

**Attachment 10**

**Detailed Specifications**

**Warm Mix Asphalt with Polymer Fibers**

**2021 VPP NYSDOT**

**Specific Projects**

**(Federal & State Funds)**

**IFB# 23225**

**DESCRIPTION**

This work shall consist of developing, producing, and paving a Warm Mix Asphalt (WMA) mixture. WMA is standard HMA produced using a WMA technology typically resulting in a production mixture temperature of 275°F or lower.

WMA pavement course shall be constructed in accordance with this specification and in reasonably close conformity with the required lines, grades, thicknesses, and typical sections shown on the plans or established by the Engineer. The Contractor is responsible for compacting pavement to a specified density requirement.

The words “hot mix asphalt” and “HMA” in the standard specifications and other documents referenced by this specification shall apply to WMA.

**MATERIALS**

Requirements of §401-2 and §402-2 shall apply except as noted herein.

1. **WMA Technology.** Use a WMA technology appearing on the State’s Approved List for Warm Mix Asphalt Technologies.
2. **Fibers.** Use polymer fibers such as polyester or similar in combination with Aramid fibers. The Aramid fiber shall be in the range of 2.0 to 2.5 ounce per pound of total fiber. The polymer fibers shall have a minimum decomposition temperature of no less than 250°F. The Aramid fibers shall meet the physical requirements of Table 1 – *Aramid Fiber Properties*.

<b>Table 1 – Aramid Fiber Properties</b>	
Length	¾ in. ± 1/16
Form	Fibrillated & Monofilament Fibers, non-resin impregnated
# of filaments per strand	1,000
Specific Gravity	1.44 +/-0.01
Filament diameter	12 microns +/- 2 microns
Acid/Alkali/ Resistance	Inert
Tensile Strength, minimum	400,000 psi
Decomposition Temperature	800° F, minimum

Deliver fiber-reinforcement in sealed, undamaged containers with legible labels, intact, indicating material name, and lot number. Store the fibers in accordance with manufacturer's recommendations. As a general rule protect fibers from UV radiation and do not allow boxes to become wet or contaminated. Discard any fibers that are contaminated or wet and replaced at no additional cost to the Department.

**3. WMA Design.** Design a mixture using a WMA Technology in accordance with MM 5.16, *Superpave Hot Mix Asphalt Mixture Design and Mixture Verification Procedure*. At a minimum, a one point verification of the mixture's volumetric properties is acceptable for the following situations:

- When the WMA mix design is based on an existing Production Status HMA mix design.
- When the WMA mix design utilizes a different WMA technology than an existing Production Status WMA mix design.

Comply with the manufacturer's recommendations for incorporating the WMA technology. Notify the Regional Material Engineer (RME) how the WMA technology will be incorporated prior to fabricating the test specimens. Test specimens may be made from plant produced or laboratory prepared WMA. Test specimens must be made from plant produced WMA if adding the WMA technology in the lab does not simulate the production process. The RME may require a State representative be present during the fabrication and testing. Submit the WMA design to the RME for review and verification at least 14 calendar days before production, including:

- Name of WMA technology being used and the target dosage rate.
- If using an additive other than water, oSubmit a MSDS for the additive.
  - o Submit either enough of the additive for the laboratory mix design verification, or the additive pre-blended in the PG Binder at the correct dosage. If the additive is not pre-blended into the PG Binder, include directions for properly incorporating the additive into the laboratory made mixture.

Prior to the submission of any mix design, contact the RME to determine if there is an increased concern regarding the mixture's moisture susceptibility based on the WMA technology and/or the type of aggregate being used, or the performance of similar mixes. The RME may require AASHTO T 283 moisture susceptibility test results, meeting a minimum Tensile Strength Ration (TSR) of 80%, as part of the mix design submission.

Submit Production Quality Control Plan revisions incorporating the WMA technology if not previously submitted.

### **CONSTRUCTION DETAILS**

Requirements of §401-3 and §402-3 shall apply except as modified below:

**Mix Temperature.** Select a desired WMA mixture temperature within the mixing and compaction range as recommended by the WMA technology provider. If the asphalt mixture is being placed over a *SheetApplied Waterproofing Membrane*, maintain a minimum delivery temperature in accordance with the Material Detail Sheets prepared by the membrane manufacturer.

For 80 Series compaction method, complete all breakdown roller passes before the mat temperature falls below 230°F, unless approved by the Director, Materials Bureau.

## 404.XXYZQ409 - WARM MIX ASPHALT WITH POLYMER FIBERS

---

**Fibers.** Add fibers to the asphalt mixture at a rate of at least one pound per ton of mixture through specialized equipment that can accurately proportion and meter, by weight of total mix, during production of asphalt mixture. Calibrate the equipment to the satisfaction of the Representative to show the fiber is being accurately metered and uniformly distributed into the mix (visual inspection). When a batch plant is used, pre-weighed fibers bags may be added per batch to provide the designed quantity of fibers in the asphalt mixture. Additional requirements for plants are as follows:

- 1. Batch Plant.** When a batch plant is used, add fibers to the aggregate in the weigh hopper and follow the manufacturer's recommendations for both the dry and wet mixing times. Ensure the fiber is uniformly distributed before the injection of asphalt cement into the mixture.
- 2. Drum Mixer Plant.** When a drum plant is used, do not allow fibers to become entangled in the exhaust system. If there is evidence of clumps of fibers at the discharge chute or on the project, stop production of asphalt mixture and follow the fiber manufacturer's procedures to reduce clumping.

Provide proportioning devices that are interlocked with the plant system and controlled to  $\pm 10\%$  of the weight of the fibers required. Include the following in the fiber supply system:

- Low level indicator.
- No-flow indicator.
- Printout of feed rate status.
- A section of transparent pipe in fiber supply line for observing flow.
- Have manufacturer's representative approve all fiber supply systems.

### **METHOD OF MEASUREMENT**

Provisions of §401-4 and §402-4 shall apply.

### **BASIS OF PAYMENT**

Provisions of §401-5 and §402-5, *Basis of Payment*, apply except that the bid price shall include the cost of fibers, feeder, and labor for the production of WMA mixtures with fibers.

<b>Item No.</b>	<b>Item Description</b>	<b>Pay Unit</b>
404.05890409	Shim Course F9 WMA with Polymer Fibers, 80 Series Compaction	Ton
404.06820409	6.3 F2 Top Course WMA with Polymer Fibers, 80 Series Compaction	Ton
404.09520409	9.5 F2 Top Course WMA with Polymer Fibers, 50 Series Compaction	Ton
404.09620409	9.5 F2 Top Course WMA with Polymer Fibers, 60 Series Compaction	Ton
404.12520409	12.5 F2 Top Course WMA with Polymer Fibers, 50 Series Compaction	Ton
404.12620409	12.5 F2 Top Course WMA with Polymer Fibers, 60 Series Compaction	Ton
404.19590409	19 F9 Binder Course WMA with Polymer Fibers, 50 Series Compaction	Ton
404.19690409	19 F9 Binder Course WMA with Polymer Fibers, 60 Series Compaction	Ton
404.00001109	Plant Production Quality Adjustment to WMA Items	Quality Unit
404.00002109	Pavement Density Quality Adjustment to WMA Items	Quality Unit
404.00005109	Test Section Adjustment to WMA Items	Quality Unit