



Standard Operating Procedure: Aramid Fiber Layering Method for Mixing

June 16, 2023

In Partnership with



Prepared by:

Zachary McKay

Laboratory Operations Manager

Reviewed by:

Phil Blankenship, P.E.

Owner & Civil Engineer

125 S. Killarney Lane • Richmond KY 40475-2309

PO Box 1656 • Richmond KY 40476-1656

Zack@BlankenshipAsphaltTech.com

Office: (859) 544-6200

Cell: (859) 200-3377

Fiber Layering Method for IDEAL-CT & HWT

The Standard Operating Procedure (SOP) was developed by Blankenship Asphalt Tech & Training in partnership with Surface Tech.

Sample Preparation

1. Prepare a batch that after mixing will produce three (3) IDEAL-CT or HWT specimens of 62 mm height and 150 mm diameter.
 - a. Typically, a minimum of 2500 g is needed to produce a single specimen with 7.0% air voids. Therefore, a batch size **greater than 7500 g is needed**.
2. Calculate the amount of aramid fiber using the equation below to determine the necessary amount of fiber needed for the batch.
 - a. Standard dose amount is 2.1 oz/ton (65.6 g/tonne), but dose can be adjusted to meet the required design

Equation:

$$\text{Weight of Fiber (g)} = \text{Dose (oz)} \times 0.00003125 \times \text{Batch Size (g)}$$

$$\text{Weight of Fiber (g)} = \text{Dose (g)} \times 0.000001 \times \text{Batch Size (g)}$$

Where:

Dose is the recommended amount of aramid fiber per ton of mix single or double dose (i.e. 2.1 oz/ton or 65 g/tonne or 4.2 oz/ton or 130 g/tonne)

Batch Size is the size of mix required to produce three replicate samples

Example for 2.1 oz/ton of uncoated fiber:

$$\text{Weight of Fiber (g)} = 2.1 \text{ oz} \times 0.00003125 \times 7700 \text{ g}$$

$$\text{Weight of Fiber (g)} = 0.505\text{g}$$

Example for 65 g/tonne of uncoated fiber:

$$\text{Weight of Fiber (g)} = 65.6 \text{ g} \times 0.000001 \times 7700 \text{ g}$$

$$\text{Weight of Fiber (g)} = 0.505\text{g}$$

Online Calculator: www.battlab.us/calculators

3. After calculating the amount of aramid fiber needed, weigh up fiber and separate bundles finely by hand until fibers are separated into individual fiber strands.
4. Divide fibers into three equal amounts and place into respective containers.
 - a. This makes addition of fiber easy and cuts down on mix prep time
5. Heat aggregates, RAP, and binder to mixing temperature in preparation for mixing.
6. Follow the steps below to layer the mix into three layers in the mixing bowl. Each layer will consist of Aggregate and/or RAP with fiber spread on top of the aggregate.

Step 1 – Add RAP and Aggregate to bowl. Spread into even layer in bowl.



Step 2 – Layer separated fiber on top Aggregate and RAP, then gently stir fiber into Aggregate and RAP.



Step 3 – Add second layer of RAP and Aggregate. Spread evenly.



Step 4 – Add second layer of separated fiber on top of RAP and Aggregate. Gently stir fiber into RAP and Aggregate.



Step 5 – Repeat steps 3 and 4 to add the third layer of RAP, Aggregate, and Fiber.

Step 6 – Form crater in center material and pour Binder.



Step 7 – Fold Aggregate and RAP over Binder and place bowl into mixer. Mix sample until mixture is sufficiently coated.





Step 8 – After mixing, split mix into three pans for conditioning. Each pan should contain enough material to compact one IDEAL-CT or HWT specimen.