

ITEM 05410.201199 M - QUICK-SET SLURRY, TYPE II
ITEM 05410.201299 M - QUICK-SET SLURRY, TYPE III

DESCRIPTION

Apply a properly proportioned mixture of quick-set asphalt emulsion, mineral aggregate, mineral filler, water and field control additives, to a paved surface. All necessary pavement cleaning, joint sealing, crack filling, pavement markings removal, tack coats, and utility grade adjustments will be paid for under their appropriate items.

MATERIAL REQUIREMENTS

A. Bituminous Materials. ASTM D 3910 5.3.1. Quick-set emulsified asphalts.

B. Aggregates. §703-02, Coarse Aggregate, except as modified herein.

1. Use 100% crushed aggregate, from an approved source.
2. Use aggregate with a minimum sand equivalent quality of 45%, as determined according to AASHTO T 176, "Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test," or that is classified as non-plastic according to AASHTO T 89, "Determining the Liquid Limit of Soils," and AASHTO T 90, "Determining the Plastic Limit and Plasticity Index of Soils."
3. Use aggregate that consists of one of the following.
 - a. Limestone having an acid insoluble residue content $\geq 20.0\%$, excluding particles of chert and similar siliceous rocks, unless otherwise approved by the Director, Materials Bureau. Blends of siliceous and non-siliceous limestones will not be permitted.
 - b. Dolomite, excluding Wappinger Dolomite.
 - c. Sandstone, granite, chert, traprock, ore tailings, or other similar non-carbonate materials.
 - d. Use gravel, or blend two or more of: gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, or other similar materials to produce a final blend having at least 40.0% (by weight with adjustments to equivalent volumes for materials of different specific gravities) non-carbonate particles in each size fraction coarser than the 600 μm sieve. Non-carbonate particles are those having a minimum acid insoluble residue content of 80.0%.

C. Water. §712-01, Water.

D. Mineral Filler. §703-08, Mineral Filler.

E. Equipment. Use self propelled mixing and placing equipment that appears on the Department's Approved List for micro-surfacing equipment. Calibrate each mixing unit according to Materials Method 8.4 "Calibration of Micro-surfacing Mix Units." Provide all required information before the start of work. Verify the calibration as ordered by the Regional Materials Engineer.

The emulsion, aggregate and mineral filler counters must be accessible to the Engineer and inspectors.

ITEM 05410.201199 M - QUICK-SET SLURRY, TYPE II
ITEM 05410.201299 M - QUICK-SET SLURRY, TYPE III

MIXTURE DESIGN

Employ a Department approved laboratory to develop a job mix formula, following the procedure outlined in ASTM D 3910, that meets the requirements listed in Table 1 - Mixture Design Requirements. All materials used to develop the mixture design must be representative of the materials to be used on the project. The mixture design must clearly list the proportions of mineral aggregate, mineral filler, water, additive(s), percent asphalt emulsion based on the dry weight of aggregate, and design set and cure times. Submit the mixture design for approval to the Director, Materials Bureau at least 14 days before the start of work. Mixture design approvals are valid until December 31, of the year in which they are approved.

TABLE 1 - PROPORTIONAL REQUIREMENTS	
Constituent	Proportional Requirement
Residual Asphalt	Type II 7.5% to 13.5%; Type III 6.5% to 12.0% (by dry mass of aggregate)
Mineral Filler	0.5% to 2.0% by dry mass of aggregate.
Water	As required to produce proper mixture consistency.
Field Control Additive	As required to control the emulsion's set properties or increase adhesion, but must be part of the mixture design and compatible with all other components.

TABLE 2 - PHYSICAL REQUIREMENTS		
Property	Test Method	Requirement
Consistency	ASTM 3910	2 to 3 cm
Mix Time	ISSA TB 113	Controllable to 180 sec.
Set Time	ASTM 3910	1 hour, maximum
Cure Time	ASTM 3910	24 hour, maximum
Wet Track Abrasion Loss	ASTM D3910; 1 hr soak	807 g/m ² , maximum
Excess Asphalt by LWT Sand Adhesion	ISSA TB 109	538 g/m ² maximum
Wet Cohesion (quick traffic systems)	ISSA TB 139; 30 minutes ISSA TB 139; 60 minutes	12 kg-cm, minimum 20 kg-cm, minimum

TABLE 3 - GRADATION REQUIREMENTS	
Mixture Type	Aggregate Gradation
Type 2	2MS ⁽¹⁾
Type 3	3MS ⁽¹⁾

⁽¹⁾§703-02 Material Requirements, Table 703-5 Sizes of Stone Gravel and Slag for Slurry

CONSTRUCTION DETAILS

- A. Stockpile.** Build an aggregate stockpile at a location approved by the Engineer. When blending multiple aggregates, use automated proportioning and blending equipment to produce a uniformly graded stockpile. Screen the aggregate at the stockpile, prior to delivering it to the micro-surfacing equipment.
- 1. Testing.** Take three samples, according to Materials Method 5.0, and test for gradation, according to AASHTO T11, "Materials Finer than 75µm Sieve in Mineral Aggregates by Washing," and T27, "Sieve Analysis of Fine and Coarse Aggregates." Each sample must contain material from each face of the stockpile. Submit the test results to the Engineer and Regional

ITEM 05410.201199 M - QUICK-SET SLURRY, TYPE II
ITEM 05410.201299 M - QUICK-SET SLURRY, TYPE III

Materials Engineer for approval before using material from the stockpile. The Engineer will take at least one sample for friction aggregate analysis according to Materials Method 28, "Friction Aggregate Control and Test Procedures."

- Tolerance.** The maximum stockpile tolerances are given in Table 4 - Maximum Stockpile Tolerances. The design value plus the stockpile tolerance can not exceed the gradation limits (Table 3).

Screen Sizes (mm)	9.5	4.75	2.36	1.18	0.600	0.300	0.150	0.075
Stockpile Tolerance	-	±5.0%	±5.0%	±5.0%	±5.0%	±4.0%	±3.0%	±2.0%

- Approval.** Stockpile gradation approval is valid until new material is added to the stockpile. Approval will be based on the average of three gradation tests. If the percent passing exceeds the stockpile tolerance or is outside the gradation limits for any sieve, or ranges from the high end to the low end of the tolerance limits for any two consecutive sieves, the stockpile will be rejected.

If the non-carbonate or acid insoluble residue contents of the material in the stockpile are not within the specified limits, the stockpile will be rejected.

All slurry placed with material from a rejected stockpile will be rejected pending submission and approval of a mix design representing the stockpile gradation.

- Weather and Seasonal Limitations.** §401-3.01 Weather and Seasonal Limitations, except as modified herein. Do not place slurry in the rain, or if the air temperature is expected to fall below 10°C within 24 hours after application. Application will be permitted to begin when pavement temperature is >10°C and is expected to rise, above 15°C.

- Mixture Consistency.** Produce a mixture which is homogeneous, with no excess water or emulsion, lumps, balls, unmixed aggregate, or segregation of the emulsion and fines from the coarser aggregate.

Control the break time and mix consistency with mixture proportion adjustments. Keep the mixture from setting until after application. The maximum adjustment of the mineral filler is 1%. Notify the Engineer of all mixture adjustments before making them.

- Pavement Preparation.** If necessary, dampen the pavement surface before applying quick-set slurry. Standing or free flowing water will not be permitted. Remove all debris before applying the slurry.

E. Application.

- Application Rate.** Use one pass to achieve the design application rate as shown in Table 5 - Application Limits.

Gradation	Design Application Rate (kg/m²)	Tolerance (kg/m²)
Type II	7	1.5
Type III	11	3

- Coverage.** Apply the quick-set slurry to the pavement evenly across the entire width of the spreader box to produce a smooth riding surface with no streaks, excess buildup, thin or

ITEM 05410.201199 M - QUICK-SET SLURRY, TYPE II
ITEM 05410.201299 M - QUICK-SET SLURRY, TYPE III

uncovered areas. Do not use hand tools to expand the width of application wider than the spreader box, except as described under *Hand Finishing* below. Hand held squeegees may not be used to expand the width of application during main-line paving.

3. **Joints.** Minimize the number of joints. Construct joints such that no gap is present between adjacent applications. When possible, place longitudinal joints at the edges of traffic lanes. Joint overlap and grade difference requirements are given in Table 6 - Joint Requirements. Measure the difference in grade across joints by laying a 3 m straight edge centered on the joint perpendicular to the direction of the joint.

TABLE 6 - JOINT REQUIREMENTS		
Requirement	Minimum	Maximum
Difference in grade	-	6.0 mm
Longitudinal Joint Overlap	50 mm	150 mm
Transverse Joint Overlap	50 mm	300 mm

4. **Odd-Width Passes.** Apply no more than one odd-width pass. Odd-width passes will not be permitted as the last pass unless ordered by the Engineer.
 5. **Hand Finishing.** Use hand held squeegees to finish areas which cannot be reached with the spreader box, and to produce straight lines along curbs, shoulders and through intersections. Apply the same type of finish to the surface as is applied by the spreader box.
 6. **Utilities.** Cover all utility structures within the area being paved. Remove the covers each day. Utility structures may include, but not limited to, catch basins, manhole covers, water boxes, traffic controllers, and raised reflectorized pavement markings.
 7. **Excess Material.** Remove all excess material in areas such as driveways, gutters and intersections, etc. as specified by the Engineer, each day.
- F. Curing.** Protect the quick-set slurry from traffic until the mixture has cured sufficiently to resist damage. Repair damage from traffic to the Engineer's satisfaction.

METHOD OF MEASUREMENT

Measure the total metric tons of aggregate, mineral filler, and asphalt emulsion used according to Materials Method 8.4 "Calibration of Micro-surfacing Mix Units."

BASIS OF PAYMENT

Include the cost of all labor, materials, and equipment necessary to perform the work in the unit price bid per metric ton.

Payment will be made under:

Item No.	Item	Pay Unit
05410.201199	Quick-set Slurry, Type II	Metric Tons
05410.201299	Quick-set Slurry, Type III	Metric Tons