDRAIN TYPE C	300.000 LF	_____	 _____	_____	 _____
0530	605.13 18 INCH UNDERDRAIN TYPE C	180.000 LF	_____	 _____	_____	 _____
0540	605.15 24 INCH UNDERDRAIN TYPE C	180.000 LF	_____	 _____	_____	 _____

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018987.00

Project(s): 018987.00, 020369.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: \_\_\_\_\_

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0550	606.178 GUARDRAIL BEAM	112.500 LF	_____	 _____	_____	 _____
0560	606.231 GUARDRAIL TYPE 3C - 15 FOOT RADIUS AND LESS	50.000 LF	_____	 _____	_____	 _____
0570	606.265 TERMINAL END - SINGLE RAIL - GALVANIZED STEEL	1.000 EA	_____	 _____	_____	 _____
0580	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	40.000 EA	_____	 _____	_____	 _____
0590	606.36 GUARDRAIL REMOVED AND RESET	37.500 LF	_____	 _____	_____	 _____
0600	606.362 GUARDRAIL ADJUSTED	1,150.000 LF	_____	 _____	_____	 _____
0610	606.367 REPLACE UNUSABLE EXISTING GUARDRAIL POSTS	5.000 EA	_____	 _____	_____	 _____
0620	609.31 CURB TYPE 3	1,700.000 LF	_____	 _____	_____	 _____
0630	610.08 PLAIN RIPRAP	20.000 CY	_____	 _____	_____	 _____
0640	613.319 EROSION CONTROL BLANKET	1,200.000 SY	_____	 _____	_____	 _____
0650	615.10 DIRTY BORROW	300.000 CY	_____	 _____	_____	 _____
0660	618.14 SEEDING METHOD NUMBER 2	380.000 UN	_____	 _____	_____	 _____

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 018987.00

Project(s): 018987.00, 020369.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: \_\_\_\_\_

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0670	619.12 MULCH	380.000 UN	_____	 _____	_____	 _____
0680	627.78 TEMPORARY 4 INCH PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW	164,100.000 LF	_____	 _____	_____	 _____
0690	629.05 HAND LABOR, STRAIGHT TIME	100.000 HR	_____	 _____	_____	 _____
0700	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	180.000 HR	_____	 _____	_____	 _____
0710	631.15 ROLLER, EARTH AND BASE COURSE (INCLUDING OPERATOR )	8.000 HR	_____	 _____	_____	 _____
0720	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	360.000 HR	_____	 _____	_____	 _____
0730	639.19 FIELD OFFICE TYPE B	1.000 EA	_____	 _____	_____	 _____
0740	652.33 DRUM	50.000 EA	_____	 _____	_____	 _____
0750	652.34 CONE	150.000 EA	_____	 _____	_____	 _____
0760	652.35 CONSTRUCTION SIGNS	1,300.000 SF	_____	 _____	_____	 _____
0770	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	140.000 CD	_____	 _____	_____	 _____
0780	652.38 FLAGGER	4,100.000 HR	_____	 _____	_____	 _____

3/9/2016

Maine Department of Transportation

Proposal Schedule of Items

Page 5 of 5

Proposal ID: 018987.00

Project(s): 018987.00, 020369.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: Alt Mbr ID:

Contractor: \_\_\_\_\_

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0790	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM	LUMP	SUM	_____	_____
0800	659.10 MOBILIZATION	LUMP SUM	LUMP	SUM	_____	_____
<b>Section: 1</b>			<b>Total:</b>		_____	_____
			<b>Total Bid:</b>		_____	_____

## CONSTRUCTION NOTES

### **202.202 REMOVING PAVEMENT SURFACE**

#### Station – Station

10+00 – 49+60 (Mainline)

41+25 – 49+60 LT (Shoulder)

#### Note:

- 50% of the pavement millings shall remain the property of the State of Maine and shall be delivered to Daggett Pit on Route 149. The pit is located 3.0 miles from the start of the project. Payment for delivery and stockpiling shall be considered incidental to Item 202.202. Stockpiling shall include all equipment, personnel and other incidentals required to construct and maintain stockpiles as per normal construction practices.

### **202.203 PAVEMENT BUTT JOINTS**

#### Location

53+18 (Bridge)

421+48 (End Project)

Drives, side roads and high spots on the shoulders as directed by the Resident

### **410.151 EMULSIFIED ASPHALT SEALCOAT, APPLIED**

### **424.3331 ASPHALT LOW MODULUS CRACK SEALER, APPLIED**

#### Station – Station (LT)

10+00 – 41+25 (Shoulder)

#### Station – Station (RT)

10+00 – 49+60 (Shoulder)

### **411.10 UNTREATED AGGREGATE SURFACE COURSE (Truck Measure)**

To be used in various driveways as directed by the Resident.

**CONSTRUCTION NOTES**

**603.179 18 INCH CULVERT PIPE OPTION III**

<u>Station</u>	<u>Length (FT)</u>
41+35	42
44+33	42
46+12	34
47+63	36
49+60	34
46+12 RT	92

Note:

- Metal pipe shall not be used.

**603.199 24 INCH CULVERT PIPE OPTION III**

<u>Station – Station</u>	<u>Length (FT)</u>
47+82 – 49+28 LT	146

Note:

- Metal pipe shall not be used.

**605.12 15 INCH UNDERDRAIN TYPE C**

<u>Station – Station</u>	<u>Length (FT)</u>
41+37 – 44+29 LT	292

Note:

- Metal pipe shall not be used.

**605.13 18 INCH UNDERDRAIN TYPE C**

<u>Station – Station</u>	<u>Length (FT)</u>
44+32 – 46+04 LT	172

Note:

- Metal pipe shall not be used.

**CONSTRUCTION NOTES**

**605.15 24 INCH UNDERDRAIN TYPE C**

<u>Station – Station</u>	<u>Length (FT)</u>
46+07 – 47+79 LT	172

Note:

- Metal pipe shall not be used.

**606.178 GUARDRAIL BEAM**

<u>Station – Station (LT)</u>	<u>Station – Station (RT)</u>
19+70 – 19+95	69+62 – 69+74.5
20+00 – 20+50	383+95 – 384+07.5
21+50 – 21+62.5	

**606.231 GUARDRAIL TYPE 3C – 15 FOOT RADIUS AND LESS**

<u>Station – Station (LT)</u>	<u>Station – Station (RT)</u>
100+39 – 100+64	145+46 – 145+71

**606.265 TERMINAL END – SINGLE RAIL – GALVANIZED STEEL**

Station  
145+71 RT

**606.36 GUARDRAIL REMOVED AND RESET**

Station – Station  
104+07.5 – 104+45 RT

**CONSTRUCTION NOTES**

**606.362 GUARDRAIL ADJUSTED**

Station – Station (LT)

100+64 – 104+39  
379+98 – 380+85.5

Station – Station (RT)

103+70 – 104+07.5  
104+45 – 105+32.5  
129+59 – 133+46.5  
137+62 – 138+62

Note:

- Broken pavement around the adjusted posts shall be repaired with HMA as directed by the Resident. Payment will be made under Item 403.209.

**609.31 CURB TYPE 3**

Station – Station (LT)

18+90 – 19+07  
41+21 – 41+33  
41+40 – 46+40  
47+00 – 49+75  
83+97 – 84+67  
84+86 – 85+82  
86+21 – 86+90  
93+38 – 93+53  
272+46 – 272+52  
344+70 – 344+76

Station – Station (RT)

20+46 – 20+58  
24+10 – 24+20  
37+20 – 37+57  
46+61 – 46+95  
69+00 – 69+15  
98+00 – 100+00  
226+60 – 228+30  
252+41 – 252+59  
291+25 – 291+35  
292+16 – 292+21  
377+67 – 378+28  
394+05 – 394+25

**610.08 PLAIN RIPRAP**

Station

67+55 RT

## CONSTRUCTION NOTES

### **627.78 TEMPORARY 4" PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW**

Station – Station

10+00 – 421+48

- Temporary center lines shall be painted on all matched pavement within one week.
- Temporary edge lines shall be painted on all pavement layers within four weeks.
- All temporary lines shall be painted prior to final striping.
- Multilane sections, truck lanes, and milled surfaces must be striped daily on all matched pavement layers.
- TOMs must be used on all pavement layers until temporary paint is applied.
- TOMs will be removed before final striping.
- TOM removal will be addressed in the Traffic Control Plan.
- Only painted temporary line will be paid under this item. TOMs will be considered incidental to the contract.

### **652.35 CONSTRUCTION SIGNS**

Note:

- Two **Road Work Next 8 Miles** signs are required for this project.

**SPECIAL PROVISION**

**SECTION 400**

**Pavements**

(Emulsified Asphalt Seal Coat, Applied)

Description This work consists of furnishing and applying one or more applications of emulsified asphalt sealcoat material on an approved surface in accordance with these specifications, and in reasonably close conformity with the lines shown on the plans or established.

Materials The bituminous material shall meet the applicable requirements of Section 702 – Bituminous Materials. Liquid asphalt grades for the fog coat treatment shall meet the requirements for SS-1, SS-1h, CSS-1, or CSS-1h.

The emulsified asphalt shall be produced by diluting an approved, tested and certified emulsion product at a 1:1 ratio, and thoroughly mixed into a homogenous liquid. Each load shall be accompanied by a loading invoice listing the material supplier, emulsion type, dilution rate, total quantity loaded, and copy of the undiluted emulsified asphalt product certification. The diluted emulsion shall meet the requirements listed in Table 1 of this specification.

Table 1 – Diluted Asphalt Emulsion for Seal Coat

<u>Test requirements for diluted material</u>	<u>Range</u>
Sieve test %	0 – 0.10
Residue by distillation, %	28 - 40
Penetration	40 - 90
Application Temperature	80 – 130 °F

Equipment Emulsified asphalt sealcoat material application equipment shall meet the requirements specified in Section 409 – Bituminous Tack Coat, subsection 409.05 - Equipment.

**CONSTRUCTION PROCEDURES**

Weather Limitations Emulsified asphalt sealcoat material shall not to be applied when the atmospheric temperature is below 10°C (50°F), or pavement temperature below 15°C (59°F).

Emulsified asphalt sealcoat shall not be applied in wet conditions, or when wet weather conditions are forecasted within the cure period.

Preparation of Surface Before application of the bituminous material the surface shall be thoroughly cleaned of all loose and objectionable material. Preparation of the surface shall be considered incidental to the contract. The Contractor shall be responsible for covering all utility irons just prior to application of emulsion and uncovering utilities after application.

Immediately before applying an emulsified asphalt seal coat, the pavement surface must be cleaned with a road sweeper, power broom, or flushed with a water pump-unit to remove dust, dirt, and debris. The pavement surface must be clean and dry before applying the emulsified

asphalt sealcoat. If flushing with water is required, it should be completed 24 hours prior to the application of the fog seal to allow for adequate drying.

Application Emulsified asphalt seal coat materials shall be applied by a pressure distributor in a uniform, continuous spread over the area to be treated and within the temperature range specified in Section 702.05 – Application Temperatures or as otherwise listed in this specification. No moisture shall be present on the roadway surface.

Application rates shall generally be in the range of 0.10 to 0.20 gallons per square yard. For the purposes of this specification, the approximate application rate at the time of bid shall be 0.12 gallons per square yard. Should the Department and Contractor determine that the rate of application increase or decrease from the 0.12 gallons per square yard rate, then the unit price shall be adjusted by contract modification.

A control section shall be established to verify application rates before continuing application of seal coat. The control section shall be of sufficient length to verify the approximate emulsion use at the prescribed rate. Generally, the length of control strip should be approximately 2000 linear feet.

During bituminous material application, adequate provisions shall be made to prevent marring and discoloration of adjacent pavements, structures, vehicles, foliage or personal property. The use of skirting or end panels may be required to control application widths, and limit overspray.

Areas found to lack the proper emulsified asphalt seal coat application rate will require a re-application of emulsion material to meet the required rate. Areas requiring re-application will not be paid for directly but shall be considered incidental to the emulsified asphalt seal coat pay item,

In the event that excessive emulsion materials are applied, the use of sand blotter material shall be used to reduce the risk of bleeding and tracking by traffic. Blotter material, if used, will be considered incidental to the emulsified asphalt seal coat pay item.

Traffic Control All traffic shall be kept off the emulsified asphalt seal coat areas for a minimum of 4 hours or until curing is complete. The emulsified asphalt seal coat surface will be considered cured when the emulsion does not track off the treated surface, or when directed by the Department.

#### METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Method of Measurement The Department will measure the emulsified asphalt seal coat by the square meter (square yard). Payment will be for the actual number of square yards applied in accordance with the typicals, Standard Specifications, and Section 109 - Measurement and Payment. Payment shall be full compensation for all labor, materials and equipment required to complete the work in accordance with these specifications.

Basis of Payment The Department will pay for the Work, in place and accepted, in accordance with the applicable sections of the Special Provisions at the contract unit price per square meter (square yard) applied.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
410.151 Emulsified Asphalt Seal Coat, Applied	Square Yard (Square Meter)

**SPECIAL PROVISION**  
**SECTION 424**  
**FIBER REINFORCED LOW MODULUS OR FIBER MODIFIED ASPHALT**  
**CRACK SEALER**

Description This work shall consist of the furnishing and placement of crack sealing material in the cracks of existing bituminous concrete pavement in accordance with these Special Provisions. Placement shall consist of: 1) crack cleaning and drying, 2) material preparation and application, 3) material finishing and shaping 4) barrier material and application.

Materials The sealant and equipment requirements shall be one of the following options (A or B) and shall be subject to approval by the Department prior to the start of work.

**A.) Fiber Reinforced Low Modulus Crack Sealant Material:**

1. Low Modulus Crack Sealant Material shall conform to AASHTO M 324, Type IV (ASTM D 6690, Type IV) and the following specification.

Cone Penetration	90 - 150
Flow @ 60°C [140°F]	< 3.0mm [ $\frac{1}{8}$ in]
Bond, non-immersed	Three 12.7mm [ $\frac{1}{2}$ in] Specimens Pass <sup>A</sup> 3 cycles @ 200% extension @ -20°F
Resilience, %	60 min
Asphalt Compatibility, ASTM D5329	Pass <sup>B</sup>

<sup>A</sup>The Development at any time during the test procedure of a crack, separation, or other opening that at any point is over 6 mm deep in the sealant or between the sealant and concrete block shall constitute failure of the test specimen. The depth of the crack, separation, or other opening shall be measured perpendicular to the side of the sealant showing the defect.

<sup>B</sup>There shall be no failure in adhesion, formation of any oily exudate at the interface between the sealant and asphaltic concrete or other deleterious effects on the asphaltic concrete or sealant when tested at 140°F.

2. Fibers - Polyester, fully drawn.

Length	10 mm [0.4 in] (max)
Denier	15 dpf (max)
Tenacity	4 gpd (min)
Crimp	none
Color	natural

## Fiber Reinforced Low Modulus Crack Sealant Material Properties:

Fiber concentration        0 to 5 % by weight of Low Modulus Crack Sealant Material; uniform dispersion of fibers

Blending of the fibers with the low modulus crack sealant material shall be in accordance with the recommendations of the manufacturer of the fibers. The % of fibers to be added will be at the Contractor's discretion with final adjustments and approval made by the Department. The asphalt-fiber compound shall be thoroughly mixed before application can begin, and continue if new material is added during the day.

Equipment    Equipment used in the performance of the work shall be subject to the Resident's or authorized representative's approval and shall be maintained in a satisfactory working condition at all times.

(a) Air Compressor: Air compressors shall be portable and capable of furnishing not less than 4 yd<sup>3</sup> of air per minute at not less than 120 psi pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

(b) Sweeper: Manually operated, gas powered air-broom or self-propelled sweeper designed especially for use in cleaning pavements shall be used to remove debris, dirt, and dust from the cracks.

(c) Hot Air Lance: Should operate with propane and compressed air in combination at 2000°F - 3000°F, exit air heated at not less than 120 psi. The lance should draw propane from no smaller than a 100 lb tank using separate hoses for propane and air draw. The lance shall be designed in such that the flame does not come in contact with the pavement. The hoses shall be wrapped together with reflectorized wrap to keep them together and to protect workers in low light situations.

(d) Hand Tools: Shall consist of V-shaped squeegee, brooms, shovels, metal bars with chisel shaped ends, and any other tools which may be satisfactorily used to accomplish this work.

(e) Melting Kettle: The unit used to melt the packaged joint sealing compound shall be a double boiler, indirect fired type. The space between inner and outer shells shall be filled with a suitable heat transfer oil or substitute having a flash point of not less than 608°F. The kettle shall be equipped with a satisfactory means of agitating and mixing the joint sealer at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or a continuous circulating gear pump attached to the heating unit. The kettle must be equipped with thermostatic control calibrated between 200°F and 550°F.

(f) Application Wand: The application wand shall apply a controlled flow of material via an insulated or heated hose. The nozzle shall distribute the material as called for in this specification. A pressure regulator shall be provided to regulate pressure at the nozzle. A bypass line into the holding tank is required for use when the nozzle is shut off.

## **B.) Fiber Reinforced Modified Asphalt compound consisting of:**

The sealant shall be a modified asphalt-fiber compound designed specifically for improving the strength and performance of the parent asphalt sealant.

(a) The asphalt binder shall consist of a blend of neat asphalt binder, chemically modified crumb rubber

(CMCR), and a polymer package, all of which meet the following specifications:

The binder will meet PG 64-28E requirements after modification including:

PG grade requirements of ASHTO M320  
Requirements of AASHTO P70/MP19

Modification, at a minimum, shall consist of adding 7% crumb rubber, and the maximum particle size for the recycled tire rubber shall be 80 mesh (#80 sieve)

The asphalt supplier shall provide testing for both the neat and modified asphalt binders

See below for typical modified test results for 64-28E with crumb rubber:

DSR ORIGINAL

kPa >1.00 @ 64° C. Fail temp = 76+° C

DSR RTFO.

kPa >2.20 @ 64° C. Fail temp = 76+° C

MSCR

J<sub>NR</sub>: 3.2 E <0.5% @ 64° C R3200 (Average% Recovery): >70%

DSR PAV

kPa <6000@ 64° C

Stiffness <300@ -18° C.

M-Value >0.300@ -18° C

(b) Fiber reinforcing materials shall be short-length polyester fibers having the following properties:

Length*	0.25 in. ± 0.02 in.
Elongation at Break (ASTM D2256-90)	35% ± 3%
Melting Point (ASTM D3418-82)	>475°F
Crimps/Inch (ASTM 03937-90)	None
CrossSection	Round
Denier (ASTM D1577-90)	4.5 Nominal dpf
Tensile Strength (ASTM D2256-90)	>70,000 psi
Diameter	0.0008 in.**
Specific Gravity (ASTM D792-91)	1.32 to 1.40

\* At temperatures ranging from ambient to maximum finished product mix temperature

\*\* Subject to normal variations

The modified asphalt-fiber compound shall be mixed at a rate of 8% fiber (weight to weight) of asphalt cement unless otherwise approved by the Department.

The asphalt-fiber compound shall be thoroughly mixed for a minimum of one hour before application can begin. To ensure a uniform fiber distribution in the sealant, and also to limit fluctuations in the application

temperature of the blended material, the contractor must have a full melter of sealant mixed, heated to the proper application temperature, and ready for testing at the start of each work day. Once that batch of sealant is emptied from the melter, crack sealing operations will cease for the remainder of the day. No new materials will be allowed to be added to the melter during the work day under any circumstances. Minimum application temperature shall be 320°F.

The Contractor shall supply the melter unit by means of a 3,000 to 5,000 gallon bulk tanker, filled at the asphalt suppliers facility, and accompanied by the a bill of lading, and material data sheet.

A Manufacturer's certificate of material compliance will be furnished to the Department certifying conformance to the above material specifications, including the following:

- Performance Grade of Unmodified Asphalt: PG 64-28S (standard) AASHTO M-320, Table 1
- 7% chemically-modified crumb rubber (CMCR) Composed of 100% 80-mesh recycled tire rubber
- 3-4% specially formulated polymer package
- Performance Grade of Modified Asphalt: PG 64-28E (able to withstand "extremely heavy" traffic loads)
- 8% polyester reinforcing fibers

Blending of the fibers with the modified asphalt binder shall be in accordance with the recommendations of the manufacturer of the fibers, and approval made by the Department.

The contractor shall provide the Resident or authorized representative with a copy of the material manufacturer's recommendations for the sealant material being provided pertaining to heating, application, and reheating prior to the beginning of operations or the changing of materials.

Equipment Equipment used in the performance of the work required by this section of the specification shall be subject to approval by the Department, and maintained in a satisfactory working condition at all times.

(a) Air Compressor: Air compressors shall be capable of furnishing not less than 100 cubic feet of air per minute at not less than 120 psi pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.

(b) Sweeper: Manually operated, gas powered air-broom or self-propelled sweeper designed especially for use in cleaning highway and airfield pavements shall be used to remove debris, dirt and dust from the cracks.

(c) Hot Air Lance: Should operate with propane and compressed air in combination at 2000°F - 3000°F, exit air heated at not less than 120 psi. The lance should draw propane from no smaller than a 100 lb tank using separate hoses for propane and air draw. The lance shall be designed in such that the flame does not come in contact with the pavement. The hoses shall be wrapped together with reflectorized wrap to keep them together and to protect workers in low light situations.

(d) Melter: The unit used to melt or maintain the modified asphalt crack sealant compound shall have an

approximate capacity of 1,000 gallons, and be equipped to maintain the sealant compound at the recommended application temperature. The unit shall be of the indirect fired type, and shall be equipped with a remote heat exchanger and hot oil circulation pump capable of maintaining a consistent temperature of the heat transfer oil. The heat transfer oil shall be circulated to all sides and the bottom of the tank containing the crack sealant compound making a continuous loop back to the heat exchanger and having a flash point of not less than 600°F. The melter shall be equipped with a satisfactory means of agitating the crack sealant at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or by a circulating gear pump attached to the melter. The melter must be equipped with a thermostatic control calibrated between 200°F and 550°F, and must be capable of pumping an 8% fiber content blend.

(d) Hand Tools: Shall consist of V-shaped squeegee, brooms, shovels, metal bars with chisel shaped ends, and any other tools which may be satisfactorily used to accomplish this work.

(e) Application Wand: The application wand shall apply a controlled flow of material via an insulated or heated hose. The nozzle shall distribute the material as called for in this specification. A pressure regulator shall be provided to regulate pressure at the nozzle. A bypass line into the holding tank is required for use when the nozzle is shut off.

### GENERAL CONSTRUCTION REQUIREMENTS

Weather Crack Sealant Material shall not be applied on a wet surface, after sunset or before sunrise, or when the atmospheric temperature is below 50°F in a shaded area at the job site, or when weather conditions are otherwise unfavorable to proper construction procedures.

Equipment Equipment used in the performance of the work shall meet the requirements of the material and equipment option selected by the Contractor, and approved by the Department. Equipment shall be maintained in a satisfactory working condition at all times.

Preparation All cracks greater than 1/4 inch shall be blown free of loose material, dirt, vegetation, and other debris by high pressure air. Material removed from the crack shall be removed from the pavement surface by means of a power sweeper or appropriate hand tools as required. Cracks showing evidence of vegetation after being blown out shall be additionally cleaned by appropriate hand tools and additionally blown out. All cracks must be blown and heated via the hot air lance a maximum of 5 minutes prior to the crack being sealed. Distance between the hot air lance and the crack sealing unit should be no more than 50 ft to eliminate reinvasion of water, debris, and other incompressible material. All debris, vegetation, and water shall be removed to enhance adhesion of the crack sealing material. **THIS WORK SHALL NOT BE DONE IN INCLEMENT WEATHER.**

Preparation and Placement of Sealer The crack sealant material shall be heated and applied at the temperature specified by the manufacturer and approved by the Resident or authorized representative. Any material that has been heated above the manufacturer's specification shall not be used. Material that is reheated or held at temperature for an extended period of time may be used as allowed by the manufacturer's specification and approval of the Resident or authorized representative. The Contractor shall provide the Resident or authorized representative with a suitable device for verifying the sealant temperature in the kettle and at the application site. Any over application or spills are to be removed to the satisfaction of the Resident or authorized representative. Any sealed areas with damaged or contaminated sealer or visible voids are to be removed, prepared and resealed at no additional cost to the Department.

Sealer shall be delivered to the crack while the cracks are still hot from the hot air lance preparation through a pressure hose line and applicator shoe. The sealer overbanding area shall be kept to a minimum and not exceed a maximum of 1 1/2 inch wide and 3/32 inch thick. The applicator shall be followed by a V-shaped squeegee to minimize the thickness of the overband. Any loose material on the surface or in the crack, which may contaminate the crack sealer or impede bonding of the sealant to the pavement, is to be removed by hand tools prior to crack filling. No crack filling material shall be applied in a crack that is wet or where frost, snow, or ice is present. The ambient air temperature must be 50°F or higher.

Blotter material such as Glenzoil, Black Beauty or an equivalent material approved by the Department shall be provided by the Contractor and shall be applied to the crack sealer to prevent pickup and tracking. Blotter material shall be incidental to the crack seal item.

Quality of Work Excess of spilled sealer shall be removed from the pavement by approved methods and discarded. Any quality of work determined to be below normal acceptable standards will not be accepted, and will be corrected and/or replaced as directed by the Resident or authorized representative at no additional cost to the Department.

Method of Measurement Low Modulus or Fiber Modified Asphalt Crack Sealer will be measured by the pound of sealant used. The manufacturer's weights of the sealant will be accepted as the basis for measurement. The Department may, at their discretion, take material samples to verify the manufacturers weights provided. Materials supplied by the gallon will be accompanied by a bill of lading and material certification specifying the pound per gallon conversion, and provide an accurate means to verify gallons used daily in order to accurately convert gallons to pounds.

Basis of Payment The accepted quantity of Low Modulus or Fiber Modified Asphalt Crack Sealer will be paid for at the contract unit price per pound complete in place. This price shall be full compensation for furnishing and placing crack sealer, including cleaning cracks and furnishing and placing barrier or blotter materials if necessary.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
424.3331 Low Modulus Crack Sealer, Applied	Pound

SPECIAL PROVISION  
SECTION 606  
GUARDRAIL  
(Removed and Reset)

606.09 Basis of Payment: This Section of the Standard Specifications is amended by the addition of the following:

Payment will be made under:

Pay Item

Pay Unit

606.36          Guardrail Removed and Reset

Linear Foot