

**Construction Specification for
Cold Milling of Asphalt Pavement**

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TS 3.15.01 SCOPE

This specification covers the requirements for removing all or portions of existing asphalt pavement to a specified depth and the removal and disposal of the milled asphalt materials.

TS 3.15.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

TS 3.20 Construction Specification for Tack Coating
TS 310 Construction Specification for Hot Mixed, Hot Laid Asphaltic Concrete Paving

Ontario Provincial Standard Specifications

OPSS 180 General Specification for the Management of Excess Materials

TS 3.15.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Reclaimed Asphalt Pavement (RAP) means the processed HMA material that is recovered by partial or full depth removal from milling operations.

Excessive Grooving means variation in milled surface in excess of 25 mm from high point to low point across width of surface milled by each pass of milling machine.

TS 3.15.04 DESIGN AND SUBMISSION REQUIREMENTS – Not Used

TS 3.15.05 MATERIALS – Not Used

TS 3.15.06 EQUIPMENT

The milling equipment shall be self-propelled machine, designed and built for, milling of bituminous pavements without the addition of heat. The equipment shall contain automatic grade and slope controls, capable of cold milling existing asphalt pavements to an accurate depth of cut, profile and cross slope and shall be capable of loading the milled materials directly into trucks.

The milling equipment shall be equipped with a spray-bar and water tank of sufficient size to provide thorough soaking of asphalt millings to reduce the quantity of air-borne dust and particulates. The spray-bar shall be in full working operation during actual milling.

Two high-capacity vacuum-type sweepers with 2 m pick-up heads and a minimum 225 m³/min air flow or approved equivalent meeting current standards and environmental requirements shall be used.

The machine shall be able to mill flush to all curbs and gutters, maintenance holes, catch basins and so on. The Contractor shall provide smaller milling machine if required to trim areas inaccessible to larger machine.

TS 3.15.06.01 Cutting Operation

The nature and condition of the equipment and the manner of performing the Work shall be such that the pavement is not torn, gouged, shoved, broken, sooted, oil-coated or otherwise damaged by the cutting operation.

TS 3.15.07 CONSTRUCTION

The locations to be milled shall be at all contract limits as shown on the Contract Drawings. The depth of removal shall be according to the Contract Documents.

Prior to milling operations the Contractor shall determine the location of any buried utilities or objects that may be damaged by milling operations. The onus of locating such structures and determining their susceptibility to damage by operations are the sole responsibility of the Contractor. The Contractor shall liaise with the relevant authorities to locate all underground utility services within the site of the works prior to commencement of milling operations.

If sub-surface utilities or structures are damaged by milling operations, the Contractor shall immediately notify the relevant authorities and arrange for the damage to be rectified to reinstate the utility or structure to preconstruction condition. All costs associated with such rectification works shall be at no extra cost to the City.

Milling shall not be performed when there is accumulation of snow or ice on the pavement surface.

Cold milling asphalt pavement shall be performed in a manner which prevents the tearing and breaking of underlying and adjacent pavement and the contamination of the RAP with granular, subgrade or deleterious materials. All RAP shall be loaded directly into trucks from the milling machine and hauled to stockpile or disposed of.

The milled roadway surface shall be swept clean and apply temporary pavement markings prior to opening to traffic. At locations including urban areas and bridge decks, the Contractor shall sweep the surface in a manner which minimizes dust.

Prior to covering the milled surface, the Contractor shall arrange to inspect the surface with the Contract Administrator prior to the removal of milling equipment from site.

The Contractor shall promptly repair any localized areas of distress in the milled surface that may present a hazard to traffic at no extra cost to the City.

If in the opinion of the Contract Administrator, the milled pavement contains material that is deemed unsuitable, that material shall be milled to a further depth. Additional payment shall be based on the quoted tender item rate of the works.

When the roadway is to be reopened to traffic after the daily shut down and full width pavement removal is required, the removal shall be done to essentially the same station for the full pavement width prior to the shutdown at the end of the day. Longitudinal differences in pavement elevations will not be permitted, as a result of milling operations.

Prior to reopening the milled pavement to traffic, the final milled lane shall have a transition such that the maximum lip between the milled run and the un-milled run does not exceed 10 mm. When a transition is not possible, the fall off in levels shall be ramped. Pavement transition may be omitted when vertical offset between milled surface and adjacent riding asphalt surface is less than 10 mm.

The remaining surface after milling shall have a constant and continuous crossfall matching the final surface course crossfall. The remaining surface after milling shall have an even texture, and shall be free of significantly different grooves and ridges in all directions.

The surface remaining after milling the surface irregularities out of the existing asphalt pavement such as to produce a smooth surface and, in some cases to cut the pavement down to predetermined grades and cross-fall.

The Contractor shall ensure that the line and grade of the roadway is checked during the milling operation.

Excessive grooving caused by cold milling will not be permitted.

Milled asphalt material shall not remain on the roadway after completion of the day's operation.

When the milled material is to remain temporarily on the site due to construction operations, the material shall be temporarily placed on an asphalt or concrete surface until final removal. Milled asphalt materials which are different, due to the removal equipment used or pavement type, shall be placed in separate stockpiles.

All reclaimed asphalt pavement material shall become the property of the Contractor and shall be disposed of off the site, according to OPSS 180.

TS 3.15.07.01 After the Milling Operation

Following the milling operation, the Contractor shall arrange for grade inspection with the Contract Administrator prior to paving with hot mix asphalt. The surface shall be tack-coated with SS-1 asphalt emulsion diluted with an equal volume of water according to TS 310 and TS 3.20. Then the Contractor shall expedite the hot mix asphalt paving.

TS 3.15.08 QUALITY ASSURANCE – Not Used

TS 3.15.09 MEASUREMENT FOR PAYMENT

TS 3.15.09.01 Cold Milling of Asphalt Pavement

Measurement of cold milling of asphalt pavement removed shall be by area, in square metres (m²).

If the Contractor is directed to remove more asphalt than the depth specified, payment will be prorated based on the maximum depth specified for the item.

TS 3.15.10 BASIS OF PAYMENT

TS 3.15.10.01 Cold Milling of Asphalt Pavement – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include water for the milling of the asphalt, picking up, sweeping and cleaning up of all milling materials and the removal and disposal of the milling materials offsite and temporary pavement markings.

No additional payment shall be made for the removal of asphalt by hand work in areas inaccessible to a milling machine.