Portable Toilet: Provide a portable toilet for use by the Field Laboratory personnel and service weekly or as directed.

Cleaning Equipment: Broom, dustpan, mop and pail.

Printer: Provide one printer with toner and paper capable of connecting to a laptop via USB port.

**Method of Measurement.** The Engineer will measure the acceptably completed work as follows:

Superpave Combo Field Laboratory, complete in place, ready for operation by the lump sum.

**Basis of Payment.** The Department will pay for accepted quantities at the contract unit price as follows:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP Superpave Combo Field Laboratory</td>
<td>LS</td>
</tr>
</tbody>
</table>

Any other items required to complete the installation and removal will not be measured separately but included in this item.

No separate payment will be made for furnishing and maintaining the Field Laboratory, parking area, equipment, or any other costs related to the operation of the Field Laboratory. The Department considers restoration of the Field Laboratory site incidental to the cost of the item. If required, the Department considers an additional printer for the Gyro Compactor an incidental cost.

**S909-05A ARAMID FIBER REINFORCEMENT FOR HMA**

*Description.* Furnish all materials, equipment, labor, incidentals for uniformly mixing aramid fiber into hot mix asphalt (HMA) when aramid fiber is specified as a mixture ingredient.

**SUBMITTALS**

Submit the following.

1. Identification of the Contractor’s mixing plant.
2. Representative fiber product sample.
3. Acceptable product data sheet together with certified test results from the manufacturer.
4. A mixing plan including procedures, equipment for continuously feeding the aramid fiber into the asphalt and provide description of training of contractors mixing technician as well as the method of recording daily feed records of aramid fiber. The fiber supplier must approve the mixing plan.

**JOB MIX FORMULA**

When aramid fiber is required as a mixture ingredient, modification to the job mix formula is not required.

**DELIVERY AND STORAGE**

Deliver aramid fibers in sealed, undamaged containers with legible labels, intact, indicating material name and, lot number.

Store the aramid fiber in accordance with the fiber supplier recommendations. Store fibers in a dry environment and do not allow them to be in contact with moisture. If fibers are contaminated or wet, they must be rejected and replaced at no additional cost.
QUALIFICATIONS

Prior to paving, supply proof of supplier qualifications for the personnel operating the fiber distribution equipment.

Materials.

The aramid fiber properties shall meet the following specifications:

<table>
<thead>
<tr>
<th>Property</th>
<th>Measure</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Fibrillated and monofilament Fibers, non-resin impregnated</td>
<td>Manufacturer Certification</td>
</tr>
<tr>
<td>Length</td>
<td>¾” +/- 1/16”</td>
<td>Manufacturer Certification</td>
</tr>
<tr>
<td>Filament Diameter</td>
<td>0.00047” (12 microns) +/- 2 microns</td>
<td>Manufacturer Certification</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.44 +/- 0.01</td>
<td>ASTM D276</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>400,000 psi Minimum</td>
<td>ASTM D3379</td>
</tr>
<tr>
<td>Tensile Elongation</td>
<td>1.8 %</td>
<td>ASTM D3379</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>800 degrees F Minimum</td>
<td>ASTM D 276</td>
</tr>
<tr>
<td>Acid and Alkali Resistance</td>
<td>Inert</td>
<td>Manufacturer Certification</td>
</tr>
</tbody>
</table>

Supply approved aramid fibers and an approved delivery system as produced by the following company.

Forta-Fi Fiber
FORTA Corporation
100 Forta Drive
Grove City, PA 16127
(800) 245-0306

ACE Fiber
Surface Tech
111 SW Fifth Ave., Suite 1940
Portland, OR 97204
(503) 477-4740

Construction Requirements. Mix into HMA at the batch or drum plant 2.1 ounces (+/- 5 %) of pure aramid fiber per ton

INDIVIDUAL UNIT PACKAGES SHALL NOT BE AN ACCEPTABLE METHOD OF FEEDING THE PRODUCT INTO THE HMA PLANT.

Have the fiber manufacturer’s representative on site during the first three days of production mixing. This requirement can be waived if fiber supplier and HMA producer can supply evidence of supplier’s brand of fiber being successfully produced a minimum of three times at the asphalt plant to be used for the project. Contractor shall have supplier-qualified personnel operating the fiber distribution equipment at all times.

Introduce the fiber as follows:

1. Batch Plant

   When a batch plant is used, add fiber to the aggregate in the weigh hopper and increase both dry and wet mixing times, as required by the fiber supplier Representative. Ensure the fiber is uniformly distributed before the injection of asphalt cement into the mixture. If there is any evidence of clumps of fibers at the discharge chute, increase the mixing time and/or temperature to provide an acceptable mix.

   Add fiber through specialized equipment that can accurately proportion and meter, by weight (mass) the proper amount per batch or provide pre-weighed aramid fibers through metering devices that
record the addition of fibers to the batching operation and controlled to +/- 10% by mass weight of the fibers required. Calibrate the equipment to the satisfaction of the fiber supplier representative to show the fiber is being accurately metered in the mix. Include in the fiber supply system an automated recording and print-out of each bag with date and time stamp. Make this data available to an Excel spreadsheet.

2. Drum Plant

When a drum plant is used, do not allow fibers to become entangled in the exhaust system. As recommended by the fiber supplier, inject fibers through the RAP collar by placing fibers on the RAP belt or by feeding them through a blower tube system.

Add fiber through specialized equipment that can accurately proportion and meter, by weight (mass) the proper amount in a continuous and uniform manner. Provide proportioning devices that are interlocked with the plant system and controlled to +/- 10% of the weight (mass) of the fibers required. Calibrate the equipment to the satisfaction of the fiber supplier representative to show the fiber is being accurately metered and uniformly distributed into the mix (visual inspection). Include the following in the fiber supply system.

- Low level indicators
- No-flow indicators
- A printout of feed rate status in pounds per minute
- A section of transparent pipe in the fiber supply line for observing flow.
- Have a Manufacturer’s representative approve all fiber addition systems.

Visually observe the fiber reinforced HMA at the plant and in the first three trucks at the point of discharge and prior to delivery to the job site. Observation shall include using a shovel or other device. Record aramid fiber mixing observations for every 10th truck thereafter.

Acceptance of the mix will include the following factors:

1. Aramid fiber is properly proportioned based on documentation comparing fiber feed to HMA mix production on a daily basis.

2. By visual inspection at the end of the mixing process, there is no clumping of fibers and the fibers are uniformly distributed and the visible fiber stands are coated in asphalt.

If the supplier fails to deliver the aramid fiber product in a consistent and uniform flow to the plant and incomplete mixing occurs then the Supply Contractor may be suspended from this Contract and a new Supply Contractor contracted to complete the work.

**Method of Measurement.**

The Aramid Fiber Reinforcement for HMA shall be measured by the number of ounces (pounds) of aramid fiber delivered to the plant per ton of HMA. This will be based on the aramid fiber daily feed records to the mixing drum in the asphalt plant and the Contractor shall be responsible for insuring that the correct aramid fiber feed rate is maintained per ton of HMA output from the plant.

The pay quantity for Aramid Fiber Reinforcement for HMA shall not include any which is lost, displaced, used in reworking, used in restoration work or which is contrary to specifications or the direction of the Engineer. No separate measurement or payment will be made for the approved delivery system which shall be incidental to the quantity of Aramid Fiber Reinforcement for HMA.
**Basis of Payment.** Payment for accepted work will be made as follows:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aramid Fiber Reinforcement for IMA</td>
<td>LB</td>
</tr>
</tbody>
</table>

Payment for Aramid Fiber Reinforcement for HMA shall include furnishing all materials, equipment, feed system, tools, labor, fiber manufacturer’s representatives, and incidentals necessary to complete the work as specified.

Total project weight in pounds is based on the delivery of pure aramid fibers and does not include Polyolefin (PO) fiber or Sasobit® WAX

**S910-05A SP SHOULDER GRADING**

**Description.** This work shall consist of blading, processing and finishing material on the roadway shoulders to match the new edge of the new overlay surface. A separate pass of shoulder grading may be required at select locations before paving.

**Materials.** Existing shoulder materials and Shoulder Aggregate S914-05A shall be used.

**Construction Requirements.** Cut existing vegetation to within 6 inches of the ground prior to shoulder grading. Blade existing shoulder material away from the pavement edge and form windrows parallel to the roadway. Process the windrowed material to break up grass clumps prior to blading into final position. When required, add Shoulder Aggregate S914-05A in sufficient quantities to match the Plans. Blade the windrowed material and Shoulder Aggregate back to the pavement edge to form a smooth slope with the paved roadway edge as shown in the plans or as directed. Compact the shoulder with a single pass of a roller or as approved. The Contractor shall not damage the new overlay. Appropriate traffic control shall be used to accomplish this work. Any delineators, mileposts, or signs damaged during this operation will be replaced with new ITD approved materials at the Contractor’s expense. Broom the pavement to remove aggregate and shoulder material remaining on the overlay surface.

**Method of Measurement.** Shoulder Grading will be measured by the mile worked for each direction of travel. If Shoulder Grading is required prior to paving, that additional grading operation will be paid separately from post paving Shoulder Grading.

**Basis of Payment.** Payment for accepted work will be made as follows:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Grading</td>
<td>Mile</td>
</tr>
</tbody>
</table>

Watering, mowing, compaction, brooming and cleanup will be considered incidental to this item. Aggregate will be paid for under Item S914-05A, Shoulder Aggregate.

**S912-05 MICRO-MILLING**

**Description.** This work shall consist of micro-milling the existing pavement for smoothness.

**Materials Requirements.** Not specified.