

**ITEM 400HS STANDARD SPECIFICATION FOR  
ASPHALT CONCRETE - HIGH STRESS  
USING POLYPROPYLENE FIBERS**

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*This Specification has been developed by Flexible Pavements, Inc., an Association for the development, improvement and advancement of quality asphalt pavement construction in Ohio. The most current update of this document can be obtained by contacting Flexible Pavements, Inc. at 1-888-4 HOT MIX.*

**400HS.01 General**

**400HS.02 Composition**

**400HS.03 Acceptance**

**400HS.04 Basis of Payment**

**400HS.01 General.** This work shall consist of furnishing, placing and compacting surface or intermediate courses of hot mix asphalt, designed for high stresses, on a prepared surface in accordance with these specifications and in reasonably close conformity with the lines, grades, and typical sections shown on the plans or established by the owner representative.

Where reference is made to ODOT requirements, the requirements of The Ohio Department of Transportation, Construction and Materials Specifications, current edition shall apply.

Hot mix asphalt shall be placed by weight per unit of area as determined by the thickness shown on the plans or in the proposal and weight to volume conversion factors specified under method of measurement, ODOT, 401.17.

The requirements of ODOT, 441 and 446 shall apply; deviations from these are as shown.

Tack coat, when required, and the use of reclaimed material also shall meet ODOT requirements.

When used in this specification, the term "owner" is to be understood as the entity having ownership of the facility for which the work has been contracted.

**400HS.02 Composition.** The hot mix asphalt mixture designed for high stresses shall be composed of aggregate, asphalt binder and fibers. Aggregate and asphalt binder shall meet ODOT requirements. Fibers shall meet the manufacturers' requirements as detailed in the mixture specifications provided herein.

The contractor shall furnish a JMF (Job Mix Formula) or ODOT Bituminous Concrete Data Sheet suitable for the purpose of pavement construction. The JMF shall be established within the composition limits for the high stress mixture. Prior to producing material for this contract, the contractor shall submit to the owner representative, for approval, a JMF or data sheet. The JMF shall include the mix type being used, aggregate type and gradation, percentage of asphalt binder by weight of mixture, grade of asphalt binder, source of the polypropylene fibers and unit weight of the mixture. The JMF, or data sheet, shall have previously been approved for use on ODOT work. Where no previously approved JMF is available, one shall be developed meeting all criteria established herein and shall be reviewed by an independent testing laboratory prior to submission to the owner representative. The person performing the review for the testing laboratory must be of its employ and shall have a current Level II Bituminous Concrete Certification from the Ohio Department of Transportation. The independent testing laboratory shall certify to the owner the mix design is accurate, complete, and meets the requirements of this specification. Costs for performing this review shall be included in the price per unit of mix.

For surface courses except where noted below, the gradation and mixture requirements of ODOT, 441, type 1H shall apply. Intermediate course mixtures, except where noted below, shall meet the gradation and mixture requirements of ODOT, 441, type 2.

Mixtures shall be designed for HEAVY traffic.

Coarse aggregate retained on the 4.75 mm (No. 4) sieve shall be a minimum of 100% mechanically crushed particles (ODOT Mechanical Crush Definition).

A maximum of 10% natural sand may be used.

Mixture composition shall include polypropylene fibers. Fibers shall be specifically manufactured and drawn for use in bituminous concrete mixes. The fibers shall have a uniform singular color and shall meet the following requirements:

Fiber Type	Polypropylene
Material	FIBER PAVE 3010 PolyPROpylene
Manufactured By	Hercules, Inc.
Denier; ASTM D - 1577*	4 ± 1
Length, mm	9.91 ± 2.0
(inch)	(0.39 ± 0.08)
Crimps; ASTM D - 3937	None
Tensile strength, minimum, MPa (psi); ASTM D - 2256*	276 (40,000)
Specific gravity	0.91 ± 0.04
Melting temperature, minimum, °C, (°F)	160 (320)

\*This data must be obtained prior to cutting the fibers.

The contractor shall design the mix in accordance to ODOT specification 441.02 using the fiber type to be incorporated into the project. The specified rate for introduction shall be 6.0 pounds/ton of total mix.

The asphalt binder, prior to the introduction of the fibers, shall meet PG 64-22.

A maximum of 10% of reclaimed asphalt concrete pavement or reclaimed bituminous aggregate base pavement may be used.

Prior to the start of full production, the contractor shall produce a test batch of fiber asphalt concrete to demonstrate to the owner's representative how the fibers will be introduced and mixed into the asphalt concrete. Satisfactory results shall be achieved before full production will be allowed. If during production the contractor begins to get an unsatisfactory mix, production shall cease until the contractor can produce a satisfactory test batch as described above.

When a batch type plant is used, the fibers shall be added as per the manufacturer's recommendation to the heated aggregate prior to introduction of the asphalt cement. The aggregate and fibers shall be mixed dry for a minimum of 10 seconds after introduction of the fibers. The owner representative may increase this mixing time, if satisfactory results are not obtained.

When a drum mix type plant is used, the fibers shall be introduced per the direction of the fiber manufacturer.

If a mechanized delivery system is used for either a batch plant or a drum mix type plant, it must be capable of delivering the fiber on a by weight basis and provide the necessary automatic printed recordation to document the fiber introduction rate in a manner approved by the owner's representative.

For mixtures incorporating polypropylene fibers, the mixing temperature shall not exceed 143°C (290°F).

**400HS.03 Acceptance.** Acceptance of the mixture shall be in accordance with ODOT, 446.05, except that an independent testing laboratory shall test the cores in accordance with ODOT Supplement 1036 and report the data to the owner's representative for the purpose of calculating the pay factor. The person testing the cores shall have a current Level I Bituminous Concrete Certification from the Ohio Department of Transportation. Costs for the acceptance testing shall be included in the price per unit of mix.

Table A of ODOT, 446.05 shall be modified as follows:

**Mean of 10 cores as percent of daily MSG**

93.0% or greater	1.00
92.0% to 92.9%	0.97
91.0% to 91.9%	0.94
90.0% to 90.9%	0.88
Less than 90.0%	*

\*The owner will determine whether the material will remain in place. The pay factor for such material allowed to remain in place will be 0.70.

**400HS.04 Basis of Payment.** Payment for accepted quantities of mix, complete in place, will be made at the contract price for:

<b>Item</b>	<b>Unit</b>	<b>Description</b>
400HS	Cubic Yard	Asphalt Concrete - High Stress, Surface Course
400HS	Cubic Yard	Asphalt Concrete - High Stress, Intermediate Course