MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
FINE TEXTURE MILLING AND MICRO TEXTURE MILLING HOT MIX ASPHALT PAVEMENT

CFS:TGH 1 of 4 APPR:MJB:NDM:08-31-22
FHWA:APPR:09-06-22

a. Description. This work consists of fine texture or micro texture milling, removal, and disposal of existing HMA pavement from the project.

Fine texture milling is intended for use on HMA milling and resurfacing projects where production can be increased by allowing traffic to drive on the milled surface for up to 72 hours.

Micro texture milling is intended for use on Capital Preventive Maintenance (CPM) projects to mill distressed surface seals, address pavement profile, rutting, ride quality, or other deficiencies prior to a CPM surface seal. Micro texture milling may be used on CPM projects to address pavement surface deficiencies as a standalone treatment.

b. Equipment.

1. Fine Texture Milling. Equip the milling machine with a built-in automatic grade control system that can control the longitudinal profile and transverse slope to produce the specified results. Ensure the milling equipment is self-propelled with sufficient power, traction, and stability to remove the existing HMA pavement to the specified depth and cross slope.

Use a milling machine with a minimum overall length of 18 feet and minimum cutting width of 6 feet. Ensure the milling machine is configured with either a 0.3 inch tooth spacing, a 0.6 inch tooth spacing operated at a maximum speed of 40 feet per minute, or approved equal configuration and speed capable of meeting *ASTM E965* testing requirements. Provide longitudinal controls capable of operating from any longitudinal grade reference, 30 foot contact ski minimum or 30 foot non-contact sonic ski minimum. The transverse control must have an automatic system for controlling cross-slope at a given rate.

2. Micro Texture Milling. Equip the milling machine with a built-in automatic grade control system that can control the longitudinal profile and transverse slope to produce the specified results. Ensure the milling equipment is self-propelled with sufficient power, traction, and stability to remove the existing HMA pavement to the specified depth and cross slope.

Use a milling drum with a minimum of three wraps of carbide teeth with a maximum tooth spacing of 3/16 inch. Carbide cutting teeth are required to be uniform in diameter and have a uniform length of ±0.03 inches. Tooth holder blocks are required to be uniform and not cause variations in the cut radius greater than 0.03 inches. Ensure teeth on the revolving cutting drum are continually maintained and replaced as warranted to provide a uniform surface texture. Submit a copy of the drum manufacturer's specifications meeting the requirements of this special provision prior to the start of work.

Equip the milling machine with an integral pickup and conveying device to immediately remove material being milled from the surface of the roadway and discharge the millings into a truck in one operation. Provide a machine with a means of effectively limiting the amount of dust escaping from the milling and removal process.

For non-mainline areas where it is impractical to use the equipment described above, alternative equipment may be permitted with approval of the Engineer. Ensure alternative equipment is capable of providing a textured surface tolerance the same as the mainline milled surface.

c. Construction.

1. Fine Texture Milling. Schedule the milling operation to minimize the duration and placement of traffic on the milled surface. Ensure the milling operation does not proceed more than 5 miles ahead of the paving operation. Coordinate milling and paving operations to minimize the exposure to traffic. The milled surface may be exposed to traffic for a maximum of 72 hours. Failure to overlay the milled surface within the 72 hour time frame will result in the assessment of Liquidated Damages as specified in subsection 108.10.C.2 of the Standard Specifications for Construction in the amount shown in Table 1 below. Repair any damage to the pavement structure resulting from extended exposure of the milled surface to traffic as directed by the Engineer at the Contractor's expense. Maintain the milled surface, including any necessary provisions for adequate drainage, as directed by the Engineer.

Table 1: Schedule of Liquidated Damages for extended traffic exposure on fine texture milled surface

Annual Daily Traffic (ADT)	Dollar Amount per hour
0 - 500	200
>500 – 2,000	400
>2,000 – 10,000	600
Over 10,000	1,000

Ensure the pavement is milled to the depth as specified on the plans and/or in the proposal in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile as directed by the Engineer. The Engineer may adjust the average milling depth by 3/4 inches during each milling pass at no additional cost to the contract to minimize delamination of the underlying pavement course. Ensure the cross slope of the milled surface is established by an automatic cross slope mechanism. Ensure that the milled area is free from gouges, continuous grooves, ridges and has a uniform texture. Ensure the vertical edge created from the milling operation has a maximum horizontal gouge in the vertical edge milling of 1.0 inch. Adjust the mill to meet the maximum 1.0 inch gouge in vertical edge by speed adjustment, drum speed or teeth adjustments as directed by the Engineer. If traffic is to be maintained on the milled surface prior to the placement of the new HMA course, provide suitable transitions between areas of varying thickness to create a smooth longitudinal riding surface. Prior to opening the milled surface to traffic, clean the pavement surface with a power broom or other approved equipment to remove fine material which will create dust under traffic.

Ensure the milled surface has a texture such that the variation from the edge of the 10-foot straightedge to the top of ridge between two ridge contact points does not exceed 1/4 inch.

The difference in height from the top of any ridge to the bottom of the groove adjacent to that ridge will not exceed 1/8 inch. Correct any point in the surface not meeting these requirements at the Contractor's expense.

Ensure the milling operation is providing an acceptable surface texture by achieving a maximum Macro texture of 0.08 inches thickness in accordance with *ASTM E965*. Perform three tests within the first 5,000 square yards of milling, then one test every 7,500 square yards thereafter. If the required maximum depth is exceeded in one of the first three tests, repeat the test procedure until continuous required depths are achieved or the initial 5,000 square yards section will be repeated.

2. Micro Texture Milling. Mill all areas as shown on the plans or as directed by the Engineer. In rutted areas, mill no deeper than necessary to texture the low points of the wheel ruts. Texture the entire surface substantially free from waves or irregularities with a maximum 1/8 inch variation between ridge contact points as measured with a 10 foot straightedge. Bumps and depressions that exceed the specified tolerance and require additional milling will be subject to correction as directed by the Engineer at no additional cost to the contract.

Provide protection around existing manholes, catch basin inlets, utility valve boxes, and any similar structures. Ensure any damage to such structures as a result of the milling operation is repaired at the Contractor's expense. Prevent the milled material from falling into inlet openings. Remove any milled material that does fall into inlet openings. Maintain the milled surface, including any necessary provisions for adequate drainage, as directed by the Engineer. The Engineer may direct the depth to be adjusted during the initial pass ±1/2 inch due to field conditions such as scabbing or delamination at no additional cost. Dispose of the HMA millings off site unless otherwise stated in the contract.

Construct a 25 foot test section on the first day of milling at the machine ground speed and revolutions per minute (rpm's) that will be used for the project. Any request to increase the forward speed of the milling operation will require an additional test section and be at the discretion of the Engineer.

The Engineer will randomly select a minimum of 4 locations at each site and the average mean texture depth (MTD) will be determined. Ensure the finished surface macrotexture MTD is a maximum of 0.06 inches as measured in accordance with the requirements of ASTM E965 volumetric technique.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item(s):

Pay Item	**Pay Unit**
Fine Texture Pavt Milling	Square Yard
Micro Texture Pavt Milling	Square Yard

1. **Fine Texture Pavt Milling** includes furnishing all incidental's involved in the milling operation, removing milling residue, cleaning the pavement and testing per *ASTM E965* and as specified above.

2. **Micro Texture Pavt Milling** includes furnishing incidental's involved in the milling operation, removing milling residue, cleaning the pavement and testing per *ASTM E965* and

as specified above. The milled area is defined as the actual length and width of the milled surface visually verified and accepted by the Engineer for payment. No area deductions will be made for minor unmilled areas such as catch basin inlets, manholes, utility boxes and similar structures.