306-R-613 MILLING

(Adopted 11-22-13)

The Standard Specifications are revised as follows:

SECTION 306, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 306 – MILLING

306.01 Description

This work shall consist of the milling of asphalt and concrete pavements and the disposal of milled materials in accordance with 105.03.

CONSTRUCTION REQUIREMENTS

306.02 General

Milling operations shall be described in the QCP in accordance with ITM 803. Where the milling operation in a partial-day closure results in a longitudinal vertical or near vertical face exceeding 2 in. in height, the adjacent lane shall be milled during the same day, the milled lane resurfaced during the same day, or the vertical face tapered at a 45° angle or flatter. Where located within 3 in. of a curb, surface material that cannot be removed by the cold-milling machine shall be removed by other approved methods.

Transverse milled vertical faces greater than 1 in. that are exposed to traffic shall be transitioned in an approved manner.

Castings located in milling areas that are not to be adjusted may remain in place during the milling, or may be removed and replaced at the Contractor's option.

Localized weak areas uncovered by the milling process shall be patched in accordance with 304 or 305.

The milled material shall become the property of the Contractor, unless otherwise specified.

The roadway shall be cleaned before opening to traffic.

306.03 Equipment

Equipment for milling shall be in accordance with the following.

(a) Roadway Milling Machine

A milling machine shall be a power operated cold-milling machine, equipped with automatic control devices to establish profile grades by referencing from either the existing pavement or from independent grade control. The equipment shall have a positive means of controlling cross slope elevations, have an effective means for removing excess material from the surface, preventing airborne dust escaping from the operation, and producing a finished surface that provides a good bond to the new overlay.

Sufficient cutting teeth shall be on the *coarse milling or fine milling* cutting drum to produce cuttings such that 90% of the conglomerate particles pass a 2 in. sieve. *A*

coarse milling cutting drum shall have 5/8 in. spacing between the cutting teeth and be capable of producing a surface macrotexture ratio in accordance with ITM 812 equal to or greater than 1.8. A fine milling cutting drum shall have 5/16 in. or 3/8 in. spacing between the cutting teeth and be capable of producing a surface macrotexture ratio in accordance with ITM 812 equal to or greater than 5.0.

(b) Power Saw

Sawing equipment shall be capable of maintaining the specified alignment and depth of cut without damaging the pavement.

(c) Rotary Power Broom

A motorized, pneumatic tired unit with rotary bristle broom head.

(d) Straightedge

1. Straightedge – 16 ft

A 16 ft straightedge shall be a rigid beam mounted on two solid wheels on axles 16 ft apart. The straightedge has a mounted push bar to facilitate propelling the device along or across the pavement. Tolerance points are located at the 1/4, 1/2, and 3/4 points and may be composed of threaded bolts capable of being adjusted to the tolerance required.

2. Straightedge – 10 ft

A 10 ft straightedge is the same as a 16 ft straightedge except that the wheels are mounted 10 ft apart. A handheld rigid beam may be substituted.

306.04 Asphalt *or PCCP* Scarification *Milling* ~~and Profile Preparation~~

~~Asphalt scarification and profile preparation shall consist of preparing a base for resurfacing by removing existing asphalt material. The entire existing asphalt surface shall be roughened by the operations. The existing pavement shall be milled to the cross-slope as shown on the plans, and~~*Scarification milling shall consist of preparing a base for resurfacing by roughening the entire existing asphalt or PCCP surface. The milled pavement profile* shall have a surface finish that does not vary longitudinally more than 1/4 in. from a 16 ft straightedge or as described in the QCP in accordance with 401.02. ~~The milled surface shall have macrotexture equal to or greater than 2.2 for single course overlays and 1.8 for multiple course overlays in accordance with ITM 812.~~

A fine milling cutting drum in accordance with 306.03(a) shall be used when a single course overlay is specified with a lay rate as shown on the plans less than 165 lb/sq yd and the maximum scarification mill cut depth is expected to be less than 3/4 in. for asphalt or PCCP, otherwise, a coarse milling cutting drum in accordance with 306.03(a) shall be used.

The scarified milled surface shall have a macrotexture ratio in accordance with ITM 812 as follows:

(a) equal to or greater than 5.0 when using a fine milling cutting drum for a single course overlay, or

(b) equal to or greater than 2.2 for a single course overlay, or

(c) equal to or greater than 1.8 for multiple course overlays.

Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 1/8 in. when measured with a 10 ft straightedge.

Milled ~~mainline~~*traveled way* areas left open to traffic for longer than five work days will be assessed $1,600.00 per day per lane mile, or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

Milled non-~~mainline~~ *traveled way* areas such as auxiliary lanes *and shoulders* left open to traffic for longer than 10 work days will be assessed $800.00 per day per lane mile, or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

306.05 Asphalt or PCCP Profile Milling to Correct Cross-Slope

Profile milling shall consist of preparing a base for resurfacing by removing the existing asphalt or PCCP material to the specified cross-slope as shown on the plans. The milled pavement profile shall have a surface finish that does not vary longitudinally more than 1/4 in. from a 16 ft straightedge or as described in the QCP in accordance with 401.02.

A fine milling cutting drum in accordance with 306.03(a) shall be used when a single course overlay is specified with a lay rate as shown on the plans less than 165 lb/sq yd and the maximum profile mill cut depth is expected to be less than or equal to 1 1/2 in. for asphalt or 3/4 in. for PCCP, otherwise, a coarse milling cutting drum in accordance with 306.03(a) shall be used.

The profile milled surface shall have a macrotexture ratio in accordance with ITM 812 as follows:

(a) equal to or greater than 5.0 when using a fine milling cutting drum for a single course overlay, or

(b) equal to or greater than 2.2 for a single course overlay, or

(c) equal to or greater than 1.8 for multiple course overlays.

Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 1/8 in. when measured with a 10 ft straightedge.

Milled traveled way areas left open to traffic for longer than five work days will be assessed $1,600.00 per day per lane mile, or portion thereof, as liquidated damages,

not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

Milled non-traveled way areas such as auxiliary lanes and shoulders left open to traffic for longer than 10 work days will be assessed $800.00 per day per lane mile, or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

306.~~04.1~~*06* Approach Milling

Approach milling shall consist of milling the surface and cutting a wedge at the driveways, commercial or public road approaches. The existing approach shall be milled a minimum depth of no less than 1/4 in. to accommodate the approach pavement. The approach milling shall be completed to provide a smooth transition from the ~~mainline~~ *traveled way* pavement to the termini of the approach. The existing approach pavement shall be cut to provide a vertical face of 1 1/2 in. for the termini of surface.

Mailbox approaches to be resurfaced shall be milled to maintain the ~~mainline~~*traveled way* profile and cross-slope.

Automatic control devices will not be required on surface milling equipment used for approach milling. Milling shall not damage any pavement that is to remain in place.

Approach milling shall not be performed at driveways unless it is required to meet a paved surface that continues beyond the construction limit. If the driveway is other than HMA or PCC beyond the construction limits, the approach milling is not required.

The transverse vertical cut face for commercial or public road approaches shall be transitioned at a rate of 24:1 or as approved.

306.~~05~~*07* Asphalt *or PCCP* Milling *to a Specified Average Depth*

~~Asphalt m~~*M*illing shall consist of preparing a base for resurfacing by removing the existing asphalt material *or PCCP* ~~at a~~*to the* specified average depth *as shown on the plans*. The ~~existing~~*milled* pavement shall ~~be milled to the cross-slope as shown on the plans, and shall~~ have a surface finish that does not vary longitudinally more than 1/4 in. from a 16 ft straightedge or as described in the QCP in accordance with 401.02. ~~The milled surface shall have macrotexture equal to or greater than 2.2 for single course overlays and 1.8 for multiple course overlays in accordance with ITM 812.~~

A fine milling cutting drum in accordance with 306.03(a) shall be used when a single course overlay is specified with a lay rate as shown on the plans less than 165 lb/sq yd and the average mill cut depth is less than or equal to 1 1/2 in. for asphalt or 3/4 in. for PCCP, otherwise, a coarse milling cutting drum in accordance with 306.03(a) shall be used.

The milled surface shall have a macrotexture ratio in accordance with ITM 812 as follows:

(a) equal to or greater than 5.0 when using a fine milling cutting drum for a single course overlay, or

(b) equal to or greater than 2.2 for a single course overlay, or

(c) equal to or greater than 1.8 for multiple course overlays.

Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 1/8 in. when measured with a 10 ft straightedge.

If shoulders or turn lanes are not milled and the overlay material is not placed in the milled areas within the same day, drainage slots shall be provided to eliminate ponding of water.

Milled ~~mainline~~*traveled way* areas left open to traffic for longer than five work days will be assessed $1,600.00 per day per lane mile, or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

Milled non-~~mainline~~*traveled way* areas such as auxiliary lanes *and shoulders* left open to traffic for longer than 10 work days will be assessed $800.00 per day per lane mile, or portion thereof, as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.

The transverse vertical cut face shall be transitioned by HMA, CMA or prefabricated materials at a rate of 24:1 or as approved.

306.~~0~~6*08* Asphalt *Overlay* Removal

Asphalt removal shall consist of complete removal of *an* asphalt *overlay* by milling from a portland cement concrete or brick base and the satisfactory disposal of the milled materials. Minor amounts of asphalt pavement material bonded to a concrete base at joints or cracks may remain in place. If this material becomes displaced during subsequent operations it shall be removed. Minor amounts of asphalt pavement material bonded to a brick base may remain in place. Removal of minor areas of portland cement concrete or brick base during the milling operations is acceptable.

Milled areas shall be cleaned prior to reopening to traffic or before continuing construction operations.

The transverse vertical cut face shall be transitioned by HMA, CMA or prefabricated materials at a rate of 24:1 or as approved.

~~**306.07 PCCP Milling**~~

~~PCCP milling shall consist of preparing a base for resurfacing by removing the existing PCCP material at a specified average depth. The existing pavement shall be milled to the cross-slope as specified in the plans, and shall have a surface finish that does not vary longitudinally more than 1/4 in. from a 16 ft straightedge or as described in~~

~~the QCP in accordance with 401.02. The milled surface shall have macrotexture equal to or greater than 1.8 in accordance with ITM 812. Frequency of macrotexture testing shall be a minimum of once per day and shall be described in the QCP. The cross-slope shall not vary more than 1/8 in. when measured with a 10 ft straightedge or as directed by the Engineer.~~

~~A milled surface shall not be left open to traffic for longer than 14 calendar days. If the milled surface is not overlaid after 14 calendar days, $1,600.00 per day per lane mile, or portion thereof, will be assessed as liquidated damages, not as a penalty, but as damages sustained for each calendar day that the milled area remains left open to traffic.~~

~~Milled non-mainline areas such as auxiliary lanes left open to traffic for longer than 10 work days will be assessed $100.00 per day per transition as liquidated damages, not as a penalty, but as damages sustained for each work day that the milled area remains open to traffic.~~

~~The transverse vertical cut face shall be transitioned by HMA, CMA or prefabricated materials at a rate of 24:1 or as approved.~~

306.~~08~~*09* Transition Milling

Transition milling shall consist of cutting a wedge at the beginning and ending of projects, and paving exceptions. The existing pavement shall be cut to provide a nearly vertical face of 1 1/2 in. for the termini of each overlay lift of base, intermediate, and surface. The existing pavement shall be milled at a rate of 720:1 or as directed to achieve the specified cut where the pavement transition overlay lifts differ from cut depth. The transverse vertical cut face shall be transitioned by HMA, CMA or prefabricated materials at a rate of 24:1 or as approved.

Automatic control devices will not be required on surface milling equipment used for transitions cut off the ~~mainline~~*traveled way*. Cutting shall not damage any pavement that is to remain in place.

306.~~09~~*10* Method of Measurement

Approach milling, asphalt milling, asphalt removal, PCCP milling, scarification~~/profile~~ milling, *profile milling*, and transition milling will be measured by the square yard of the milled area.

306.~~10~~*11* Basis of Payment

Approach milling, asphalt milling, asphalt removal, PCCP milling, scarification *milling*, ~~and~~ profile milling, and transition milling will be paid for at the contract unit price per square yard.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Milling, Approach	SYS
Milling, Asphalt, _____ in.	SYS

thickness
Milling, Asphalt Removal ..... SYS
Milling, PCCP _____ *in.* ..... SYS
thickness
Milling, Profile ..... SYS
Milling, Scarification~~/Profile~~ ..... SYS
Milling, Transition ..... SYS

The cost for castings removed and replaced at the Contractor's option in accordance with 306.02 shall be included in the cost of the milling.

Any portion of the pavement that is damaged or removed outside the milling limits shall be replaced with no additional payment.

The cost of tapering of vertical faces and removal of milled material from the project site shall be included in the cost of milling.

The cost of cutting of the surface course shall be included in the milling.