## SUBJECT: MICRO-SURFACING AND SLURRY GUIDELINES

**APPROVED:** /s/ John E Rondinaro  
John Rondinaro, Director, Materials Bureau

**Supersedes:** Micro-Surfacing Construction Inspection Guidelines  
Dated: May, 2003

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</tr>
<tr>
<td>Type III</td>
<td>25</td>
</tr>
<tr>
<td>Type III Cold Weather</td>
<td>26</td>
</tr>
</tbody>
</table>
Introduction

The checklists provided in Chapter 1 summarize the activities and requirements prior to and during construction. The information outlined in the checklists provides basic information for parties involved in micro-surfacing & slurry operations.

Chapter 1
Pre-construction & Construction checklists and the Inspectors “Daily Report”

Chapter 2
Additional details and explanations of topics listed in the checklists. Forms to be reviewed or completed by the Engineer and the Inspectors.

Chapter 3
Calibration of Mix Units

Chapter 4
Mix design testing, submission & sampling.

Additional information about micro-surfacing and slurry operations, including requirements for use, is available in the Comprehensive Pavement Design Manual. Further questions should be directed to the Regional Materials Engineer or the Materials Bureau.

Materials Bureau
New York State Department of Transportation
50 Wolf Rd.
Albany, NY 12232

Phone: (518)457-3240
Fax:      (518)457-8171
Chapter 1

PRE-CONSTRUCTION MEETING CHECKLIST

ATTENDENCE
☐ Resident Engineer (RE) or Representative
☐ Regional Materials Engineer (RME) or Representative
☐ Inspector(s)
☐ Contractor Representative / Crew Supervisor / Foreman
☐ Pavement Marking Contractor
☐ Distribute contact information of the attendees

SCHEDULING
☐ Determine project schedule
☐ Discuss conditions that may affect cure times
☐ Discuss impact of delays

MAINTENANCE AND PROTECTION OF TRAFFIC (M&PT) / TRAFFIC FLOW
☐ Submission of M&PT for approval – if Contractor is responsible for M&PT
☐ Identify traffic safety equipment required
☐ Discuss flagger locations
☐ Signage requirements and placement

TRAFFIC FLOW
☐ Determine procedures at specific locations (intersections)
☐ Discuss local business, resident, and public facility considerations that may impact traffic
☐ Discuss consideration of non-motorized users
☐ Determine how supply trucks will enter and exit the work zone
☐ Determine procedures for emergency vehicle right-of-way
☐ Lane closures and time restrictions

SURFACE PREPARATION
☐ Identify party responsible for pavement cleaning
☐ Identify markings requiring removal (glass beads, epoxy, tape, etc.)
☐ Protection of covers, catch basins, utility structures, etc.

PAVEMENT MARKING
☐ Determine who will record the existing pavement marking locations
☐ Discuss who will place temporary pavement markings
☐ Identify party responsible for reestablishing the permanent pavement markings

BOND REQUIREMENTS
☐ Discuss Bond Requirements

AGGREGATE
☐ Location of stockpile: ____________________________
☐ Stockpile construction date ___/____/____
☐ Schedule for sampling stockpile for gradations and friction testing
- Aggregate delivery tickets with supplier(s) Source#, Location, Quantity and Date delivered

**EMULSION**
- Contractor shall submit a minimum one half gallon for each certified lot prior to construction
- Contractor shall submit a BR162C “Bituminous Material Certified Shipment Notice” for each emulsion delivery
- Contractor is responsible for obtaining a representative sample. It is recommended that the representative draw off a minimum of one gallon of asphalt emulsion from the sampling valve, prior to filling the approved sample bottle.
- Inspector will witness the sampling and take possession of an emulsion sample for each lot delivered to the job site. Submit each asphalt emulsion sample to the RME or Main Office Laboratory as soon as possible.

**MINERAL FILLER**
- Contractor verifies the mineral filler conforms to § 703-08

**WATER**
- Contractor provides the source name and location for water and verifies water meets § 712-01

**MIX DESIGN**
- Completed mix design with the company representative’s signature submitted to the Engineer, RME and Main Office Materials Bureau
- Completed cold weather mix design for work at temperatures below 60º F

**EQUIPMENT**
- List of equipment to be used, including serial numbers
- Micro-surfacing Mix Unit Setting form for each unit used to produce the approved mix design
- Calibration completed with the aggregate sources and blend listed on the Mix Design
- Calibration has not expired (90 days)
CONSTRUCTION MEETING CHECKLIST

ATTENDANCE
☐ Engineer / Inspector
☐ Contractor Representative

PAPERWORK TO BE MADE AVAILABLE TO THE INSPECTOR
☐ Mix Design
☐ Equipment Calibration Documents
☐ Micro-surfacing Specification
☐ Aggregate Delivery Tickets with the supplier(s) Source #, Location, Quantity and Date delivered

THE INSPECTOR’S TASKS
☐ Compare Contractor’s stockpile gradation & the Regional Materials gradation results to the approved Mix Design gradation
☐ Check BR162C “Bituminous Material Certified Shipment Notice” to verify that emulsion source and grade matches the approved Mix Design
☐ Witness the Contractor sample each lot of emulsion delivered to the job site.
☐ Submit emulsions to RME or forward sample(s) as soon as possible to the Main Office Materials Laboratory with a completed BR170M Form “Bitumen Sample” attached.
☐ Verify water source & location / record on the Daily Work Report
☐ Check delivery rate settings on the equipment and compare to Micro-surfacing Mix Unit Settings found in the calibration report. Check periodically throughout the day.
☐ Compare Mineral Filler to the type and source listed on the Mix Design
☐ Check stockpile to ensure additional material has not been added.
☐ Check weather conditions and record on the Daily Work Report
☐ Check pavement markings are removed and manhole covers, catch basins, Road Weather Information System (RWIS) and Utility boxes are covered.
☐ If tack coat is applied, sample and submit using form BR170M “Bitumen Sample”
☐ Visually check the mixture for homogeneity (lumps, balls, unmixed aggregate, segregation, excess water or excess emulsion are not permitted)
☐ Check spreader box for sufficient material
☐ Check application rate
☐ Check paver for excessive speed
☐ Check joint construction to specification
☐ Check the “Strike offs” for buildup of material
☐ Check that no damage has occurred to the new surface
☐ Rolling has been completed (if required)
☐ Contractor placed temporary pavement marking (if required)
☐ Complete Daily Work Report
**DAILY WORK REPORT - MICROSURFACING / SLURRY**

**CONTRACTOR WORK HOURS: _____ TO _____**

**MIX DESIGN # ______________________**

**MIX TYPE – TYPE II ☐ / TYPE III ☐**

<table>
<thead>
<tr>
<th>Mix Unit Settings</th>
<th>Setting From Calibration</th>
<th>Actual Unit Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate</td>
<td>Gate Opening (in)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delivery Rate (lb/ct) – (DR AGG)</td>
<td></td>
</tr>
<tr>
<td>Emulsion</td>
<td>Delivery Rate (lb/ct) – (DR EML)</td>
<td></td>
</tr>
<tr>
<td>Mineral Filler</td>
<td>Delivery Rate (lb/ct) – (DR MIN)</td>
<td></td>
</tr>
</tbody>
</table>

* IF OPENING DOES NOT MATCH CALIBRATION SETTINGS, STOP WORK IMMEDIATELY

**EQUIPMENT SETTINGS**

<table>
<thead>
<tr>
<th>WEATHER</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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**MIX DESIGN – GRADATION RESULTS**

<table>
<thead>
<tr>
<th>Sieves (US Customary &amp; Metric)</th>
<th>Spec Range</th>
<th>QA Results</th>
<th>Mix Design Target</th>
<th>Stockpile Gradation Tolerance *</th>
<th>Meet Gradation Tolerance &amp; Spec Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>9.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>4.75</td>
<td>±5%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>2.36</td>
<td>±5%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>1.18</td>
<td>±5%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>30</td>
<td>600</td>
<td>±5%</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>50</td>
<td>300</td>
<td>±4%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td>150</td>
<td>±3%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>200</td>
<td>75</td>
<td>±2%</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

Date Sample Taken: ____________________________

* STOCKPILE TOLERANCE CANNOT EXCEED GRADATION LIMITS

**WORK QUANTITIES**

<table>
<thead>
<tr>
<th>COURSE (FIRST, SECOND, RUT FILL)</th>
<th>REFERENCE MARKER START/STOP</th>
<th>LANE</th>
<th>TIME START/STOP</th>
<th>COUNTERS</th>
<th>AREA PAVED (9 SQF = 1 SQY)</th>
<th>QUANTITY PLACED** (TONS)</th>
<th>APPLICATION TARGET RATE (FROM SPECIFICATION)</th>
<th>ACTUAL APPLICATION RATE (QUANTITY PLACE/AREA PAVED)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**TOTAL QUANTITY CALCULATION = ((DR AGG) + (DR EML) + (DR MIN)) X (*Head Pulley Count Change) / 2000**

**REMARKS:**

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________

__________________________________________________________________________________________
Chapter 2

The purpose of this chapter is to highlight the responsibilities of all parties involved in a microsurfacing/slurry project prior to and during construction.

It is required that all paving operations begin with a meeting. The Pre-Construction meeting should be held at least two weeks ahead of paving operations. The Engineer should arrange for written minutes and contact information to be taken and distributed. Individuals attending the Pre-construction meeting should be at the project site the first day of production for the Construction Meeting. The Construction Meeting will take place before the paving operation begins. Meeting attendees are responsible for relaying the information covered and agreed upon at the Pre-construction Meeting with the Paving Crews and Inspectors.

Responsibility & Authority
The Engineer and Contractor shall discuss the responsibilities and authority of all individuals involved with the project. Identifying the chain of command and who has authority to make decisions, reduces delays when questions, changes or other issues arise during construction.

Scheduling
The project schedule will be discussed and agreed upon by the parties involved. Discuss how delays caused by weather conditions, equipment breakdown, etc. will be handled to maintain the project schedule.
- The Contractor shall submit a project schedule for the Engineers approval.
- Discuss the anticipated daily production rate.

Maintenance and Protection of Traffic / Traffic Flow
Refer to the contract documents to determine the party responsible for Maintenance and Protection of Traffic (M&PT).
- Contractor submits a M&PT plan for approval (if applicable)
- The plan complies with the Federal “Manual of Uniform Traffic Control Device” (MUTCD)
- Identify equipment needs: traffic control devices, radios, traffic cones, signs, etc.

Crack Sealing and Repair
The Engineer and contractor shall agree that all necessary repairs to the existing pavement have been completed prior to construction. Cracks not sealed at least three months prior to the proposed construction schedule should not be sealed until after reflecting through the overlay.

Surface Preparations
Refer to the contract documents to determine the party responsible for surface preparation. The area to be surfaced shall be thoroughly cleaned of vegetation, loose aggregate and soil; particularly soil that is bound to the surface. Routine debris removal during production is the responsibility of the contractor and is part of the bid price.

Discuss the following:
- Cleaning of pavement surface (equipment to be used)
- Pavement markings that require removal (glass beads, tape, etc.).
- Utilities and structures which require protection such as catch basins, manhole covers, service entrances & Road Weather Information System (RWIS), etc.
- The material that will be used to protect utilities & structures. (Construction Paper, Plastic Sheeting, etc.)
Temporary Pavement Markings
Temporary pavement markings are part of the M&PT responsibility. Refer to the contract documents to determine the party responsible for M&PT.

- Discuss what type of material will be used for temporary pavement markings
- Discuss maintaining proper pavement delineators/markings and correcting displaced markings when using material such as preformed temporary tape.

Permanent Pavement Markings
Determine who is responsible for re-establishing the permanent markings.

Construction Meeting
On the first day of production, the Engineer will arrange an informal meeting with the Contractor and Inspectors to discuss what was covered and agreed to at the Pre-construction meeting.

Documents Provided to the Inspector

Mix Design
The Inspector will review the approved mix design(s) and ensure components listed in the mix design are being used / stockpiled (see page 12). Substitution of components will require a new mix design.

Equipment Calibration Documents
Verify that the gate opening matches the equipment calibration. Record the gate opening on the Daily Work Report and monitor throughout the project.

The Micro-surfacing Specification

Aggregate Gradations & Aggregate Delivery tickets
The Contractors gradations and the Regional Materials Group gradations (QA) will be made available to the Inspector. Compare both gradation results to the approved mix design and record on the Daily Work Report. Aggregate delivery tickets will be reviewed to verify the source number, location and quantity delivered to the stockpile. Stockpile approval is valid until new material is added to the stockpile. The addition of new material requires the stockpile be retested.

Inspector’s Daily Tasks
- **Aggregate Gradations** - Compare results after testing & record on the Daily Work Report. Ensure the QA results meet specification requirements and the stockpile is within tolerance from the mix design. The design target value and stockpile tolerance cannot exceed the specification gradation limits.
- **Emulsions - Review of Documentation & Sampling** - Every delivery of emulsion will be accompanied by a BR162C “Bituminous Material Certified Shipment Notice” form (see page 13 or refer to MM 8.2). Review the BR162C and record the Lot#, Type / Grade, Source and amount (Liters / Gallons) on the Daily Work Report. Ensure that the emulsion grade delivered matches that specified on the mix design. Sample each emulsion lot delivered to the project. Forward the asphalt emulsion sample with a completed BR170 M “Bitumen Sample” form (see page 14 or refer to MM 8.2) attached to the RME or Main Office Materials Laboratory as soon as possible.
- **Water Source** - Verify the water is from the source agreed upon and record on the Daily Work Report.
- **Delivery Rate Settings** - The delivery rate settings must match the settings listed on the equipment calibration documents. Check the gate opening daily and record on the Daily Report.

- **Stockpile Inspection** - Check the stockpile daily for the addition of any new material.

- **Weather and Seasonal Limitations** - Micro-surfacing & slurry will not be applied in the rain, fog or if the air temperature is expected to fall below freezing within 24 hours after application. Application shall not occur unless pavement and ambient temperatures are above 50°F. The Cold Weather Mix Design will be used when air or surface temperatures are below 60°F. Stop Micro-surfacing if the temperature drops below 50°F.

- **Surface Preparation**
  
  Check the road surface prior to application to ensure that the Contractor has:
  - Cleared the road surface of all loose aggregate, soil, vegetation or other objectionable material.
  - Removed pavement marking tape and glass beads. (If the roadway has been plowed most of the glass beads will have been removed.)
  - Check that manhole covers, catch basins, RWIS and utility boxes are covered.

- **Check daily for**:
  - Homogeneity - No lumps, balls, unmixed aggregate, segregation, excess water or excess emulsion are permitted in the mix.
  - Material is sufficient and contained to the spreader box at all times to ensure complete coverage. Overloading of the spreader box shall be avoided.
  - Mix stability - the mixture should not break in the spreader box. “Breaking” is when the water and asphalt in the emulsion separate, beginning the curing process.
  - Excessive water shall not be sprayed directly into the spreader box while the micro-surfacing / slurry material is being placed.
  - Check the mineral filler for lumps. Lumps in mineral filler are not permitted.
  - Check the strike offs for build up of material. Strike offs can be a rigid material or burlap. Build-up on the strike offs can lead to a poor finish. Have the Contractor clean if necessary.
  - No streaks, such as those from oversized aggregate shall be left in the finished surface. If excessive streaking is observed, notify the contractor.
  - Paver Speed - Excessive speed can cause washboarding on the surface of the overlay. If observed, notify the contractor.
  - Curing - Under typical conditions the new surface should cure in one hour. Cooler, high humidity conditions may require longer cure times. The Contractor determines when to allow traffic on the finished surface. *Suitable Methods shall be used by the contractor to protect the surface until it can support traffic without damage.*
  - Joint Construction - No excess buildup, uncovered areas or unsightly appearance shall be permitted on longitudinal or transverse joints.
  - Handwork - Handwork shall be minimized. Areas which cannot be reached with the equipment shall be surfaced using approved hand tools to provide complete and uniform coverage. The same type of finish as applied by the spreader box shall be required in the hand worked areas.
  - Rolling - Rolling completed if required (After Sept. 15th)
  - Clean up - The contractor shall, on a daily basis, remove any excess material or debris associated with the work.
  - Temporary Markings - Markings placed by the end of each work day. (if required)
Daily Worksheet Calculations
- Determine the following and record on the daily worksheet:
  - Calculate the Yield
  - Quantity of Material Placed
  - The Application Rate

Calculating Yield
Determine the Area Paved using the formula \( A = L \times W \)
- Width of paved surface = 12’
- Length of paved surface = 0.8 miles (convert miles to feet)
  \[
  0.8 \text{ miles} \times 5280 \text{ ft (1 mile)} = 4224 \text{ ft}
  \]
  \[
  A = 4224 \text{ ft} \times 12' = 50688 \text{ ft}^2
  \]
  \[
  50688 \text{ ft}^2 / 9 \text{ ft}^2 = 5362 \text{ yd}^2
  \]

Determining Quantity of Material Placed
(From Calibration Sheet)
- Delivery rate of Aggregate = 50.0 lbs/ct
- Delivery rate of Emulsion = 6.5 lbs/ct
- Delivery rate of Mineral Filler = 0.5 lbs/ct
  - Total = 57.0 lbs/ct

Read the Change in Head Pulley Count
- Start = 1400 ct
- End = 4200 ct
- Difference = 2800 ct

  Take 57 lbs/ct x 2800 ct = 159,600 lbs of material placed
  - Determine tons by dividing by 2000 lbs
    - Total tons placed = 79.8 tons

Determine Application Rate
- Take the total weight of material placed and divide by the area (yd²)
  \[
  \text{Application Rate} = 159600 \text{ lbs} / 5632 \text{ (yd}^2) = 28.34 \text{ lbs} / \text{yd}^2
  \]

Compare Application Rate with the Rate in the Specification and Record on the “Daily Report”

Rut Filling
Refer to the contract documents for details on rut filling. Use the table provided for estimating the Microsurface Rut Filling Application Rate.

<table>
<thead>
<tr>
<th>Average Rut Depth (inches)</th>
<th>Rut Filling Application Rate (lbs/yd²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0- ½”</td>
<td>0-20 lbs yd²</td>
</tr>
<tr>
<td>½” to ¾”</td>
<td>20-30 lbs/ yd²</td>
</tr>
<tr>
<td>¾” to 1”</td>
<td>25-35 lbs/yd²</td>
</tr>
<tr>
<td>1” to 1 ¼”</td>
<td>28-38 lbs/yd²</td>
</tr>
<tr>
<td>1 ¼” to 1 ½”</td>
<td>32-40 lbs/yd²</td>
</tr>
</tbody>
</table>
NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU

TYPE II MICRO-SURFACING MIXTURE DESIGN FORM

Location: Rt. 2; Town of Brunswick
Initial emulsion lot: 10A

MIX DESIGN No. APC2-09-01
AGGREGATE: 100 %
EMULSION: 12.0 %
RESIDUAL ASPHALT: 7.5 %
POLYMER MODIFIER: 3.5 %
FIELD CONTROL ADDITIVE: as required %
MINERAL FILLER: 1.0 %
WATER: 10.0 %
TRAFFIC VOLUME: >4000

AGGREGATE
SOURCE No. & BLEND %:
1-1R 100%

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PASSING</th>
<th>SPECIFICATION min-max</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>100.0</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>97.0</td>
<td>90 - 100</td>
</tr>
<tr>
<td>8</td>
<td>79.0</td>
<td>65 - 90</td>
</tr>
<tr>
<td>16</td>
<td>57.0</td>
<td>45 - 70</td>
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</tr>
<tr>
<td>50</td>
<td>25.0</td>
<td>18 - 30</td>
</tr>
<tr>
<td>100</td>
<td>16.0</td>
<td>10 - 21</td>
</tr>
<tr>
<td>200</td>
<td>12.0</td>
<td>5 - 20</td>
</tr>
</tbody>
</table>

SAND EQUIVALENCY: 67.0 %

MINERAL FILLER
PRODUCT: Cement
TYPE: I
SOURCE: Blue Circle

FIELD CONTROL ADDITIVE
PRODUCT: N480L
SOURCE: KSA

POLYMER MODIFIER SYSTEM
PRODUCT: NX 1138
SOURCE: BASF

ASPHALT EMULSION
SOURCE: Koch Materials
TYPE: CQS-1hp

Residue After Distillation: 62.5 %

TESTS ON RESIDUE
Softening Point (AASHTO T53) 60.0 C
Penetration at 25°C (AASHTO T49) 55 dmm

MIX DESIGN TEST RESULTS
Wet Cohesion (ISSA TB 139) 30 minutes 15.0 kg-cm
60 minutes 23.0 kg-cm
Wet Track Abrasion Loss (ISSA TB 100) 1 hour soak 10.0 g/m²
6 day soak 25.0 g/m²
Mix Time (ISSA TB 113) 165.0 sec.
Classification Compatibility (ISSA TB 144) 11.0 points
Wet Stripping (ISSA TB 114) 100 %

Loaded Wheel Test
Excess Asphalt (ISSA TB 109) 58 g/m²
Lateral Displacement (ISSA TB 147A) 4.50 %
sg@1000 cycles 1.81

TESTING PERFORMED BY:
Atlas Asphalt Co.
234 Central Ave. Albany, NY 12232

SUBMITTED FOR APPROVAL BY:
Acme Paving Co.
2 Industrial Ave. Albany, NY 12232

CONTACT NAME: Walter Riley
PHONE #: 518-485-4090
FAX #: 518-457-8171

APPROVED: Walter Riley 7/1/2009
NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU

BITUMINOUS MATERIAL CERTIFIED SHIPMENT NOTICE

If one transport supplies two or more projects, a separate BR 162 M (7/96) is required for each project.
THIS FORM SHALL BE EXECUTED FOR ALL SHIPMENTS OF BITUMEN.

<table>
<thead>
<tr>
<th>PRIMARY SOURCE</th>
<th>LOCATION (mailing address)</th>
<th>LOT NO.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acme Asphalt Co.</td>
<td>200 Industrial Ave.</td>
<td>08-175</td>
</tr>
<tr>
<td></td>
<td>Albany, NY 12345</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUPPLIER (Present owner of material being shipped)</th>
<th>LOCATION (mailing address)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACME Asphalt Co.</td>
<td>Same</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHIPMENT DESTINATION</th>
<th>LOCATION (mailing address)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY DOT</td>
<td>Bridgeport, NY 12345</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LITERS @ 16°C</th>
<th>SPEC. GRAVITY @ 16°C</th>
<th>VEHICLE NO</th>
<th>CONTRACT NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1675</td>
<td>1.01</td>
<td>NY 3750</td>
<td>D26573</td>
</tr>
</tbody>
</table>

Complete the following section for LINE BLENDED BITUMENS ONLY.

<table>
<thead>
<tr>
<th>ITEM GRADE</th>
<th>PRIMARY SOURCE</th>
<th>LOCATION</th>
<th>LOT NO.</th>
<th>LITERS @ 16°C</th>
<th>% TOTAL</th>
<th>SPEC. GRAVITY @ 16°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above indicated material has been tested and a CERTIFIED TEST REPORT, dated 7/15/08, indicating conformance with all requirements of applicable Department Specifications, is on file.

I HEREBY CERTIFY THAT THE ABOVE INFORMATION IS CORRECT TO THE BEST OF MY KNOWLEDGE.

Walter Reilly
Plant Manager

Authorized Signature (For Supplier)  Date

* PRIMARY SOURCE — Refinery, Line-Blend Plant, Emulsion Plant, or Intermediate Storage-Facility where BITUMEN is SAMPLED, TESTED, and CERTIFIED or RECERTIFIED.

** TEMPERATURE VISCOSITY CURVE (KINEMATIC)
One copy should be sent with the first shipment of each LOT of Bitumen made to any Mix Plant or Project. (Not required for Tars, Fillers, Emulsions or Emulsion Bases).

DISTRIBUTION: WHITE - With Shipment  YELLOW - Supplier  PINK - To Region
Form BR170 M – Bitumen Sample – This form is used by the Inspector to transmit an emulsion sample to the Materials Bureau for testing. Directions for sampling the emulsion and filling out the BR170 can be found on the back of the form. After filling out the form, affix copy #5 (peel & stick) to the 1L plastic sample bottle. Submit the sample with the BR170 form to the RME or forward to the Main Office Materials Laboratory. The Pink & Yellow copies with be retained by the inspector. All other copies are sent to the Main Office with the sample.

1.) Primary Source This will be listed on the BR162
2.) Location. The mailing address of the primary source or supplier if known.
3.) Lot #. The lot number will be listed on the BR162
4.) Item # The item # for Micro-surfacing emulsions is 702-4801
5.) Grade Type. The grade of emulsion used for Micro-surfacing is CQS-1hp
6.) Date & Time Sampled Please put the correct info here.
7.) Sampled By Put your name here.
8.) Region The region where the work is being performed.
9.) Please list project number or contract number, Rte #, Vehicle #, and Liters used.
Chapter 3

CALIBRATION

Mix Unit Background:
Micro-surfacing and quick-set slurry are mixtures of asphalt emulsion, aggregate, mineral filler, water and additive. The ingredients are delivered to, and mixed by, a pugmill contained in the mix unit. The mix unit must be calibrated so that the mixture being produced contains the proper ratio of ingredients.

Each mix ingredient is fed into the pugmill separately. To ensure proper mixture proportions, each material feeder must be calibrated with the head pulley that drives the aggregate delivery belt. After each feeder is calibrated with the head pulley, the counter on the head pulley can be used to calculate the total quantity of mix produced.

The aggregate is delivered to the pugmill by a conveyor belt. A counter reads the number of rotations of the aggregate belt head pulley. The quantity of aggregate delivered into the pugmill per count of the head pulley is controlled by opening or closing the aggregate gate.

Emulsion is delivered to the pugmill by an emulsion pump that is mechanically connected to the aggregate head pulley. An emulsion counter reads the number of rotations of the emulsion pump. The pump is calibrated using the aggregate head pulley counter to proportion the mixture and the emulsion counter is disregarded because the emulsion pump and the head pulley do not turn at the same rpm. The pump delivers the same quantity of emulsion per revolution of the head pulley. Once the pump output is established, the mixture is proportioned by adjusting the aggregate gate and mineral filler feed rate.

The mineral filler feeder is not mechanically connected to the head pulley. The feeder is equipped with a separate counter, and delivers a constant quantity of material per revolution of that counter. The mineral filler delivery rate is adjusted by increasing or decreasing the number of counts per minute of the mineral filler feeder.

Calibration:
Notify the RME prior to calibrating equipment. The first calibration of the year for each mix must be witnessed by Department personnel. Calibrations are valid for 90 days from the date of calibration. Subsequent 90 day calibrations may be company certified at the discretion of the RME. The RME may request a copy of the raw calibration data and weight tickets immediately following the calibration, or at any other time prior to approving the calibration.

A separate calibration is required for each aggregate source, blend and each gradation type.

Calibration Procedure:
Use only calibrated scales sealed within the last year by the County Sealer of Weights and Measures or other certified technician. The individual delivery rates (pounds per count) must be within 3\% of the corresponding average delivery rate for the equipment to be within the calibration limits.

Emulsion
The first step in the calibration process is to determine the emulsion delivery rate in pounds per count of the head pulley (lbs/ct\text{hp}).

1. Weigh the mix unit full.
2. Pump emulsion from the mix unit into a suitable container, until at least 75 counts have elapsed on the aggregate head pulley counter.
3. Re-weigh the mix unit and determine the mass of emulsion pumped off.
4. Divide the mass of emulsion by the number of counts of the head pulley counter.
5. Repeat this process at least two more times.
6. Calculate the average emulsion delivery rate for all results (lbs/ct\text{hp}).
Aggregate
Determine the aggregate delivery rate in lbs/ct_{hp} at three or more gate openings. These measured rates are then plotted on a linear scale of Dry Aggregate Delivery Rate versus Gate Opening to determine the delivery rate of aggregate at all intermediate gate openings.

1. Set the aggregate gate to the appropriate opening.
2. Weigh the mix unit full of aggregate.
3. Discharge aggregate until at least 50 counts have elapsed on the aggregate belt head pulley counter.
4. Re-weigh the mix unit, and determine the amount of aggregate delivered.
5. Calculate the delivery rate as mass of aggregate discharged divided by the number of counts.
6. Calculate the delivery rate three times at each gate opening.
7. Determine the average delivery rate for each of the three gate openings.
8. Determine the percent moisture content of the aggregate. Use equation 1 to calculate the average delivery rate of dry aggregate at each gate opening.

\[ R_{\text{ad}} = \frac{R_{\text{am}}}{(1 + M/100)} \]

*equation 1*

where:

- \( R_{\text{ad}} \) = Average delivery rate of dry aggregate (lbs/ct_{hp})
- \( R_{\text{am}} \) = Average delivery rate of moist aggregate (lbs/ct_{hp})
- \( M \) = Moisture content of the aggregate (%)

9. Plot the average delivery rate of dry aggregate at each gate opening on a graph of Dry Aggregate Delivery Rate versus Gate Opening.

Mineral Filler
Determine the amount of mineral filler delivered in pounds per count of the mineral filler counter (lbs/ct_{mf}). This procedure requires a bucket or suitable container to hold the mineral filler.

1. Weigh the bucket empty.
2. Discharge the mineral filler into the bucket until at least 10 counts have elapsed on the mineral filler counter.
3. Weigh the bucket and mineral filler and determine the mass of mineral filler delivered.
4. Divide the mass of mineral filler by the number of counts on the mineral filler counter.
5. Repeat the procedure at least two more times.
6. Determine the average rate of delivery of mineral filler (lbs/ct_{mf}).

Setting the Mix Unit to Produce a Specific Mix Design
Emulsion is the only ingredient that is delivered at a fixed rate; the amount of aggregate and mineral filler must be adjusted to proportion the mixture correctly.

1. Determine the required delivery rate of dry aggregate in pounds per count using equation 2.

\[ R_{\text{sp}} = \frac{R_e}{(P_e / 100)} \]

*equation 2*

where:

- \( R_{\text{sp}} \) = Delivery rate of dry aggregate required to produce mix (lbs/ct_{sp})
- \( R_e \) = Average delivery rate of emulsion (lbs/ct_{sp})
- \( P_e \) = Proportion of emulsion in mix as a percent of dry mass of aggregate (%)

2. Use the graph of Dry Aggregate Delivery Rate versus Gate Openings to determine the gate opening that provides the required aggregate delivery rate.
3. Set the aggregate gate to the appropriate opening.
4. Establish the desired production rate (determined by contractor) in pounds of dry aggregate per minute. The production rate depends on the paving application rate and the desired forward speed of the unit.
5. Determine the aggregate delivery belt setting in counts per minute required to supply the desired production rate using equation 3.

\[ S_a = \frac{PR_{ad}}{R_{ap}} \]

*equation 3*

where:

- \( S_a \) = Speed setting of aggregate delivery belt (ct_hp/minute)
- \( PR_{ad} \) = Production rate of dry aggregate, determined by Contractor (lbs/minute)
- \( R_{ap} \) = Delivery rate of dry aggregate required to produce mix (lbs/ct_hp)

6. Determine the required delivery rate of mineral filler in pounds per minute using equation 4.

\[ PR_{mf} = PR_{ad} \times P_{mf} \]

*equation 4*

where:

- \( PR_{mf} \) = Production rate of mineral filler (lbs/minute)
- \( PR_{ad} \) = Production rate of dry aggregate (lbs/minute)
- \( P_{mf} \) = Proportion of mineral filler in the mix as a percentage of dry mass of aggregate (%)

7. Determine the required setting of the mineral filler feeder in counts per minute using equation 5.

\[ S_{mf} = \frac{PR_{mf}}{R_{mf}} \]

*equation 5*

where:

- \( S_{mf} \) = Speed setting for mineral filler delivery system (ct_mf/minute)
- \( PR_{mf} \) = Production rate of mineral filler (lbs/minute)
- \( R_{mf} \) = Delivery rate of mineral filler based on mineral filler counter (lbs/ct_mf)

8. To check the proportion of mineral filler in the final mixture, find the quantity of mineral filler delivered per count of the aggregate belt using equations 6.

\[ R_{mfhp} = R_{mf} \times S_{mf} / S_a \]

*equation 6*

where:

- \( R_{mfhp} \) = Delivery rate of mineral filler based on head pulley counter (lbs/ct_hp)
- \( R_{mf} \) = Delivery rate of mineral filler based on mineral filler counter (lbs/ct_mf)
- \( S_{mf} \) = Speed Setting of mineral filler feeder (ct_mf/minute)
- \( S_a \) = Speed setting of aggregate delivery belt (ct_hp/minute)

If the unit is properly set \( R_{mfhp} \) will equal \( R_{ap} \times P_{mf} \).

9. Set the mineral filler feeder to provide the appropriate number of counts per minute.

**VERIFYING THE CALIBRATION**

Calibration verification will be performed at the RME’s discretion. The decision to verify the calibration will be made on a project by project basis. The following method may be used to verify the calibration of any mix unit.

The RME may require the Contractor to perform a one point verification of the calibration as follows.

1. Set the material delivery systems to the appropriate settings for the mixture design being used on the project.
2. Emulsion, except only perform one test.
3. Aggregate, except only perform one test.
4. Mineral Filler, except only perform one test.

If the delivery rate for any material differs from the rate shown on the approved calibration by more than 5%, a new calibration is required.
### EMULSION CALIBRATION

Minimum 75 counts of the Aggregate belt counter per test.

<table>
<thead>
<tr>
<th>EMULSION</th>
<th>FULL MASS (lbs)</th>
<th>EMPTY MASS (lbs)</th>
<th>NET MASS (lbs)</th>
<th># OF COUNTS (ct)</th>
<th>DELIVERY RATE (lbs/ct&lt;sub&gt;np&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST 1</td>
<td>24000</td>
<td>23300</td>
<td>700</td>
<td>250</td>
<td>2.80</td>
</tr>
<tr>
<td>TEST 2</td>
<td>23300</td>
<td>22600</td>
<td>700</td>
<td>250</td>
<td>2.80</td>
</tr>
<tr>
<td>TEST 3</td>
<td>22600</td>
<td>21890</td>
<td>710</td>
<td>250</td>
<td>2.84</td>
</tr>
</tbody>
</table>

**AVERAGE RATE** 2.81

---

### MINERAL FILLER CALIBRATION

Minimum 10 counts of the Mineral Filler Feeder counter per test.

<table>
<thead>
<tr>
<th>MINERAL FILLER</th>
<th>FULL MASS (lbs)</th>
<th>EMPTY MASS (lbs)</th>
<th>NET MASS (lbs)</th>
<th># OF COUNTS (ct)</th>
<th>DELIVERY RATE (lbs/ct&lt;sub&gt;mf&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST 1</td>
<td>33</td>
<td>3.3</td>
<td>29.7</td>
<td>50</td>
<td>0.594</td>
</tr>
<tr>
<td>TEST 2</td>
<td>33</td>
<td>3.3</td>
<td>29.7</td>
<td>50</td>
<td>0.594</td>
</tr>
<tr>
<td>TEST 3</td>
<td>33</td>
<td>3.3</td>
<td>29.7</td>
<td>50</td>
<td>0.594</td>
</tr>
</tbody>
</table>

**AVERAGE RATE** 0.59

**NOTE:** The individual delivery rates (lbs/ct) must be within +/-3% of the corresponding average delivery rate.
### AGGREGATE CALIBRATION

<table>
<thead>
<tr>
<th>Gate Opening (in)</th>
<th>Full Mass (lbs)</th>
<th>Empty Mass (lbs)</th>
<th>Net Mass (lbs)</th>
<th># of Counts (ct)</th>
<th>Delivery Rate (lbs/ct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>66000</td>
<td>63800</td>
<td>2200</td>
<td>150</td>
<td>14.67</td>
</tr>
<tr>
<td>3</td>
<td>61314</td>
<td>59114</td>
<td>2200</td>
<td>150</td>
<td>14.67</td>
</tr>
<tr>
<td>3</td>
<td>56540</td>
<td>54340</td>
<td>2200</td>
<td>150</td>
<td>14.67</td>
</tr>
</tbody>
</table>

**Average Rate**: 14.67 lbs/ct

<table>
<thead>
<tr>
<th>Gate Opening (in)</th>
<th>Full Mass (lbs)</th>
<th>Empty Mass (lbs)</th>
<th>Net Mass (lbs)</th>
<th># of Counts (ct)</th>
<th>Delivery Rate (lbs/ct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>67100</td>
<td>64200</td>
<td>2900</td>
<td>125</td>
<td>23.20</td>
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<tr>
<td>4</td>
<td>61380</td>
<td>58380</td>
<td>3000</td>
<td>125</td>
<td>24.00</td>
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<tr>
<td>4</td>
<td>59650</td>
<td>52710</td>
<td>2950</td>
<td>125</td>
<td>23.60</td>
</tr>
</tbody>
</table>

**Average Rate**: 23.60 lbs/ct

<table>
<thead>
<tr>
<th>Gate Opening (in)</th>
<th>Full Mass (lbs)</th>
<th>Empty Mass (lbs)</th>
<th>Net Mass (lbs)</th>
<th># of Counts (ct)</th>
<th>Delivery Rate (lbs/ct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>63800</td>
<td>60555</td>
<td>3245</td>
<td>100</td>
<td>32.45</td>
</tr>
<tr>
<td>5</td>
<td>57860</td>
<td>54560</td>
<td>3300</td>
<td>100</td>
<td>33.00</td>
</tr>
<tr>
<td>5</td>
<td>52030</td>
<td>48730</td>
<td>3300</td>
<td>100</td>
<td>33.00</td>
</tr>
</tbody>
</table>

**Average Rate**: 32.82 lbs/ct

**NOTE**: The individual delivery rates (lbs/ct) must be within +/-3% of the corresponding average delivery rate.

<table>
<thead>
<tr>
<th>Gate Opening (in)</th>
<th>Average (lbs/ct)</th>
<th>Moisture Content %</th>
<th>Dry Aggregate (lbs/ct&lt;sub&gt;dry&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.00</td>
<td>14.67</td>
<td>4</td>
<td>14.10</td>
</tr>
<tr>
<td>4.00</td>
<td>23.60</td>
<td>4</td>
<td>22.89</td>
</tr>
<tr>
<td>5.00</td>
<td>32.82</td>
<td>4</td>
<td>31.55</td>
</tr>
</tbody>
</table>
MICROSURFACING CALIBRATION

COMPANY: ACME PAVING
PHONE #: 599-Nevermind

TRUCK TYPE: Truck Mount
SERIAL #: 1000-00
MAKE: Delorian
CONTACT PERSON: Wile E. Coyote

EMULSION
Average pounds of emulsion per count of the aggregate belt head pulley counter

Primary Source: Bitumaster
Type: CQS-1hp
RATE - EMUL: 2.81 lbs/ct

MINERAL FILLER
Average pounds of mineral filler per count of the mineral filler counter

PRODUCT: Cement
TYPE: 1
SOURCE: Quickrete
RATE - MINFIL: 0.59 lbs/ct

AGGREGATE
AGGREGATE SOURCE NO.: 1-1A
GRADATION (2MS / 3MS): 3MS
AGGREGATE SUPPLIER: Flintstones

DRY AGGREGATE DELIVER RATE VS GATE OPENING

Calibration Date: 09/24/08
90 Day Expiration Date: 12/23/08
Company Representative Signature
Date

NYSDOT Approval Signature
Date
MICROSURFACING CALIBRATION

MICROSURFACING MIX UNIT SETTINGS

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>ACME PAVING</th>
<th>DATE (mm/dd/yy)</th>
<th>09/24/08</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUCK TYPE</td>
<td>Truck Mount</td>
<td>SERIAL #</td>
<td>1000-00</td>
</tr>
<tr>
<td>CONTACT PERSON</td>
<td>Wile E. Coyote</td>
<td>PHONE #</td>
<td>Delorian</td>
</tr>
<tr>
<td>Stockpile Location</td>
<td>Rensselaer County Maintenance Facility</td>
<td>Mix Design</td>
<td>ABC3-08-01</td>
</tr>
<tr>
<td>Stockpile Created Date</td>
<td>06/01/08</td>
<td>GRADATION (2MS / 3MS)</td>
<td>3MS</td>
</tr>
<tr>
<td>AGGREGATE SOURCE NO.</td>
<td>1-1A</td>
<td>AGGREGATE SUPPLIER</td>
<td>Flintstones</td>
</tr>
<tr>
<td>AGGREGATE SOURCE NO.</td>
<td>2-1A</td>
<td>AGGREGATE SUPPLIER</td>
<td>Kramerica</td>
</tr>
<tr>
<td>AGGREGATE SOURCE NO.</td>
<td>0</td>
<td>AGGREGATE SUPPLIER</td>
<td>0</td>
</tr>
</tbody>
</table>

MIX DESIGN # ABC3-08-01

% Emulsion From Mix Design | 13 % FROM MIX DESIGN
% Mineral Filler From Mix Design | 1 % FROM MIX DESIGN

Required Delivery Rate of Dry Agg | 21.64 lbs/ct

Production Rate | 1500 lbs/min FROM CONTRACTOR
Gate Opening For Required Delivery Rate | 3.77 in

Counts per minute of Aggregate Belt | 69 ct/min
Counts per minute of Mineral Filler | 15 lbs/min
Counts per minute of Mineral Filler | 25 ct/min

Delivery Rate of Mineral Filler per count of Agg Belt Counter | 0.22 lbs/ct

MATERIAL DELIVERY RATES (lbs per count of Aggregate Belt)

<table>
<thead>
<tr>
<th>Material</th>
<th>Settings</th>
<th>(DR&lt;sub&gt;EMI&lt;/sub&gt;)</th>
<th>(DR&lt;sub&gt;AGG&lt;/sub&gt;)</th>
<th>(DR&lt;sub&gt;MNF&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emulsion</td>
<td>Fixed</td>
<td>2.81 lbs/ct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate</td>
<td>Gate Opening</td>
<td>3.77 in</td>
<td>21.64 lbs/ct</td>
<td>0.22 lbs/ct</td>
</tr>
<tr>
<td>Mineral Filler</td>
<td>MF Delivery Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I certify that the calibration and mix design information used to determine these mix unit settings are based on the actual material and mix design to be used on the project.

Contractor Representative's Signature ___________________________ Date ________________

ACME PAVING 1000-00 3/10/2009
Contractor Mix Design / Sample Submittals

Standard Mix Design Procedure:
Mix Designs should be completed and submitted to the RME, Resident Engineer, and Materials Bureau, 2 weeks prior to construction.

Mix Design Requirements:
Standard Tests
- Wet Track Abrasion Loss (ISSA TB 100); @ 1 hour & 6 day soak
- Mix Time (ISSA TB 113)
- Classification Compatibility (ISSA TB 144)
- Wet Stripping (ISSA TB 114)
- Loaded Wheel Test (ISSA TB 109 & 147A); excess asphalt, lateral displacement, specific gravity @ 1000 cycles
- Wet Cohesion ISSA TB 139; @ 30 & 60 minutes

Cold Weather Micro-Surfacing Mix Designs:
Micro-surfacing placed when pavement or ambient temperatures are below 60 °F are required to use a modified mix design specifically developed for cold weather application. The test procedure is the Wet Cohesion ISSA TB139; @ 30 & 60 minutes except as modified:

Modified Wet Cohesion Procedure:
Place mix ingredients (excluding emulsion) and mixing equipment (molds, bowls, spoons, etc.) in an environmental chamber capable of maintaining a temperature of 55 ± 2°F. Use emulsion maintained at the expected field delivery temperature, but not more than 140°F.

After mix ingredients and equipment are acclimated to 55 °F, remove necessary materials, mix with emulsion, cast specimens and cure in the environmental chamber. Test cured specimens at standard laboratory temperature and report:
- Wet Cohesion at 30 & 60 minutes
- Emulsion temperature

Sample Submittals:

Field Control Additive:
Submit a minimum of one quart of any field control additive to be used during the construction season. Field control additives must be submitted prior to any mix design approval.

Emulsion:
Submit a minimum of one half gallon from each certified emulsion lot.

Submit samples to:
Field Engineering 2
NYSDOT Materials Bureau
50 Wolf Road
Albany 12232
### NEW YORK STATE DEPARTMENT OF TRANSPORTATION MATERIALS BUREAU
#### TYPE II MICRO-SURFACING MIXTURE DESIGN FORM

<table>
<thead>
<tr>
<th>MIX DESIGN</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGREGATE:</td>
<td>100 %</td>
</tr>
<tr>
<td>EMULSION:</td>
<td>%</td>
</tr>
<tr>
<td>RESIDUAL ASPHALT:</td>
<td>%</td>
</tr>
<tr>
<td>POLYMER MODIFIER:</td>
<td>%</td>
</tr>
<tr>
<td>FIELD CONTROL ADDITIVE:</td>
<td>%</td>
</tr>
<tr>
<td>MINERAL FILLER:</td>
<td>%</td>
</tr>
<tr>
<td>WATER:</td>
<td>%</td>
</tr>
<tr>
<td>TRAFFIC VOLUME:</td>
<td></td>
</tr>
</tbody>
</table>

#### AGGREGATE
**SOURCE No. & BLEND %:**

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>PASSING %</th>
<th>SPECIFICATION min-max</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>90 - 100</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>65 - 90</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>45 - 70</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30 - 50</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>18 - 30</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>10 - 21</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>5 - 20</td>
<td></td>
</tr>
</tbody>
</table>

**SAND EQUIVALENCY %**

#### ASPHALT EMULSION
**SOURCE:**

**TYPE:** CQS-1hp

<table>
<thead>
<tr>
<th>RESIDUE AFTER DISTILLATION</th>
<th>%</th>
</tr>
</thead>
</table>

**TESTS ON RESIDUE**

- Softening Point (AASHTO TS3) | C
- Penetration at 25°C (AASHTO T49) | dmm

#### MINERAL FILLER
**PRODUCT:**

**TYPE:**

**SOURCE:**

#### FIELD CONTROL ADDITIVE
**PRODUCT:**

**SOURCE:**

#### POLYMER MODIFIER SYSTEM
**PRODUCT:**

**SOURCE:**

#### MIX DESIGN TEST RESULTS

<table>
<thead>
<tr>
<th>TEST</th>
<th>TIME</th>
<th>STRENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Cohesion</td>
<td>30 minutes</td>
<td>kg-cm</td>
</tr>
<tr>
<td>Wet Cohesion</td>
<td>60 minutes</td>
<td>kg-cm</td>
</tr>
<tr>
<td>Wet Track Abrasion Loss</td>
<td>1 hour soak</td>
<td>g/m²</td>
</tr>
<tr>
<td>Wet Track Abrasion Loss</td>
<td>6 day soak</td>
<td>g/m²</td>
</tr>
<tr>
<td>Mix Time (ISSA TB 113)</td>
<td>sec</td>
<td></td>
</tr>
<tr>
<td>Classification Compatibility (ISSA TB 144)</td>
<td>points</td>
<td></td>
</tr>
<tr>
<td>Wet Stripping (ISSA TB 114)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Loaded Wheel Test</td>
<td></td>
<td>g/m²</td>
</tr>
<tr>
<td>Excess Asphalt</td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Lateral Displacement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### TESTING PERFORMED BY:

**LABORATORY/COMPANY NAME:**

**ADDRESS:**

#### SUBMITTED FOR APPROVAL BY:

**COMPANY NAME:**

**ADDRESS:**

**CONTACT NAME:**

**PHONE #:**

**FAX #:**

### APPROVED:

**NAME/TITLE**

**SIGNATURE**

**DATE**
NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
TYPE II MICRO-SURFACING MIXTURE DESIGN FORM

COLD WEATHER MIX DESIGN
Location:
Initial emulsion lot:

MIX DESIGN
AGGREGATE: 100 %
EMULSION: %
RESIDUAL ASPHALT: %
POLYMER MODIFIER: %
FIELD CONTROL ADDITIVE: %
MINERAL FILLER: %
WATER: %
TRAFFIC VOLUME:

AGGREGATE
SOURCE No. & BLEND %:

GRADATION
SIEVE PASSING SPECIFICATION
SIZE % min-max
3/8 100
4 90 - 100
8 65 - 90
16 45 - 70
30 30 - 50
50 18 - 30
100 10 - 21
200 5 - 20

SAND EQUIVALENCY %

ASPHALT EMULSION
SOURCE: TYPE: CQS-1hp
Residue After Distillation: %
TESTS ON RESIDUE
Softening Point (AASHTO T53) C
Penetration at 25C (AASHTO T49) dmm

MINERAL FILLER
PRODUCT: TYPE: SOURCE:

FIELD CONTROL ADDITIVE
PRODUCT: SOURCE:

POLYMER MODIFIER SYSTEM
PRODUCT: SOURCE:

MIX DESIGN TEST RESULTS
Wet Cohesion (Modified ISSA TB 139) 30 minutes kg-cm
60 minutes kg-cm
Wet Track Abrasion Loss (ISSA TB 100) 1 hour soak g/m²
6 day soak g/m²
Mix Time (ISSA TB 113) sec.
Classification Compatibility (ISSA TB 144) points
Wet Stripping (ISSA TB 114) %
Loaded Wheel Test Excess Asphalt (ISSA TB 109 & 107) g/m²
Lateral Displacement (ISSA TB 147A) %
s@1000 cycles

TESTING PERFORMED BY:
LABORATORY/COMPANY NAME: ADDRESS:

SUBMITTED FOR APPROVAL BY:
COMPANY NAME: ADDRESS:
CONTACT NAME: PHONE # FAX #:

APPROVED:
NAME/TITLE SIGNATURE DATE
**NEW YORK STATE**
**DEPARTMENT OF TRANSPORTATION**
**MATERIALS BUREAU**
**TYPE III MICRO-SURFACING MIXTURE DESIGN FORM**

<table>
<thead>
<tr>
<th>MIX DESIGN</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGGREGATE:</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>EMULSION:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>RESIDUAL ASPHALT:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>POLYMER MODIFIER:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>FIELD CONTROL ADDITIVE:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>MINERAL FILLER:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>WATER:</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>TRAFFIC VOLUME:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AGGREGATE**

| SOURCE NO. & BLEND %: |  |

<table>
<thead>
<tr>
<th>SIEVE SIZE</th>
<th>% PASSING</th>
<th>SPECIFICATION min-max</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>70 - 90</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>45 - 70</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>28 - 50</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>19 - 34</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>12 - 25</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>7 - 20</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>5 - 20</td>
<td></td>
</tr>
</tbody>
</table>

**SAND EQUIVALENCY** %

**GRADATION**

**ASPHALT EMULSION**

<table>
<thead>
<tr>
<th>TYPE:</th>
<th>CQS-1hp</th>
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<tbody>
<tr>
<td>Residue After Distillation:</td>
<td>%</td>
</tr>
<tr>
<td>TESTS ON RESIDUE</td>
<td></td>
</tr>
<tr>
<td>Softening Point (AASHTO T53)</td>
<td>C</td>
</tr>
<tr>
<td>Penetration at 25°C (AASHTO T49)</td>
<td>dmm</td>
</tr>
</tbody>
</table>

**MINERAL FILLER**

| PRODUCT: | TYPE: | SOURCE: |

**FIELD CONTROL ADDITIVE**

| PRODUCT: | SOURCE: |

**POLYMER MODIFIER SYSTEM**

| PRODUCT: | SOURCE: |

**MIX DESIGN TEST RESULTS**

<table>
<thead>
<tr>
<th>TEST</th>
<th>TIME</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet Cohesion</td>
<td>30 minutes</td>
<td>kg·cm</td>
</tr>
<tr>
<td>50 minutes</td>
<td>kg·cm</td>
<td></td>
</tr>
<tr>
<td>Wet Track Abrasion Loss</td>
<td>1 hour soak</td>
<td>g/m²</td>
</tr>
<tr>
<td>(ISSA TB 100)</td>
<td>6 day soak</td>
<td>g/m²</td>
</tr>
<tr>
<td>Mix Time (ISSA TB 113)</td>
<td>sec.</td>
<td></td>
</tr>
<tr>
<td>Classification Compatibility (ISSA TB 144)</td>
<td>points</td>
<td></td>
</tr>
<tr>
<td>Wet Stripping (ISSA TB 114)</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Loaded Wheel Test</td>
<td>Excess Asphalt</td>
<td>g/m²</td>
</tr>
<tr>
<td>(ISSA TB 109 &amp; ISSA TB 147A)</td>
<td>Lateral Displacement</td>
<td>%</td>
</tr>
<tr>
<td>sg@1000 cycles</td>
<td></td>
<td></td>
</tr>
</tbody>
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| NAME: | SIGNATURE: | DATE: |
NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
MATERIALS BUREAU
TYPE III MICRO-SURFACING MIXTURE DESIGN FORM

COLD WEATHER MIX DESIGN
Location:
Initial emulsion lot:

MIX DESIGN
AGGREGATE: 100 %
EMULSION:
RESIDUAL ASPHALT:
POLYMER MODIFIER:
FIELD CONTROL ADDITIVE:
MINERAL FILLER:
WATER:
TRAFFIC VOLUME:

TYPE 3 AGGREGATE GRADATION

AGGREGATE
SOURCE No. & BLEND %:

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ASPHALT EMULSION
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TYPE: CQS-1hp
Residue After Distillation: %
TESTS ON RESIDUE
Softening Point (AASHTO T53): C
Penetration at 25C (AASHTO T49): dmm

MINERAL FILLER
PRODUCT:
TYPE:
SOURCE:

FIELD CONTROL ADDITIVE
PRODUCT:
SOURCE:

POLYMER MODIFIER SYSTEM
PRODUCT:
SOURCE:

MIX DESIGN TEST RESULTS
Wet Cohesion
(Modified ISSA TB 139)
30 minutes kg-cm
60 minutes kg-cm
Wet Track Abrasion Loss
(ISSA TB 100)
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6 day soak g/m²
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sec.
Classification Compatibility (ISSA TB 144)
points
Wet Stripping (ISSA TB 114):
%

Loaded Wheel Test
Excess Asphalt g/m²
(ISSA TB 109 &
ISSL TB 147A)
Lateral Displacement %
sg@1000 cycles

TESTING PERFORMED BY:
LABORATORY/COMPANY NAME:
ADDRESS:

SUBMITTED FOR APPROVAL BY:
COMPANY NAME:
ADDRESS:
CONTACT NAME:
PHONE #
FAX #:

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