ITEM 51405.0201 M - COLD IN-PLACE RECYCLING ASPHALT CONCRETE
ITEM 51618.34 M - BITUMINOUS MATERIAL
ITEM 51623.05 M - AGGREGATE
ITEM 51407.01 M - TACK COAT

DESCRIPTION. This specification covers the requirements for cold in-place recycling of asphalt concrete. This work shall consist of cold in-place recycling of the existing asphaltic pavement in a continuous multi-step process of milling, remixing with liquid bituminous material and aggregate, reshaping, and compacting the asphalt mixture. All work under this item shall be in accordance with these specifications and in reasonably close conformity with the limits shown on the plans or established by the Engineer.

MATERIAL REQUIREMENTS.

Bituminous Material. Liquid bituminous material required for remixing with the recycled pavement material shall conform to the requirements in Section 702 - Bituminous Materials. The bituminous material shall be obtained from a storage facility that has been approved in the calendar year of the material's use by the Director, Materials Bureau. The type, grade, and intended rate of usage of bituminous material shall be that specified by special note in the contract proposal. Alternate bituminous materials may be substituted by the contractor with the approval of the Director, Materials Bureau.

Aggregates. Additional aggregates required for cold in-place recycling of pavements shall be crushed stone or crushed gravel conforming to the requirements of Section 703-02, Coarse Aggregate, or fine aggregate conforming to the requirements of Section 703-01, Fine Aggregate. Gradation of aggregates shall be as specified by special note in the contract proposal.

Reclaimed Material. Asphalt pavement and/or aggregate material which has been removed and/or processed from the pavement is hereinafter called reclaimed material. The reclaimed material shall pass the 50mm sieve size.

Tack Coat. Tack Coat shall meet the requirements of Section 407 - Tack Coat.

Design Guidelines. The recycled mixture shall consist of reclaimed material, additional aggregate (if required), bituminous material, and water as required. The final mixture shall conform to the requirements in the contract proposal. The quantity of water added to the mix shall be determined by the contractor and may be adjusted to account for changing conditions.

Sampling and Pretesting. The Department will take and analyze core samples to the depth to be recycled and provide the following information in the contract proposal.

1. Location of cores.
2. Depth of existing asphalt pavement to be recycled.
3. The aggregate gradation in the material to be recycled.
4. Recovered asphalt content and penetration of the recovered asphalt.

The information supplied is intended only to be an indication of the existing conditions and in no way releases the Contractor from responsibility in fulfilling this specification.

CONSTRUCTION DETAILS

Equipment. The Contractor shall use a cold in-place asphalt concrete recycler and the recycling equipment appearing on the current Materials Bureau Approved List. Requests for approval of recyclers or equipment not currently on the Approved List shall be made to the Director, Materials Bureau, prior to

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the start of any work. All other equipment and tools shall be approved by the Engineer. All equipment and tools shall be maintained in satisfactory working condition at all times.

Calibration. The recycling equipment will be calibrated by the Recycler in accordance with established calibration procedures, as detailed in the Department Publication "Inspection and Calibration of Soil Stabilization Plant" official issuance No. 741-3 SCP-10/86. This calibration shall be verified in the presence of a Department representative. At least two weeks advance notice is required when scheduling the verification with the Regional Materials Engineer. If the equipment is found to be accurate and in good working order, the Recycler will receive a letter from the Department with the date of the verification. At intervals of no more than 90 days the Recycler shall verify the accuracy of the equipment. A copy of the forms used for these verifications shall be sent to the Regional Materials Engineer. If all is in order the Recycler will receive a letter from the Department with the date of this verification. A copy of the most recent verification letter shall be supplied to the Engineer prior to the start of work. No equipment will be allowed to work on the project until the calibration has been completed and verified.

Weather & Seasonal Limitations. This work will not be permitted when the existing pavement contains frost, nor when the air or surface temperature is below 7_C. No material shall be placed from the last Saturday in September to May 15.

Testing. Once continuous production has been achieved, four samples of the recycled mixture shall be taken by the Contractor and tested to verify the mix proportions. The Contractor is responsible for having these samples tested and supplying the gradation and total asphalt content to the Engineer before the end of the next workday. Any laboratory capable of accurately performing the desired tests may be used subject to the approval of the Engineer. The forward speed of the recycling equipment shall be noted. Changes in speed during routine production shall only be made with the approval of the Engineer. Each day, during routine production, one sample shall be taken from each half mile recycled or fraction thereof. Each of these daily samples shall be tested for gradation and total asphalt content, every third sample shall have the penetration of the recovered asphalt tested.

All of the samples taken shall be retained until acceptance of the project. If, in the opinion of the Engineer, the existing pavement condition changes or the recycled pavement is not satisfactory, additional tests shall be performed as ordered by the Engineer at no cost to the State. Test results (gradation and total asphalt content) shall be made available to the Engineer within two working days. If conditions warrant the Engineer may stop work until the required test results become available. The Contractor shall make adjustments to the mix proportions as determined and ordered by the Engineer.

Spreading. The mixture shall be deposited in a windrow or directly into a paver and mechanically spread in a uniform layer so as to produce the specified thickness and surface tolerance after compaction. Excessive amounts of non-coated millings which spill onto the milled surface shall be removed, as ordered by the Engineer, prior to placing the mixture. Any material which segregates and results in an unstable mat shall be repaired at no additional cost to the State.

Compaction. After spreading, the mixture shall be thoroughly and uniformly compacted in accordance with the applicable provisions of Sect. 401-3.12 Compaction, except as noted in this Specification. A pneumatic tired roller with a minimum ballasted weight of fifteen tons shall be required for compaction on the cold recycled mix. The rolling sequence and number of passes to achieve the desired compaction shall be approved by the Engineer. It may be necessary to complete or finish roll the material on a subsequent day at no additional expense to the state. Material that cannot be properly and adequately compacted to a stable condition as determined by the Engineer shall be removed and replaced.

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Tolerance. The recycled surface shall be constructed to a 10mm tolerance. If, in the opinion of the Engineer, the pavement has not been constructed to this tolerance based upon visual observation or upon riding quality the Engineer may test the surface with a 5m straight edge or string line placed parallel to the center line of the pavement. The Engineer may also test with a 3m straight edge or string line placed transversely to the center line of the pavement on any portion of the pavement. Variations exceeding 10mm shall be satisfactorily corrected or the pavement relaid at no additional cost to the Department as ordered by the Engineer. The Contractor shall not be responsible for corrections in the cross slope to meet the typical cross sections set forth in the plans where sufficient materials do not exist in the existing pavement to make such a correction.

Curing. The mixture shall be allowed to cure for a minimum of seven (7) days before the next paving course is placed. The provisions of the paragraph above, Tolerance, shall apply during the entire period prior to the recycled material being overlaid. Adequate curing shall be the responsibility of the Contractor, who shall take into account all factors, including weather, the time of year and the restrictions of the project Maintenance and Protection of Traffic plan. The overlay shall be placed prior to the end of the paving season.

Tack Coat. Tack coat shall be applied to the recycled surface in accordance with Section 407, Tack Coat, immediately prior to placement of the overlay. The recycled surface shall be cleaned as directed by the Engineer prior to the placement of tack coat.

METHOD OF MEASUREMENT

Cold In-Place Recycling Asphalt Concrete. Measurement will be the number of square meters of pavement surface recycled in accordance with the specifications and contract documents.

Bituminous Material. Measurement will be the number of liters, measured at 15.6 degrees C, incorporated into the work in accordance with the specifications.

Aggregate. Measurement will be the number of metric tons incorporated into the work in accordance with the specifications.

Tack Coat. Measurement will be the number of liters of asphalt emulsion, measured at 15.6 degrees C, incorporated into the work in accordance with the specifications.

BASIS OF PAYMENT

Cold In-Place Recycling Asphalt Concrete. Payment will be made at the unit price per square meter for the quantities measured. The unit price bid shall include the cost of all labor, materials, equipment and incidentals necessary to complete the work except that Bituminous Material, Aggregate, and Tack Coat will be paid for under their appropriate pay items. No separate payment will be made for the use of water in the mixing process. Any work required for the maintenance, replacement, or repair of the cold in-place recycled pavement prior to the acceptance of the contract, shall be done at no additional cost to the State.

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Bituminous Material. Payment will be made at the unit price per liter for the quantities measured. The unit price shall include the cost of furnishing all labor, materials and equipment necessary to incorporate the bituminous materials into the work.

Aggregate. Payment will be made at the unit price per metric ton for the quantities measured. The unit price shall include the cost of furnishing all labor, materials and equipment necessary to properly incorporate the aggregate into the work.

Tack Coat. Payment will be made at the unit price per liter for the quantities measured. The unit price per liter shall include the cost of furnishing all material, equipment and labor necessary to complete the work. Any necessary cleaning of recycled pavement surfaces ordered by the Engineer prior to the application of tack coat shall be included in the unit price .

Payment will be made under:

Item No.	Description	Pay Unit
51405.0201 M	Cold In-Place Recycling Asphalt Concrete	Square Meter
51618.34 M	Bituminous Material	Liter
51623.05 M	Aggregate	Metric Ton
51407.01 M	Tack Coat	Liter

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