

Proposed Specification Revisions July 2014

The CAS Bureau is proposing revisions to 26 Standard Specifications. These proposed revisions will be out for comment during the month of July, 2014.

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|---|------------------------------------|
| 1. 101.03 Definitions | Major Bid Item |
| 2. 102.07(B) Bidding Requirements | Electronic Storage Devices |
| 3. 108.03 Project Schedules | Clarify |
| 4. 203.03.1 Excavation | refer to Table 701-24 |
| 5. 301.03.9 Bridge end backfill | Add construction requirement |
| 6. 501.03.13 Joints | Add info for Alternate Layout |
| 7. 501.03.16 Opening to Traffic | Add additional requirements |
| 8. 553.03.1 Fabrication | Pre-qual requirements |
| 9. 556.03.1 Pre-qualification for steel fabricators | Re-write categories |
| 10. 561.03.3 Procedures | Cleanup |
| 11. 562 Deck Repair | Cleanup |
| 12. 610 Weed Cntrl Mat | Add requirements |
| 13. 610.03.2 Composting | Add note from SP |
| 14. 613.03.4 Conc Drainage Chutes | Remove ref to Conc |
| 15. 618.03.12 TC for Seal Coat | Add Sweeping |
| 16. 619 Snow Poles | Add requirements |
| 17. 622.03.3 Subsurface Drain | cleanup paragraph |
| 18. 701.02.9 CTB Aggregate | Modify No 200 Sieve |
| 19. 701.03.2 Table 701-15 & 18 | Modify VMA ranges |
| 20. 701.12 Digout and Subex | modify Table 701-24 (see 203.03.1) |
| 21. 704.02.1 Aluminum Signs | Coating Requirements |
| 22. Table 704-3 | Remove old group numbers |
| 23. 713.06 Reserved | Weed Cntrl Mat Req's |
| 24. 713.13 Compost | Add QPL requirement |
| 25. 714 Paint | Add Black Color |
| 26. 717.02.2 Bridge Deck Sealants | Modify requirements for sand |

101.03 DEFINITIONS

MAJOR ITEM

Individual bid items having a ~~bid~~ value equal to or exceeding 5% of the total ~~Contractor's~~ ~~bid~~.

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102.07 BIDDING REQUIREMENTS

B. Bidding Requirements.

Acknowledge addenda using the amended EBS project file to generate the Proposal, Schedule of Items and DBE requirements. The printout indicates acknowledgment of receipt of addenda when the correct project file is used. Return an [electronic storage device](#) containing the complete project files for all projects bid with the bid package. It is the bidder's responsibility to ensure that they acquire and apply addenda files when applicable.

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108.03 PROSECUTION OF WORK

108.03.1 General

Begin obtaining all air quality, water quality and storm water runoff permits, approval of reclamation plans, and archaeological and historical clearances immediately upon receipt of the notice of contract award letter from the Department. Furnish the completed applications to secure permits, approvals or clearances as they are submitted to the respective agency. Furnish approved permits, reclamation plans and clearances necessary to complete the work in conformance with all federal, state and contract requirements.

The Department will reimburse all reasonable costs incurred in securing the permits, approvals and clearances if the Department does not execute the contract for reasons outside its control.

A pre-construction conference will be held on a mutually agreed date between the Contractor, Department and other parties interested in the work before work within the project limits begins no later than 20 calendar days after the Notice to Proceed date. The Contractor's superintendent in charge of the project must attend the conference. Encourage subcontractors to attend. No payments will be made on the contract until the pre-construction conference has been held.

Obtain written approval before starting night work. Provide work area flood lighting for night work and do not rely solely on equipment lights. Night work approval may be rescinded at any time.

Suspending and resuming work on all or a part of the contract will be by Subsection 105.01.

Work may be suspended on working day contracts for unsuitable weather or for other conditions that are detrimental to the work accuracy and quality. Prevent damage and repair damaged work that was not protected during the suspension at Contractor expense. No time extensions will be approved for work to correct non-protected work.

Store materials to protect against damage and without obstructing, endangering or impeding traffic.

Do not allow water to pond on the roadway or within the construction limits, excluding environmental protective devices. Open ditches and shoulder drains, and take other actions to protect the public and the work.

The Department does not authorize project suspension by the Contractor and time will be charged during unauthorized project suspensions. If the Contractor suspends the project, provide written notification of the suspension to the Project Manager 7 calendar days before the suspension. The Contractor is responsible for all maintenance required during unauthorized suspensions and for all work and materials required due to the suspension.

108.03.2 Project Schedules

Furnish a WN that details the work and time (working days, calendar days or completion date) to complete the contract. The initial schedule must show that the work will be completed in the time frame specified in the contract.

A. ASC Schedules. For projects not subject to Subsection 108.03.2(B) requirements, submit a schedule in accordance with the Table of Contractor Submittals. No other work, except obtaining permits, may begin until the schedule requirements have been met. No payments will be made on the contract until the submitted schedule is reviewed.

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Comment [JMac1]: Timing has been modified to state "submit schedule 7 calendar days before the pre-construction conference" this will allow time for review of schedules, discussion of schedule at the Pre-Con and to avoid the situations where Contractors wish to start work the day after a PreCon.

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The Contractor may use a CPM schedule as the ASC if it meets the requirements described in Subsection 108.03.2(A) herein and results in no additional cost to the Department.

1. Include in the ASC:

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- a. A bar chart chronologically sequenced and to time scale showing the following:
 - 1) All work activities with a completion duration of 5 or more working days. (For this requirement, working days does not exclude the period from November 16th through April 15th.)
 - 2) Any work activity that has an impact on completion of the project.
- b. The relationship of each work activity listed in Subsection 108.03.2(A)(1)(a) to other work activities, permits, plans, submittals and approvals required to complete the project.
- c. Work activity durations by working days or calendar days as appropriate. Indicate non-working periods exceeding 3 days on each activity bar.

2. Include in the WN:

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- a. The proposed work process sequence describing the relationship of the work activities listed in Subsection 108.03.2(A)(1) required to complete the contract, including shop drawing submittals, permits (including estimated maximum waiting periods for all required permits), fabrication and delivery activities.
- b. A detailed description and the progress time of each work activity listed in Subsection 108.03.2(A)(1) measured by working day or calendar day, as appropriate.
- c. A detailed description of the ASC, including holidays, planned workdays per week, number of shifts per day, hours per shift, size of work crews and resources used.
- d. Adjusts to activity durations and production rates to account for weather.

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Submit an updated ASC and WN every month in which work is performed, one week before the end of the project's monthly estimate cycle. The ASC and WN should show current progress and all revisions or modifications that reflect changes in the method or manner of the work, specification changes, extra work, changes in duration, changes in shifts, work crews or resources. If the work is not proceeding consistently with the Contractor's most recently reviewed ASC and WN, the Project Manager may require that the Contractor submit 2 copies of an updated ASC and WN that accurately reflect the Contractor's progress, resource allocation for the project, and revised schedule. Submit the updated ASC and WN within 1 working day of the Project Manager's request. Ensure that the WN and ASC submitted meet the above requirements and accurately reflect the work progress.

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Any delay in beginning or prosecuting work that is caused by the Contractor's failure to provide an ASC or WN when and as required is solely the responsibility of the Contractor, and is not an excusable delay.

Prosecute the work with the resources required to complete the contract within the time shown in the Contractor's updated ASC and WN.

The Department may withhold 10% of each monthly progress estimate for failure to submit an initial or updated ASC or WN on time and in the manner required. Payment

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withheld for violation of the schedule requirements will be included in the next progress estimate following the Contractor's submission of the required ASC and WN. The Project Manager's review does not attest to the validity of the ASC or WN.

B. CPM Scheduling. Develop, maintain and provide a detailed time-scaled computer generated progress schedule using the critical path method that is compatible with Primavera P6 or other Primavera product which generates a .xer file type.

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Submit a schedule in accordance with the Table of Contractor Submittals. No other work, except obtaining permits, may begin until the schedule requirements have been met. No payments will be made on the contract until the submitted schedule is reviewed.

Schedule all contract work including that of subcontractors, vendors and suppliers. The initial schedule must show that the work will be completed in the time frame specified in the contract.

Prepare the initial CPM schedule as an Activity On Node (AON) or Precedence Diagramming Method (PDM).

The Project Manager may withhold 10% of each monthly progress estimate for failure to submit an original or updated CPM schedule on time and in the manner required. Payment withheld for violation of the schedule requirements will be included in the next progress estimate following the Contractor's submission of the required CPM schedule. The Project Manager's approval of the CPM schedule does not attest to the validity of the Contractor's assumptions, logic constraints, dependency relationships, resource allocations, labor and equipment or other schedule aspects.

1. Preparation and Submission of Schedule. Prepare an initial schedule and submit an electronic file compatible with Primavera P6 or other Primavera product which generates a .xer file type. Once an accepted baseline schedule is submitted, furnish one ANSI D (24-inch by 36-inch) paper copy. Submit all items listed in Subsection 108.03.3(C).

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Attend a meeting scheduled by the Project Manager within 10 calendar days of the Project Manager's receipt of the CPM schedule to review, correct or adjust the CPM schedule if required.

Make all schedule adjustments and corrections discussed at the meeting and re-submit the revised schedule within 15 calendar days after the meeting. Plan and execute the work to meet project milestones and completion dates.

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2. Initial Schedule Requirements. Include the requirements listed in Subsection 108.03.3(C) and the following:

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a. Total float sort; responsibility/early start sort; area/early start sort;

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b. 60-day look ahead bar charts by early start; and

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c. Logic diagram having a maximum 100 activities for each ANSI D (24-inch by 36-inch) size sheet. Ensure each sheet includes project number, page number, title, match data or diagram correlation and key to identify all components used in the diagram.

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3. Schedule Requirements. Submit schedules that include:

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a. Activity identification numbers;

b. Project milestones;

c. Activity descriptions;

d. Appropriate relationships;

- e. Activity durations of no more than 20 days. Submit activity manpower, equipment, unit quantities and production rates to the Project Manager for review;
- f. Procurement of permits;
- g. Material procurement separated into at least two activities, fabrication and delivery. Include time for delivering all submittals and Department review of working drawing submittals as separate items in the schedule logic for all items requiring submittal, review and approval;
- h. Activities coded to reflect the party performing each activity (only one party performs each activity) including subcontractors and suppliers and the area/location of each activity;
- i. Work days per week, holidays, number of shifts per day, hours per shift and major equipment to be used;
- j. Phasing (staging) details, if the work has phasing or is to be performed in phases;

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k. A W/N which describes the following:

- Anticipated work in an orderly sequence of the construction phasing;
- Activity relationships;
- Anticipated problems; and
- Anticipated project completion dates, in a detailed description.

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Narratives that are a listing of the work will not be accepted. Include written narratives with each submission;

l. Calendars, including weekends, holidays, or other Contractor non-work periods.

Use project specific calendars. All activities must be identified by entry of their appropriate calendar; and

m. Adjustments to activity durations and production rates to account for weather.

Use only contractual constraints in the schedule logic.

Float is defined as the amount of time between when an activity “can start” and when it “must start”. Total float is float shared with all other activities and is defined as the amount of time an activity can be delayed without affecting the overall time of project completion. Float is a shared commodity, not for the exclusive use or financial benefit of either party. Either party has the full use of float until it is depleted.

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A detailed description and the progress time of each work activity and appropriate relationships listed in the CPM schedule, measured by working day or calendar day, as appropriate.

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The critical path is defined as the longest continuous sequence of activities through the network schedule that establishes the minimum overall project duration. The submitted activity sequence and durations must generate a CPM schedule having a critical path with zero float. Keep multiple critical paths and near-critical paths to a minimum. Describe multiple critical paths and near-critical paths with thorough and reasonable justification in the written narrative.

Show the sequence and interdependence of all activities required for the complete performance of all items of work under this contract, including acquiring all the environmental permits. Show all network “dummies” on the diagram.

The Department reserves the right to limit the number of activities on the schedule to between 50 and 1000 activities.

Describe the activities so that the work is identifiable and the progress on each activity is measurable.

Deleted: Do not use any other schedule constraints such as activity mandatory start and finish dates or mandatory zero float constraints.

4. Schedule Updates and Progress Payments. Schedule and attend monthly project progress meetings to compare the schedule to the actual finish dates of completed activities, the remaining duration of uncompleted activities and the proposed logic and/or time estimate revisions. Provide the status of activities at these meetings, and the schedule updates based on this information, once it has been verified.

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Each month of the project, one week before the end of the project's monthly estimate cycle, submit an electronic file using Primavera P6 or other Primavera product which generates a .xer file type and a .PDF file containing:

Comment [JMac2]: PDF file is useful to EPM while schedule is with the DOE for scrubbing. The EPM can review the schedule for conflicts if DOE is unavailable to view the .XER file for a period of time.

a. Total float sort;

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b. A narrative report describing the critical path, logic revisions or modifications to the schedule, including, but not limited to: changes in the method or manner of the work, changes in specifications, extra work, changes in duration, etc.; and

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c. Any revised activity on node diagrams for the following:

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1) Delay in the completion of any critical activity;

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2) Actual prosecution of the work that is different than that represented on the CPM schedule; and

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3) The addition, deletion, or revision of activities required by contract modification or logic revisions.

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Monthly schedule updates must reflect the previous month's actual work. The contract time will be adjusted only as specified in the contract. Furnish documentation to support requests for time extensions for milestone dates or the contract completion date.

The Project Manager may suspend work under Subsection 105.01(A) if the WN or project schedule does not accurately reflect the actual progress of the work; the suspension may continue until an accurate WN and project schedule is submitted.

Comment [JMac3]: place here or in General?

Comment [JMac4]: Paul Rieger Comment: suspension needs to address both ASC and CPM schedules. Place in General.

C. CPM Scheduling Method of Measurement

CPM schedule is measured by the lump sum. Other scheduling requirements are not measured for payment.

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D. CPM Scheduling Basis of Payment

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Payment for all costs associated with CPM scheduling is included in the lump sum contract unit price for CPM scheduling. Payment for all costs associated with other scheduling requirements is included in the payment for other items of work.

Failure to submit a CPM schedule or schedule update to the Project Manager within 2 calendar days of its due date will result in a 10% deduct of the CPM schedule bid item for each update that is late.

Failure to submit a revised CPM schedule as specified may also result in withholding 10% of each monthly progress estimate. Payment withheld for violation of the schedule requirements will be included in the next progress estimate following the Contractor's submission of the required schedule.

Partial payments for CPM scheduling will be made based on the lump sum contract unit price as follows:

1. 50% when the initial schedule is finalized.
2. 75% when the overall project is 50% complete.
3. 100% when all updates have been submitted.

203.03.1 Excavation

G. Digout. In areas of digout, excavate the full road width to a depth as shown in the contract or as directed by the Project Manager. Excavate parallel to the finish grade, daylighting to the left and right slopes. Slope the ends of the digout no steeper than 4H:1V. Dispose of the excavated material to the satisfaction of the Project Manager.

Furnish replacement material for digouts in accordance with Subsection 701.12.

H. Sub Excavation. Unless otherwise shown in the contract or directed by the Project Manager, in areas of sub excavation, excavate the full road width to a depth of 2 feet (600 mm) below the top of the subgrade soils or to a depth where the subgrade soils are firm and stable, whichever is shallower. Excavate parallel to the finish grade, daylighting to the left and right slopes. Slope the ends of the excavation no steeper than a 10H:1V. Dispose of the excavated material to the satisfaction of the Project Manager.

Furnish sub-ex replacement material in accordance with Subsection 701.12.

701.12 DIGOUT AND SUB EXCAVATION REPLACEMENT MATERIAL

Furnish replacement material for digout and sub excavation areas consisting of a well-graded sand and gravel, free of organic and other deleterious material, meeting the AASHTO M 145 requirements for A-1-a group classification as amended by Table 701-24. The material may consist of up to 50% RAP, uniformly blended. Crusher reject material may be used for either application provided it meets the requirements in Table 701-24.

**TABLE 701-24
DIGOUT AND SUB EXCAVATION REPLACEMENT MATERIAL**

<u>Percentage By Weight Passing Square Mesh Sieves</u>		
	<u>Sieve size</u>	<u>Percent Passing</u>
<u>Digout</u>	<u>2-inch (50 mm)</u>	<u>100</u>
	<u>No. 200 (0.075 mm)</u>	<u>8 maximum</u>
<u>Sub excavation</u>	<u>6-inch (152 mm)</u>	<u>100</u>
	<u>No. 200 (0.075 mm)</u>	<u>8 maximum</u>
<u>Crusher Reject</u>	<u>4-inch (100 mm)</u>	<u>100</u>
	<u>No. 4 (4.75 mm)</u>	<u>0-50</u>
	<u>No. 40 (0.425 mm)</u>	<u>0-30</u>
	<u>No. 200 (0.075 mm)</u>	<u>8 maximum</u>

Deleted: Provide special borrow for digout replacement material consisting of a well-graded sand and gravel, free of organic and other deleterious material, meeting the AASHTO M 145 requirements for A-1-a group classification, with 100% passing the 2-inch (50 mm) sieve and a maximum of 8% passing the No. 200 (0.075 mm) sieve. The material may consist of up to 50% millings, uniformly blended. Crusher fines and reject material may be used if the requirements in Table 701-22 are met

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Deleted: or as shown in the contract or as directed by the Project Manager.

Deleted: Provide special borrow for sub-excavation replacement material consisting of a well-graded sand and gravel, free of organic and other deleterious material, meeting the AASHTO M 145 requirements for A-1-a group classification, with 100% passing the 6-inch (152 mm) sieve and a maximum of 8% passing the No. 200 (0.075 mm) sieve. The material may consist of up to 50% millings, uniformly blended. Crusher fines and crusher reject material may be used if the requirements in Table 701-22 are met.¶

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Deleted: If crusher reject material is used for digout and sub excavation replacement material, meet the gradation requirements in Table 701-24.¶

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301.03.9 Bridge End Backfill

Place bridge end backfill full width of the roadway embankment typical section to 10 feet behind the base of the pile cap then ascending on a 6H:1V slope. The top of the bridge end backfill is subgrade elevation. When the bridge end backfill does not daylight at an embankment slope to provide drainage, extend the bridge end backfill 3 feet beyond the wingwall and daylight to the slope facing the span.

Do not place bridge end backfill against any backwall or abutment until the deck concrete has cured in accordance with Subsection 551.03.7, or has achieved 70% of the required design

strength. Furnish a certified laboratory test report showing the field-cured cylinders meet the required strengths.

Place bridge end backfill material in 6" layers and meet the moisture and density requirements of Section 301.

Do not saturate bridge end backfill with water while performing bridge work.

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401.03 CONSTRUCTION REQUIREMENTS

For non-commercial mix, set the initial job mix targets before producing more than 2000 tons (2000 MT) of plant mix surfacing. Plant mix produced prior to setting initial targets is defined as start-up mix. Furnish the Project Manager 1 copy of form CB30QA-VM (S) with the proposed job mix targets for VMA, VFA, VTM, and D/A. Once the job mix targets are set, Quality Assurance (QA) will be applied to all subsequent plant mix produced. No pay incentive or disincentive will be applied to the plant mix until the targets are set. Produce start-up mix meeting the criteria listed in accordance with the Start-Up Job Mix Range in Table 701-18. A Hamburg wheel track test (Hamburg) will be run when the produced mix does not meet all the criteria specified in accordance with the start-up job mix range in Table 701-18.

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The Contractor may revise the job mix targets one time during the contract. Submit revised job mix targets no later than 2 business days following completion of plant mix production, or initial job mix targets will be used to determine payment. If more than one project is included in the contract (tied projects), the job mix targets may be revised for each project only if the projects use different mix designs. Submit to the Project Manager 1 signed copy of form CB30-QA-VM (S) with the revised job mix targets for VMA, VFA, VTM and D/A. The revised targets will be applied retroactively to all plant mix produced after the initial targets are set, and payment will be recalculated.

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401.03.1 Mix Design

Submit to the Project Manager 4 copies of a plant mix design following AASHTO R 35 and meeting AASHTO M 323. Include the binder supplier's recommended mixing and compaction temperature ranges. This compaction temperature range is for testing purposes only. Choose the design air voids target to be the lowest value, within the range of 3.4 to 4.0, as long as all other criteria are met. Report the D/A for the target asphalt content. The mix design is to be produced on a total weight of mix basis. On contracts with multiple gravel sources, or combination of gravel sources, provide a mix design and meet all the requirements for each source or combination of sources and suppliers. For mix designs using RAP, furnish the asphalt content and gradation of the RAP. Furnish the total asphalt content and Job Mix Formula gradation including the RAP as aggregate. Furnish all specific gravities.

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401.03.3 Test Procedures

Plant mix will be evaluated in accordance with the following test procedures:

- MT 303 - Sampling Bituminous Materials
- MT 314 - Method of Test for Bulk Specific Gravity of Compacted Bituminous Mixtures
- MT 319 - Ignition Oven Burn Procedure
- MT 320 - Gradation of Aggregate Recovered by MT 319
- MT 321 - Maximum Specific Gravity of Bituminous Mixtures (Rice Method)
- MT 328 - Method of Establishing Field Target Density for Plant Mix Surfacing Density Control
- MT 332 - Gyrotory Compaction of Bituminous Mixtures
- MT 334 - Wheel Tracking Test Procedure (Hamburg Device)

When testing material in accordance with MT 332, when the height of gyrotory specimens is out of tolerance, an evaluation will be conducted to determine if the specimen will be retained or discarded. The Department will check plant production information, test equipment, processes, calculations, etc. for errors. If a problem is noted in processes controlled by the Contractor, the test will be considered valid. If a problem is found with the testing or other Department process, the test will be redone on

material from the same sample, if possible. If a non-correctable testing problem is found, the specimen will be discarded.

401.03.5 Acceptance Commercial Plant Mix Surfacing

For the first 1000 tons (1000 MT), a \$3.00/ton maximum price reduction in the unit bid price for plant mix surfacing will be applied for any mix represented by a test not meeting the VMA, VFA, VTM, or D/A specified. A \$3.00/ton price reduction (\$9.00/ton maximum) in the unit bid price for plant mix surfacing will be applied to any subsequent mix for each test not meeting the VMA, VFA, VTM, or D/A specified. Price reductions will be assessed on the quantity of material represented by each failing sample. The quantity of material represented by each sample is the total tons of material produced divided by the total number of samples representing the material.

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501.03.13 Joints

Construct the joints as shown in the contract. Submit an alternate plan for longitudinal and transverse joint layout with details that are determined by Contractor sequencing to the Project Manager for approval a minimum of 15 business days before the start of paving work.

Space the transverse joints not less than 10 feet (3.0 meters) and not more than 15 feet (4.5 meters). Space longitudinal joints not further than 13 feet (3.96 meters) and as close to lane lines as possible. Skew longitudinal lines along mainline to match lane lines ahead.

Construct transverse joints at a 90-degree angle to the centerline. Continue transverse joints through the curb. Skew longitudinal and transverse joints to intersect all manholes, boxes, and inlets. The angle of joint intersection, or between joints and a free edge must not be less than 60 degrees. Space joint offsets not less than 18 inches (460 mm).

501.03.16 Opening to Traffic

Do not permit traffic or Contractor equipment, excluding joint sawing and sealing equipment, on the concrete until one of the following test results indicate the concrete has developed sufficient strength.

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- A. **Flex Beam Method.** Prepare the concrete flex beams in accordance with MT 101 and test for modulus of rupture using AASHTO T 97.

One test set consists of 3 beams. Take the concrete for the test beams from different concrete batches for each 2,500 square yards (2,100 m²) of concrete pavement and make at least 2 sets per day. Test the beam sets for modulus of rupture. Cure the test beams under the same environmental conditions as the pavement they represent. The pavement, represented by the beams, may be opened to traffic when the average modulus of rupture of the set exceeds 350 psi (2,415 kPa) and no individual beam's modulus of rupture is less than 300 psi (2,070 kPa).

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The Contractor may select the time for testing the beams. Test the flex beams on or near the project, using Contractor furnished equipment and with a Department Inspector witnessing the tests.

Include all costs to make, cure and test the flex beams in the contract unit price for PCCP.

Opening to traffic does not constitute a final acceptance of the pavement. The pavement is accepted upon confirmation of the 28-day flexural strength. Repair all concrete damaged prior to the final acceptance at Contractor expense.

- B. Maturity Meter Method.** Prepare concrete flex beams or compressive test cylinders to validate the maturity meter performance curves. Furnish the Project Manager the maturity-strength relationship and maturity curves along with supporting data for verification. Maturity-strength relationship must indicate compressive strengths of 2500 psi or greater. Develop the maturity meter index curves before construction has commenced.

Determine the time for testing flex beams. Furnish suitable testing equipment.

The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the maturity meter readings reflect target values have been met.

Furnish all equipment, including maturity meter, thermocouples, wire, and a qualified technician to monitor the maturity meter system.

- C. Concrete Test Cylinder Method.** Prepare concrete test cylinders according to MT 101 and MT 105, and test for compressive strength according to AASHTO T 22.

Make a minimum of one set of three compressive test cylinders, sampled from random locations, for each 2,500 square yards (square meters) of concrete pavement but not less than two sets per day. Test compressive test cylinders in sets of three for compressive strength. Cure test cylinders under the same conditions as the pavement they represent.

The pavement may be opened to traffic and construction equipment, with Project Manager's approval, when the average compressive strength of a set of test cylinders is 2500 psi (17,237 kPa) or greater with no single test less than 2,000 psi (13,790 kPa).

Determine the time for testing cylinders. Furnish suitable equipment and test compressive cylinders on or near the project.

553.03.1 Fabrication

Fabricate all prestressed concrete members using a manufacturing plant currently certified by the Prestressed Concrete Institute or the National Precast Concrete Association in the category applicable to the member being fabricated. The Department will make an exemption for new manufacturing plants that are of the same ownership as an existing certified plant, provided the new manufacturing plant operates under the same quality assurance and control programs as the certified plants, modified to address any production differences, and all fabrication is performed under the direct supervision of a quality assurance and control manager provided by an existing pre-qualified plant. Direct supervision means that the quality assurance and control manager is on site during all fabrication performed in the new fabrication plant and is responsible for the quality assurance and control activities.

Furnish a copy of the plant's current certification in the applicable category along with the fabrication drawings for the elements to be fabricated. For new manufacturing plants, submit and receive approval of any proposed modifications to the parent plant's quality assurance and control program prior to beginning production. Allow 30 business days from the date submitted for Department review and approval. New manufacturing plants may operate under the parent plant's quality assurance and control programs for a maximum of 18 months from the date of opening. Plants currently operating under this exemption may do so only until January 1, 2016.

The fabricator may prestress by pretension or post-tensioning the member, subject to the contract requirements.

Obtain written approval before changing the prestressing details.

556.03.1 Pre-Qualification for Steel Fabricators

Use metal fabricators that are pre-qualified under the AISC Quality Certification Program for the items listed below. The Department will make an exemption for new manufacturing plants that are of the same ownership as an existing certified plant, provided the new manufacturing plant operates under the same quality assurance and control programs as the certified plants, modified to address any production differences, and all fabrication is performed under the direct supervision of a quality assurance and control manager provided by an existing pre-qualified plant. Direct supervision means that the quality assurance and control manager is on site during all fabrication performed in the new fabrication plant and is responsible for the quality assurance and control activities. For new manufacturing plants, submit and receive approval of any proposed modifications to the parent plant's quality assurance and control program prior to beginning production. Allow 30 business days from the date submitted for Department review and approval. New manufacturing plants may operate under the parent plant's quality assurance and control programs for a maximum of 18 months from the date of opening. Plants currently operating under this exemption may do so only until January 1, 2016. Items not listed may be fabricated by non-certified shops. Use metal fabricators having the following AISC quality certification categories:

1. Use fabricators having Advanced Bridges (ABR) certification to fabricate the following:
 - a. Fracture critical members and attachments. Fabricators must have the fracture critical endorsement (F).
 - b. Tub, trapezoidal or closed box girders, large or non-preassembled trusses (over 200 ft.), cable supported bridges, bascule bridges, arches and bridges with tight radius.
2. Use fabricators having Intermediate Bridges (IBR) certification to fabricate the following:
 - a. Fracture critical members and attachments. Fabricators must have the Fracture Critical Endorsement (F).
 - b. Rolled beams with field or shop splices, either straight or with a radius over 500 ft.
 - c. Built-up I-shaped plate girders with constant depth, either straight or with a radius over 500 ft.
 - d. Built-up I-shaped plate girders with variable web depth (e.g., haunched), either straight or with a radius over 1000 ft.
 - e. A truss with a length of 200 ft. or less that is entirely or substantially pre-assembles at a certified facility and shipped in no more than three sub-assemblies.
 - f. Welded floor beams.
 - g. Diaphragms for horizontally curved girders.
3. Use fabricators having Simple Bridges (SBR) certification to fabricate the following:
 - a. Non-spliced rolled beams.
 - b. Non-spliced floor beams.
 - c. Diaphragms for straight girders (does not include diaphragms used for concrete beams).
4. Use fabricators having an SBR or certified component fabricator-bridge (CPT) certification to fabricate the following:
 - a. Bridge expansion joints.
 - b. Steel grid decking.
 - c. Bridge expansion bearings.
 - d. Bridge traffic or pedestrian railing.
 - e. Overhead sign bridge and cantilever sign structures.

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f. Lighting poles and anchor bases.

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561.03.3 Procedures

- (a) **Hydrodemolition.** Mechanical scarification equipment may be used in conjunction with hydrodemolition to remove the portion of the deck above the top mat of reinforcement. If the milling equipment snags reinforcing steel, adjust the depth of removal to prevent further snagging. Remove the remaining concrete to the specified depth using hydrodemolition.

Before beginning hydrodemolition, configure the hydrodemolition unit by adjusting water pressure, nozzle size and angle, nozzle travel speed and unit travel speed to remove sound concrete to the plan depth. Record all the settings and provide them to the Project Manager. During hydrodemolition, verify the removal depth every 30 feet (10 m) along the length of the deck and along the width of the hydrodemolition path. Record the settings at each of these points and provide them to the Project Manager.

Use only potable water for hydrodemolition. Do not use stream or lake water. Plug all deck drains. Install dams of clean, washed aggregate, hay bales, sand bags, or other materials as needed to strain and to direct the flow of runoff. Provide and use settlement basins if necessary to produce visibly clear water before disposal. Do not allow wastewater or waste-cement slurry to run across active travel lanes. Obtain necessary permits before beginning the work and comply with applicable water quality regulations when disposing of the wastewater. Protect all adjacent areas and the traveling public from flying debris during removal operations.

- (b) **Mechanical Scarification.** Scarify the deck to the depth indicated in the contract. If the equipment snags reinforcing steel, stop work immediately and notify the Project Manager.

Remove concrete in areas designated for milling that milling equipment cannot reach with chipping hammers no larger than a nominal 15 pound (7 kg) class or other equipment as approved by the project manager. This work is measured with the Bridge Deck Milling item.

Thoroughly clean the deck of all aggregate, paste, residue, oil, and any other substance that may interfere with the repair or overlay concrete. Use cleaning methods that do not damage remaining concrete, reinforcing steel, or that cause debonding of remaining concrete and reinforcing steel.

Keep heavy loads off of reinforcing steel left unsupported by concrete due to concrete removal.

Deleted: Remove any remaining unsound concrete. Do not operate the hammers at an angle greater than 45° from the deck.¶

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562.03.3 Location and Inspection of Repair Areas.

1. Complete milling operations, if included in the contract, prior to the locating of Class A or B repair areas
2. Use compressed air to dry the deck and to blow it clean of debris. The Project Manager will then locate and mark areas of Class A and Class B deck repair.
3. Notify the Project Manager if repair work reveals areas which differ from the marked areas.
4. If the Project Manager determines that an area of Class A repair or bridge deck milling has exposed more than minimal amounts of the bottom mat of reinforcing steel, the Project Manager may require Class B repair in that area. Do not perform Class B repair without prior approval.

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562.03.4 Concrete Removal

1. Remove all delaminated, cracked, disintegrated, loose, or otherwise unsound concrete using mechanical equipment. Finish the removal with lightweight hand tools. Prevent cutting, stretching, or other damage to exposed reinforcing steel.

Deleted: If the bond between existing concrete and reinforcing steel breaks, remove concrete around the circumference of the bar at least 1-inch (25 mm).

562.03.5 Reinforcing Steel

If an existing reinforcing bar has less than 1-inch (25 mm) clearance from the new finished concrete surface, remove concrete from under the bar, then press it down and fasten it in place to provide 1-inch (25 mm) clearance.

Deleted: Remove concrete as necessary to provide a clearance of 1-inch (25 mm) around the circumference of the bar.

562.04 METHOD OF MEASUREMENT

Replacement of reinforcing bars will be measured and paid for in accordance with Subsection 109.04. Replace any reinforcing bars damaged by Contractor operations at Contractor expense. When not located in an area of Class A or B repair, work necessary to provide reinforcement clearance in accordance with Subsection 562.03.5 will be measured and paid for in accordance with Subsection 109.04.

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610.02 MATERIALS

Furnish materials in accordance with the following subsection requirements:

Weed Control Mat 713.06

610.03.5 Weed Control Mat

Handle and place weed control mat following the manufacturer's recommendations.

610.04.9 Weed Control Mat

Weed control mat is measured by the square yard (m²) in place.

610.05 BASIS OF PAYMENT

Payment for the completed and accepted quantities is made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
<u>Weed Control Mat</u>	<u>Square Yard (m²)</u>

610.03.2 Seeding, Fertilizing, and Mulching

- G. Composting.** Use the compost type specified in the contract. Apply the compost at the rate, method and sequence specified in the contract. Compost rates are dry weight equivalent.

613.03.4 Drainage Chutes

Construct drainage chutes as shown in the Detailed Drawings.

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409.03.10 Sweeping and Brooming

Provide a roadway free of loose cover material. In curb and gutter and guardrail sections, remove and dispose of all loose cover material from the roadway and sidewalks. Do not allow material to get into the storm drain system or any aquatic resource.

Correct surface irregularities affecting the ride quality at the Contractor's expense.

- A. Initial Sweeping and Brooming.** Remove all loose cover material before terminating pilot car use, dispose of the material if required. If pavement markings are not placed within 72 hours of completion of the seal coat work, the Department may have work performed and deduct the costs from monies due to the Contractor. Traffic control beyond these 72 hours, unless ordered by the Project Manager is at the Contractor's expense.

Apply final pavement markings as specified elsewhere in the contract.

- B. Final Sweeping and Brooming.** Perform final sweeping and brooming operations to remove excess loose material no sooner than 5 calendar days before final pavement markings. [Provide traffic control in accordance with Section 618.](#)

618.03.12 Traffic Control for Striping and Sweeping Operations

Provide the following traffic control for striping [and final sweep and broom](#) operations not performed under closed lane or pilot car situations.

1. Furnish and operate a shadow vehicle equipped with a truck-mounted attenuator in accordance with Subsection 618.02 conforming to appropriate test levels. Position the truck to follow within 150 to 1,000 feet (45 - 305 m) on pavement marking removal and application, [and sweeping and brooming](#). When placing or removing traffic cones that protect the pavement markings, use a vehicle with a truck-mounted attenuator or follow with a shadow vehicle possessing a truck mounted attenuator.
2. Equip shadow vehicles with an arrow board facing rear-approaching traffic.
 - a. On multiple-lane roadways, place the arrow board display in lane shift mode (sequential arrow mode).
 - b. On two-lane two-way roadways, place the arrow board in a hazard warning mode not displaying the lane-shift mode
3. If peak hours are specified in the contract, provide the Project Manager a schedule of striping [and final sweep and broom](#) operations at least 48 hours prior to [work](#). Perform [work](#) during off-peak hours in order to minimize impacts to the traveling public unless approved differently by the Project Manager.
4. Include all costs associated with this work in the striping [or final sweep and broom](#) bid item.
5. If requested by the Project Manager, provide a WN identifying the proposed traffic control devices to be used for striping operations. If the Contractor and Project Manager agree that additional traffic control devices not listed in items 1 through 3 are warranted; the additional traffic control devices will be measured and paid in accordance with Subsections 618.04 and 618.05.

Failure to properly notify the Project Manager or provide adequate traffic control renders the striping [or final sweep and broom](#) operation unacceptable and unauthorized. Unacceptable or unauthorized work will be addressed in accordance with Subsection 105.12.

Deleted: striping

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619.03.8 Delineators

Furnish and install new delineators at the locations specified and marked by the Project Manager. Remove delineators conflicting with new construction as specified. Furnish and install snow poles, if required, in accordance with the Detailed Drawings.

Removed delineators are the Contractor's property.

619.04.4 Delineators

Delineators of each type specified are measured by the unit and include the reflector, mounting hardware, post, and snow pole, if applicable, complete in place.

Removal of existing delineators is not measured for payment.

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622.03.3 Subsurface Drainage Geotextile Filter

Place the drainage aggregate immediately following geotextile placement. Cover the geotextile with a minimum of 12 inches (300 mm) of loosely placed aggregate prior to compaction.

Deleted: If a perforated collector pipe is to be installed in the trench, place a minimum of a 6-inch (150 mm) bedding layer of drainage aggregate below the pipe, with the remainder of the aggregate placed to the minimum required construction depth.

701.02.9 Aggregate for CTB

Furnish aggregate for CTB; including added blending material in accordance with Table 701-13.

**TABLE 701-13
TABLE OF GRADATIONS - AGGREGATE FOR CTB**

Percentage By Weight Passing Square Mesh Sieves	
Sieve Size	Percent Passing
¾-inch (19.0 mm)	100
No. 4 (4.75 mm)	40-70
No. 10 (2.00 mm)	25-55
No. 200 (0.075 mm)	2 -12

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**TABLE 701-15
GRADE S MIXTURE DESIGN AND PRODUCTION REQUIREMENTS**

¾ inch (19 mm), ½ inch (12.5 mm) and ⅜ inch (9.5 mm) Nom. Max. Aggregate Size													
Design 1	Number of Compactive Gyrations			% of Rice			Coarse Agg Angularity	VMA %			VFA %	VTM % (Air Voids)	DP(Dust to effective binder ratio)2
	Daily	Initial (Nini)	Design (Ndes)	Max (Nmax)	Max@ Nini	Max@ Ndes	Max@ Nmax	1 face / 2 face	Min @ Ndes (¾ in)	Min @ Ndes (½ in)	Min @ Ndes (⅜ in)	Range@ Ndes	Range @ Ndes
≤ 41	7	75	115	91.5	96 to 96.6	98	75/ -	≥ 13.0	≥ 14.5	≥ 15.5	70 to 80	3.4 to 4	Deleted: 13.5
41 to <1370				90.5			85/80				65 to 78		
≥1370				89			95/90						

**TABLE 701-18
GRADE S SPECIFICATIONS**

¾-inch (19 mm), ½-inch (12.5 mm) and ⅜-inch (9.5 mm) Nominal Maximum Aggregate Size							
Property	Job Mix Target Limits			Job Mix Tolerance	Start-Up Job Mix Range ³		
	¾-inch (19 mm)	½-inch (12.5 mm)	⅜-inch (9.5 mm)		¾-inch (19 mm)	½-inch (12.5 mm)	⅜-inch (9.5 mm)
VMA	13.0 to 17.0	14.5 to 18.0	15.5 to 18.4	± 0.6	12.4 to 17.6	13.9 to 18.6	14.9 to 19.0
VFA	65 to 80			± 5.0	60 to 85		
VTM @ N _{des} ¹	3.4 to 4.0			± 1	2.4 to 5.0		
D/A ²	0.6 to 1.4			±0.2	0.6 to 1.4		
Commercial Plant Mix Requirements							
VMA	12.4 to 17.6	13.9 to 18.6	14.9 to 19.0	N/A	N/A		
VFA	60 to 85			N/A	N/A		
VTM ¹	2.4 to 5.0			N/A	N/A		
D/A	0.6 to 1.4			N/A	N/A		

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Notes:

1. Choose the design and production air voids target to be the lowest value, within the range in Table 701-16 inclusive of 3.4 and 4.0, such that all other criteria are met.
2. Percentages or quantities of hydrated lime will not be subtracted from the aggregate gradation.
3. Start-up job mix range only applies to production before initial target set. Tolerances do not apply to start up job mix range.

704.02.1 Aluminum Signs

Treat the etched sheeting with a light, tight adherent chromate conversion coating before applying the reflective sheeting. This coating must not leave a powdery residue and may leave a silvery iridescence to pale yellow appearance. Coat in accordance with ASTM [B921 or B449](#), Class 2, 10 to 35 milligrams thick per square foot (0.093 m²). Hot air dry the sheeting once coated. Apply and seal the reflectorized sheeting on the prepared aluminum sheeting following the reflective sheeting manufacturer's recommendations. Apply legends and borders in accordance with Subsection 704.01.10(B).

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**TABLE 704-3
ASTM RETRO-REFLECTIVE SHEETING REQUIREMENTS**

Traffic Control Rate Schedule Group No.	Specification	Type
1-15, 19, 25 (panel) and all other work zone sign faces (e.g. flag person paddles, pilot car signs, etc.)	ASTM D4956	XI, X, IX VIII, VII or VI
17, 27, and all cones and tubular markers	ASTM D4956	III or V

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713.06 WEED CONTROL MAT

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Furnish a machine woven weed control mat composed of synthetic polypropylene or polyolefin fibers. Meet the requirements in table 713-9.

**TABLE 713-9
WEED CONTROL MAT**

Property	Value	Test Method
<u>Average weight</u>	<u>minimum 4 oz/yd²</u>	<u>ASTM D3776</u>
<u>Water permeability</u>	<u>10-15 gallons per min per square foot</u>	<u>ASTM D4491</u>
<u>UV stability (minimum % tensile retention)</u>	<u>70%</u>	<u>ASTM D4355 (2,500-hour exposure)</u>
<u>Grab tensile strength</u>	<u>Warp: 90 lbs minimum Fill: 50 lbs minimum</u>	<u>ASTM D4632</u>

713.13 COMPOST

Furnish compost [listed on the QPL and](#) in accordance with Table 713-8.

714.04 WATERBORNE TRAFFIC PAINT

Furnish waterborne traffic paint in accordance with Table 714-2. Where the NTPEP method is specified, recorded NTPEP results must be within the specifications shown.

**TABLE 714-2
WATERBORNE TRAFFIC PAINT COMPOSITION**

Test	Specification	Method
Color (x, y, Y) ¹	ASTM D6628	ASTM D6628 and ASTM D7585
Durability (Wheel)	minimum of 6 at 12 months	NTPEP
Luminance	white: ≥30 at 12 months yellow: ≥20 at 12 months	NTPEP
Viscosity (Krebs Stormer), K.U. at 77 °F (25 °C)	80-95	ASTM D562
Density deviation	maximum of ±0.30 lbs/gallon (±35.9 g/L) from density target	ASTM D1475
Contrast ratio	0.92	MT 545
Dry no track	90 seconds	NTPEP
Freeze-thaw stability	Δ10KU	ASTM D2243
Static heat stability	Δ10KU	MT 548
Bleeding ratio	0.95 minimum	ASTM D868
Skinning and lumps	Pass	MT 549
Settling	Pass	MT 549
Skinning	Pass	MT 549
NTPEP lab test verification	must match NTPEP	NTPEP and MT 543
Antimony	≤20.0 mg/Kg	MT 544
Arsenic	≤20.0 mg/Kg	
Cadmium	≤4.0 mg/Kg	
Chromium	≤5.0 mg/Kg	
Cobalt	≤20.0 mg/Kg	
Lead	≤20.0 mg/Kg	
Mercury	≤1.00 mg/Kg	
Tin	≤20.0 mg/Kg	

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Note 1: Furnish black paint in accordance with color chip 37038 of Federal Standard 595B.

714.05 HIGH DURABILITY WATERBORNE TRAFFIC PAINT

Furnish high durability waterborne traffic paint in accordance with Table 714-3. Where the NTPEP method is specified, recorded NTPEP results must be within the specifications shown.

**TABLE 714-3
HIGH DURABILITY WATERBORNE TRAFFIC PAINT COMPOSITION**

Test	Specification	Method
Color (x, y, Y) ¹	ASTM D6628	ASTM D6628 and ASTM D7585
Durability (wheel)	minimum of 8 at 24 months	NTPEP
Luminance	white: ≥30 at 12 months yellow: ≥20 at 12 months	NTPEP
Viscosity (Krebs Stormer), K.U. at 77 °F (25 °C)	80-95	ASTM D562
Density deviation	maximum of ±0.30 lbs/gallon (±35.9 g/L) from density target	ASTM D1475
Contrast ratio	0.92	MT 545
Dry no track	10 minutes maximum	NTPEP
Freeze-thaw stability	Δ10KU	ASTM D2243
Static heat stability	Δ10KU	MT 548
Bleeding ratio	0.95 minimum	ASTM D868
Skinning and lumps	Pass	MT 549
Settling	Pass	MT 549
Skinning	Pass	MT 549
NTPEP lab test verification	must match NTPEP	NTPEP and MT 543
Antimony	≤20.0 mg/Kg	MT 544
Arsenic	≤20.0 mg/Kg	
Cadmium	≤4.0 mg/Kg	
Chromium	≤5.0 mg/Kg	
Cobalt	≤20.0 mg/Kg	
Lead	≤20.0 mg/Kg	
Mercury	≤1.00 mg/Kg	
Tin	≤20.0 mg/Kg	

Note 1: Furnish black paint in accordance with color chip 37038 of Federal Standard 595B.

714.06 EPOXY OR OTHER POLYMERIC TRAFFIC PAINT

Furnish epoxy or other polymeric traffic paint in accordance with Table 714-4. Where the NTPEP method is specified, recorded NTPEP results must be within the specifications shown.

**TABLE 714-4
EPOXY OR OTHER POLYMERIC TRAFFIC PAINT COMPOSITION**

Test	Specification	Method
Color (x, y, Y) ¹	ASTM D6628	ASTM D6628 and ASTM D7585
Durability (wheel)	minimum of 7 at 36 months	NTPEP
Luminance	White: ≥30 at 36 months Yellow: ≥15 at 36 months	NTPEP
Dry no track	45 minutes maximum	NTPEP
NTPEP lab test verification	must match NTPEP	NTPEP and MT 543
Antimony	≤20.0 mg/Kg	MT 544
Arsenic	≤20.0 mg/Kg	
Cadmium	≤4.0 mg/Kg	
Chromium	≤5.0 mg/Kg	
Cobalt	≤20.0 mg/Kg	
Lead	≤20.0 mg/Kg	
Mercury	≤1.00 mg/Kg	
Tin	≤20.0 mg/Kg	

Note 1: Furnish black paint in accordance with color chip 37038 of Federal Standard 595B.

717.02.2 Bridge Deck Crack Sealant

C. Deck Sealant Sand. Furnish sand for bridge deck crack sealing operations in accordance with manufacturer's recommendations.

Deleted: Furnish silica or garnet sand containing less than 0.5% moisture and in accordance with Table 717-2.¶
TABLE 717-2¶
DECK SEALANT SAND GRADATIONS¶
Percentage By Weight Passing Square Mesh Sieves