

**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE II**  
**ITEM 18410.203302 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.

**MATERIAL REQUIREMENTS.**

**A. Bituminous Materials.** § 702 - Bituminous Materials, CQS-1h, Item 702-4601.

**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 when sampled and tested in accordance with Materials Method 28, "Friction Aggregate Control and Test Procedures."
  - a. Limestone having an acid insoluble residue content  $\pm$  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  $\mu$ m sieve. Non-carbonate particles are those having a minimum acid insoluble residue content of 80.0%.

**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, "Plant Inspector's Manual for Bituminous Concrete Mix Production" and test for gradation, according to

**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE II**  
**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE III**

AASHTO T 11, “Materials Finer than 75  $\mu$ m Sieve in Mineral Aggregates by Washing,” and AASHTO T 27, “Sieve Analysis of Fine and Coarse Aggregates.” Each sample must contain material from each face of the stockpile.

Sample and test the aggregate in accordance with Materials Method 28, Appendix C, Table C1 - Minimum Testing Frequencies for Micro-Surfacing Aggregates.

Submit the test results to the Engineer and Regional 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.

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

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

3. **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.

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

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 quick-set slurry previously placed with material from a stockpile rejected for non-carbonate or acid insoluble residue content will be rejected pending evaluation of the pavement in accordance with Materials Method 28.

**C. Water.** § 712-01, Water.

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

**MIXTURE DESIGN.**

Employ a Department approved laboratory to develop a job mix formula, following the procedure outlined in ASTM D 3910, Standard Practices for Design, Testing, and Construction of Slurry Seal that meets the requirements listed in Table 1 - Proportional Requirements and Table 2 - Physical Requirements, and Table 3 - Gradation Requirements. All materials used to

**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE II**  
**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE III**

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.

<b>TABLE 1 - PROPORTIONAL REQUIREMENTS</b>	
<b>Constituent</b>	<b>Proportional Requirement</b>
Residual Asphalt	Type II, 7.5 to 13.5%; Type III, 6.5 to 12.0% (by dry mass of aggregate).
Mineral Filler	0.0 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.

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

<b>TABLE 3 - GRADATION REQUIREMENTS</b>	
<b>Mixture Type</b>	<b>Aggregate Gradation</b>
Type II	2MS <sup>(1)</sup>
Type III	3MS <sup>(1)</sup>

<sup>(1)</sup> § 703-02 Material Requirements, Table 703-5 Sizes of Crushed Gravel, Stone, and Slag for Slurry.

**CONSTRUCTION DETAILS.**

- A. 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 8.4M, "Calibrating Micro-Surfacing Mix Units." Calibrations are valid for 90 days.

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

Submit a copy of the approved mix design and equipment calibration information to the Engineer prior to the start of work. Adjust the material delivery setting on the micro-surfacing equipment to produce the approved mix design. Verify the calibration and material delivery settings during construction according to Materials Method 8.4M, Calibrating Micro-Surfacing Mix Units as requested by the Regional Materials Engineer.

**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE II**  
**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE III**

**B. Weather and Seasonal Limitations.** The requirements of Section 402-3.01, Weather and Seasonal Limitations apply, 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. Stop applying the slurry if the surface or air temperature drops below 10\_C.

**C. Mixture Consistency.** Produce a homogeneous mixture, without lumps, balls, unmixed aggregate, segregation, excess water, or excess emulsion.

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.

**D. Surface Preparation.**

1. Thoroughly clean the entire area to be overlaid. The surface of the area to be overlaid must be free of dirt, oil, and other foreign materials. Remove all debris and standing water.
2. Cover all manhole covers, water boxes, catch basins, and other such utility structures within the area being paved with plastic, building felt, or other material approved by the Engineer. Remove the covers each day.
3. If necessary, dampen the pavement surface with water or apply a tack coat emulsion to the pavement surface before applying quick-set slurry.

**E. Application.**

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

<b>Gradation</b>	<b>Design Application Rate (kg/m<sup>2</sup>)</b>	<b>Tolerance (kg/m<sup>2</sup>)</b>
Type II	7	1.5
Type III	11	3

2. **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 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 mainline paving.
3. **Joints.** Minimize the number of joints. Construct joints such that no gap is present between adjacent applications. Place longitudinal joints at the edges of traffic lanes. Other longitudinal joint arrangements require the Engineer's approval. Measure the difference in grade across joints by laying a 3 m straight edge centered on the joint

**ITEM 18410.202302 M - QUICK-SET SLURRY, TYPE II**  
**ITEM 18410.203302 M - QUICK-SET SLURRY, TYPE III**

perpendicular to the direction of the joint. Joint overlap and grade difference requirements are given in Table 6 - Joint Requirements.

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

4. **Variable-Width Passes.** Apply no more than one variable-width pass. Variable-width passes will not be permitted as the last pass unless approved 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. **Excess Material.** Remove all excess material in areas such as driveways, gutters, intersections, etc. each day.
- F. Curing.** Protect the quick-set slurry from traffic until the mixture has cured sufficiently to resist damage. The time required will vary based on the mix design and environmental conditions. Repair damage from traffic to the Engineer's satisfaction.

**METHOD OF MEASUREMENT.**

The Engineer will measure the total metric tons of aggregate, mineral filler, and asphalt emulsion used according to Materials Method 8.4M, "Calibrating 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. All necessary pavement cleaning, joint sealing, crack filling, pavement markings removal, and utility grade adjustments will be paid for under their appropriate items.

**Payment will be made under:**

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
18410.202302 M	Quick-Set Slurry, Type II	Metric Tons
18410.203302 M	Quick-Set Slurry, Type III	Metric Tons