MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
WARRANTY WORK REQUIREMENTS FOR HOT MIX ASPHALT ULTRA-THIN OVERLAY (CAPITAL PREVENTIVE MAINTENANCE)

CFS:DJW 1 of 5 APPR:KPK:RAG:09-25-20
FHWA:APPR:10-02-20

a. Description. This special provision must be used in conjunction with 20SP-500B to construct warranted Low, Medium, and High Volume hot mix asphalt (HMA) Ultra-Thin Overlay. Section 501 of the Standard Specifications for Construction remains in effect except as noted in this special provision.

b. Limits of Warranted Work. The warranted work includes all HMA Ultra-Thin Overlay applications on driving lanes within the project limits unless otherwise indicated in the contract.

c. Warranty Period. The length of warranty will be 2 years from the Acceptance Date of Warranted Work.

d. Amount of Warranty Bond. Supply a warranty bond equal to 100 percent of the warranted work for HMA Ultra-Thin Overlay.

e. Materials. Provide HMA and materials meeting the following requirements:

1. Bond Coat. Ensure the bond coat is an emulsified asphalt in accordance with the requirements of section 904 of the Standard Specifications for Construction, Type SS-1h.

2. HMA Ultra-Thin Overlay. Compose the HMA Ultra-Thin Overlay of a mixture of aggregate, asphalt binder, and if required, mineral filler, as listed in Table 1.

Table 1: HMA Ultra-Thin Overlay Mixture Requirements

Parameter	
Air Voids %	4.5
VMA % (min.) based on Gsb	15.5
Fines/Binder % Maximum	1.4
N_d	35

3. Aggregate Gradation and Physical Properties. Ensure the combined gradation of the aggregate portion of the mixture, including the mineral filler, is within the limits of Table 2. Ensure the physical properties of the combined aggregates meet the criteria of Table 3.

Table 2: HMA Ultra-Thin Overlay Aggregate Gradation

Sieve Size	Total Passing Percent by Weight
1/2 inch	100
3/8 inch	99-100
No. 4	75-95
No. 8	55-75
No. 30	25-45
No. 200	3-8

Table 3: HMA Ultra-Thin Overlay Aggregate Physical Requirements

Parameter	Low Volume Comm. ADT <380	Medium Volume Comm. ADT 380 - 3400	High Volume Comm. ADT >3400
Percent Crush (minimum)	50%	75%	95%
Fine Aggregate Angularity Minimum Criteria	40	43	45
L.A abrasion loss (maximum)	40	35	35
Aggregate Wear Index (AWI)	(a)	(a)	(a)
a. AWI of 220 is required for projects with less than or equal to 2000 ADT, projects with ADT greater than 2000 the minimum AWI requirement is 260.			

In addition, the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles which are structurally weak or are found to be non-durable in service must not exceed 8.0 percent.

4. Performance Graded (PG) Asphalt Binder. Binder selection is based on present day two-way commercial ADT as listed in Table 4. Ensure the PG binder meets all the requirements in section 904 of the Standard Specifications for Construction. Substitution of reclaimed asphalt pavement (RAP) for part of the new materials required to produce the HMA is acceptable as follows: Reclaimed Asphalt Pavement up to 27 percent binder by weight of the total binder in the mixture is allowed with no change in binder grade. For reclaimed asphalt pavement >27 percent RAP binder by weight of the total binder in the mixture, the binder grade for the asphalt binder is selected using a blending chart for high and low temperatures. Supply the blending chart and the RAP test data used in determining the binder selection according to *AASHTO M323*.

Table 4: Asphalt Binder Selection for HMA Ultra-Thin Overlay

Low Volume Comm. ADT <380	Medium Volume Comm. ADT 380-3400	High Volume Comm. ADT >3400
PG 58-28	PG 64 -28P	PG 70-28P

f. Construction.

1. Bond Coat Application. Apply the bond coat material to completely cover the prepared surface at a rate of 0.11 - 0.15 gallons per square yard.

2. Mixture Application Rate. The target application rate is 83 pounds per square yard.

3. Density. Thoroughly compact the mixture immediately after placement.

4. Mix Design. Submit a mix design in accordance with section 501.02 of the Standard Specifications for Construction.

A. Materials Required.

(1) Three samples of mixture at * grams each, at optimum asphalt content (gyratory compaction).

* = grams of mixture to achieve 115 mm ±3 mm height at N_{des}

(2) AWI samples per *HMA Production Manual*.

B. Documentation Required.

(1) Form 1820 - Contractor Bituminous Mix Design Communication.

(2) Form 1923 - Sample Identification. Note: must be included in each sample package.

(3) Form 1813 - Submitted Mix Design Summary Sheet.

(4) Form 1851 - Gyratory Compacted Bulk Specific Gravity Worksheet.

(5) Form 1806 - Theoretical Maximum Specific Gravity.

(6) Form 1849 - Bituminous Mix Design Checklist.

(7) Form 1859 - Coarse Aggregate Gravity.

(8) Form 1860 - Fine Aggregate Gravity

(9) Form 1879 - RAP Stockpile Summary Data Sheet. Note: only if RAP is included in the mixture.

(10) Mix Design Regression Analysis.

(11) Temperature - Viscosity Graph/Table showing mixing and compaction temperatures.

(12) Summary Height Data @ N_{des}. Replicate at all asphalt contents.

g. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
HMA, Ultra-Thin, Low Volume, Warranty	Square Yard
HMA, Ultra-Thin, Medium Volume, Warranty	Square Yard
HMA, Ultra-Thin, High Volume, Warranty	Square Yard

HMA, Ultra-Thin, Low Volume, Warranty; HMA, Ultra-Thin, Medium Volume, Warranty and **HMA, Ultra-Thin, High Volume, Warranty** includes preparing the surface, placing the HMA Ultra-Thin Overlay mixture and complying with all requirements including the warranty. The placement includes placement of a single course of mixture for full width coverage as specified on the plans.

h. Warranty Requirements. The following lists the allowable threshold limit for each condition parameter within each segment and the maximum number of allowable segments within a driving lane during the warranty period. If the threshold is exceeded for a condition parameter, for more than the maximum number of allowable segments, warranty work is required.

The deficient segments for surface distress may or may not be contiguous to necessitate corrective action. The maximum allowable number of deficient segments for each condition parameter applies to each driving lane in each travel direction. Evaluate each driving lane independent of adjacent driving lanes. Ensure any pavement surface requiring removal/replacement to correct deficiencies, for any condition parameter, is replaced full-width across the driving lane.

Perform the warranty work prior to conclusion of the warranty period or within such other time frame as agreed to by the Department and the Contractor, unless safety concerns dictate otherwise.

Maximum Deficient Segments per Driving lane

4 Segments - A combination of one or more surface deficiencies exceeding the allowable threshold limit for rutting, raveling, bleeding/flushing, and debonding.

1 Segment - Rutting exceeding the allowable threshold limit.

1 Segment - Any single surface deficiency for raveling, bleeding/flushing, and debonding, exceeding 10 percent of the segment length.

Threshold Limits and Corrective Action

1. Rutting. A single measure of rut depth must not exceed 1/4 inch for any 528 feet (0.1 mile) segment during the first 120 days after initial project acceptance. Rut depths that average in excess of 1/4 inch are deficient. The average rut depth will be defined by 5 measurements at 100 foot intervals in the segment as determined by the Engineer.

Pavement segments where the original pavement rut depth exceeds 1/2 inch are excluded from the warranty for rutting threshold level. The Contractor will define locations where rutting exceeds 1/2 inch and provide the information to the Engineer. Work cannot begin until the Engineer has verified and accepted the Contractor's list of warranty exceptions. Any subsequent rutting caused from movement of the underlying pavement layers is excluded from the warranty.

The measurement will be done using a straight rigid device that is a minimum of 7 feet long and of sufficient stiffness that it will not deflect from its own weight, or a wire under sufficient tension to prevent sag when extended 7 feet. Measurements will be taken by placing this "straightedge" across the pavement surface perpendicular to the direction of travel. The

straightedge must contact the surface on at least two bearing points with one located on either side of the rut. The straightedge is properly located when sliding the straightedge along its axis does not change the location of the contact points. Rut depth is then measured at the point of greatest perpendicular distance from the bottom of the straightedge to the pavement surface.

Reapply the HMA Ultra-Thin Overlay treatment on segments that have a rutting deficiency. The Engineer may accept alternative corrective measures, based on unique conditions. Place the corrective action on the full lane width.

2. Raveling. The threshold limit for raveling is 8 percent of the segment length.

Corrective action for this parameter requires the Contractor to reapply HMA Ultra-Thin Overlay to the deficient portion of the segment, including shoulders if part of the HMA Ultra-Thin Overlay work. The Engineer may accept alternative corrective measures, based on unique conditions. Place the corrective action on the full lane width.

3. Bleeding/Flushing. The threshold limit for bleeding or flushing is 5 percent of the segment length.

Corrective action for this parameter requires the Contractor to either reapply HMA Ultra-Thin Overlay, diamond grind, or remove and replace the HMA Ultra-Thin Overlay treatment on the deficient portion of the segment, including shoulders if part of the HMA Ultra-Thin Overlay work. Place the corrective action on the full lane width. The Engineer may accept alternative corrective measures, based on unique conditions.

4. Debonding. The threshold limit for debonding is 5 percent of the segment length.

Corrective action for this parameter requires the Contractor to either reapply HMA Ultra-Thin Overlay or remove and replace the HMA Ultra-Thin Overlay on the deficient portion of the segment, including shoulders if part of the HMA Ultra-Thin Overlay work. The Engineer may accept alternative corrective measures, based on unique conditions. Place the corrective action on the full lane width.