



## Florida Department of Transportation

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August 6, 2010

Monica Gourdine  
Program Operations Engineer  
Federal Highway Administration  
545 John Knox Road, Suite 200  
Tallahassee, Florida 32303

Re: Office of Design, Specifications  
Section 334  
Proposed Specification: **3340101 Superpave Asphalt Concrete.**

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by Greg Sholar of the State Materials Office for general cleanup and formatting and to delete:

- references to Option 2 Mixture Acceptance, as it has been deleted from Section 334
- the ignition oven extraction method of determining the  $G_{sb}$  of RAP aggregate due to the results of recent research
- the Small Quantity Pay Table for FC-5 Mixtures. The information is now located in the Department's Asphalt Plant – Pay Factor workbook.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to ST986RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4280.

Sincerely,

Rudy Powell, Jr., P.E.  
State Specifications Engineer

RP/dt  
Attachment

cc: Gregory Jones, Chief Civil Litigation  
Florida Transportation Builders' Assoc.  
State Construction Engineer

**SUPERPAVE ASPHALT CONCRETE.****(REV 765-2934-10)**

SUBARTICLE 334-1.1 (of the Supplemental Specifications) is deleted and the following substituted:

**334-1.1 General:** Construct a Superpave Asphalt Concrete pavement with the type of mixture specified in the Contract, or when offered as alternates, as selected. Superpave mixes are identified as Type -SP-9.5, Type -SP-12.5 or Type -SP-19.0.

Meet the requirements of Section 320 for plant and equipment. Meet the general construction requirements of Section 330, except as modified herein, including the provision for Quality Control Plans and Quality Control Systems as specified in *Section 1056-8*.

~~On projects with only Traffic Level A and/or B asphalt mixtures, select Option 1 or Option 2 Mixture Acceptance as specified in 334-5. The selection shall be indicated in the Contractor Quality Control Plan in accordance with Section 105 and shall apply to all mixes, including base, structural and friction courses, on the entire project. Traffic Level C, D and E mixtures will be accepted under Option 1 Mixture Acceptance only. On Contracts having both Traffic Level A or B and Traffic Level C, D or E asphalt mixtures, material will be accepted only under Option 1 Material Acceptance.~~

~~When Option 2 Mixture Acceptance is selected, the requirements of 330-2 will not apply, with the exception of the roadway requirements as defined in 330-2.2.~~

~~For Option 1 Mixture Acceptance, the Engineer will accept the work on a LOT to LOT basis in accordance with 334-5.1. The LOTs will be subdivided into sublots and the size of a LOT and sublot will be as specified in 334-5.1.2.~~

~~For Option 2 Mixture Acceptance, the Engineer will accept the work in accordance with 334-5.2.~~

SUBARTICLE 334-2.3.3 (of the Supplemental Specifications) is deleted and the following substituted:

**334-2.3.3 RAP Stockpile Approval:** Prior to the incorporation of RAP into the asphalt mixture, stockpile the RAP material and obtain approval for the stockpile by one of the following methods:

1. Continuous stockpile: When RAP is obtained from one or multiple sources and is either processed, blended, or fractionated, and stockpiled in a continuous manner, assure an adequate number of test results are obtained for stockpile approval. Test the RAP material for gradation and asphalt content at a minimum frequency of 1 sample per 1000 -tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) and for recovered viscosity at a minimum frequency of 1 sample per 5000 -tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. In addition, address in the QC Plan the details and specifics of the processing, sampling, testing and actions to be taken.

2. Non-continuous single stockpile: When an individual stockpile is being constructed, obtain representative samples at random locations and test the RAP material for gradation and asphalt content at a minimum frequency of 1 sample per 1000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) and for recovered viscosity at a minimum frequency of 1 sample per 5000 tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. Once the RAP stockpile has been approved, do not add additional material without prior approval of the Engineer.

Determine the asphalt binder content and gradation of the RAP material in accordance with FM 5-563 and FM 1-T -030, respectively. Extract and recover the asphalt binder from the RAP in accordance with FM 5-524 and FM 3-D 5404, respectively. Determine the viscosity of the recovered asphalt binder in accordance with ASTM D 2171. Establish the  $G_{sb}$  of the RAP material by using one of the following methods:

a. Calculate the  $G_{sb}$  value based upon the effective specific gravity ( $G_{se}$ ) of the RAP material, determined on the basis of the asphalt binder content and maximum specific gravity ( $G_{mm}$ ) of the RAP material. The Engineer will approve the estimated asphalt binder absorption value used in the calculation.

b. Measure the  $G_{sb}$  of the RAP aggregate, in accordance with FM 1-T 084 and FM 1-T 085. Obtain the aggregate by using ~~either a solvent or ignition oven~~ extraction method.

ARTICLE 334-4 (of the Supplemental Specifications) is deleted and the following substituted:

**334-4 Contractor Process Control (for Option 1 Mixture Acceptance).**

Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for process control purposes. Enter all Process Control test data into the Department's Laboratory Information Management System (LIMS) database. The Engineer will not use these test results in the acceptance payment decision.

Address in the Quality Control Plan how Process Control failures will be handled. When a Process Control failure occurs, investigate, at a minimum, the production process, testing equipment and/or sampling methods to determine the cause of the failure, and make any necessary changes to assure compliance with these Specifications. Obtain a follow up sample immediately after corrective actions are taken to assess the adequacy of the corrections. In the event the follow-up Process Control sample also fails to meet Specification requirements, cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Quality Control Manager.

ARTICLE 334-5 (of the Supplemental Specifications) is deleted and the following substituted:

### **334-5 Acceptance of the Mixture.**

#### ~~334-5.1 Option 1 Mixture Acceptance.~~

~~334-5.1.1 General:~~ The mixture will be accepted at the plant with respect to gradation ( $P_{.8}$  and  $P_{.200}$ ), asphalt content ( $P_b$ ), and volumetrics (volumetrics is defined as air voids at  $N_{design}$ ). The mixture will be accepted on the roadway with respect to density of roadway cores. Acceptance will be on a LOT-by-LOT basis (for each mix design) based on tests of random samples obtained within each subplot taken at a frequency of one set of samples per subplot. A roadway LOT and a plant production LOT shall be the same. Acceptance of the mixture will be based on Contractor Quality Control test results that have been verified by the Department.

~~334-5.1.1.1 Sampling and Testing Requirements:~~ Obtain the samples in accordance with FM 1-T 168. Obtain samples at the plant of a sufficient quantity to be split into three smaller samples; one for Quality Control, one for Verification and one for Resolution testing; each sample at approximately 35 pounds. The split samples for Verification testing and Resolution testing shall be reduced in size and stored in three boxes each. The approximate size of each box must be 12 *inches*<sup>2</sup> x 8 *inches*<sup>2</sup> x 4 *inches*<sup>2</sup>. Provide, label and safely store sample boxes in a manner agreed upon by the Engineer for future testing.

~~The asphalt content of the mixture will be determined in accordance with FM 5-563. In the event the FM 5-563 ignition oven goes out of service during production, the Contractor may elect to use a replacement oven at another location for no more than 72 hours while the oven is being repaired. The gradation of the recovered aggregate will be determined in accordance with FM 1-T 030. Volumetric testing will be in accordance with AASHTO T 312-08 and FM 1-T 209. Measure the inside diameter of gyratory molds in accordance with FM -5-585. Prior to testing volumetric samples, condition the test-sized sample for one hour *plus or minus* five minutes at the target roadway compaction temperature in a covered, shallow, flat pan, such that the mixture temperature at the end of the one hour conditioning period is within *plus or minus* 20°-F of the roadway compaction temperature. Test for roadway density in accordance with FM 1-T 166.~~

~~334-5.1.1.2 Acceptance Testing Exceptions:~~ When the total combined quantity of hot mix asphalt for the project, as indicated in the plans for Type SP and Type -FC mixtures only, is less than 2000 -tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may require the Contractor to run process control tests for informational purposes, as defined in 334-4, or may run independent verification tests to determine the acceptability of the material.

~~Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any asphalt layer placed on subgrade (regardless of type), miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-10.1.89. In addition, density testing for~~

acceptance will not be performed on the following areas when they are less than 1,000 feet (continuous) in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes or ramps.

————Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) as approved by the Engineer or with Standard Rolling Procedure as specified in 330-10.1.2. In the event that the rolling procedure deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.

————The density pay factor (as defined in 334-8.2) for LOTs where there are areas not requiring density testing for acceptance will be prorated based on a pay factor of 1.00 for the quantity (tonnage) of material in areas not requiring density testing for acceptance and the actual pay factor for the tonnage of material in areas requiring density testing.

————**334-5.1.2 Full LOTs:** Each LOT will be defined (as selected by the Contractor prior to the start of the LOT) as either (1) 2,000 tons, with each LOT subdivided into four equal sublots of 500 tons each, or (2) 4,000 tons, with each LOT subdivided into four equal sublots of 1,000 tons each. As an exception to this, the initial LOT of all new mix designs shall be defined as 2,000 tons, subdivided into four equal sublots of 500 tons each. Before the beginning of a LOT, the Engineer will develop a random sampling plan for each subplot and direct the Contractor on sample points, based on tonnage, for each subplot during construction.

————**334-5.1.3 Partial LOTs:** A partial LOT is defined as a LOT size that is less than a full LOT. A partial LOT may occur due to the following:

————1. The completion of a given mix type or mix design on a project.

————2. Closure of the LOT due to time. LOTs will be closed 30 calendar days after the start of the LOT. Time periods other than 30 calendar days may be used if agreed to by both the Engineer and the Contractor.

————3. A LOT is terminated per 334-5.1.4.4.

————All partial LOTs will be evaluated based on the number of tests available, and will not be redefined.

————**334-5.1.4 Quality Control Sampling and Testing:** Obtain all samples randomly as directed by the Engineer.

————Should the Engineer determine that the Quality Control requirements are not being met or that unsatisfactory results are being obtained, or should any instances of falsification of test data occur, approval of the Contractor's Quality Control Plan will be suspended and production will be stopped.

————**334-5.1.4.1 Lost or Missing Verification/Resolution Samples:** In the event that any of the Verification and/or Resolution samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the minimum possible pay factor for each quality characteristic as described in 334-8.2 will be applied to the entire LOT in question, unless called for otherwise by the Engineer. Specifically, if the LOT in question has more than two sublots, the pay factor for each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for

each quality characteristic will be 0.80. In either event, the material in question will also be evaluated in accordance with 334-5.4-9.5.

———If any of the Verification and/or Resolution samples that are in the custody of the Department are lost, damaged, destroyed or are otherwise unavailable for testing, the corresponding Quality Control test result will be considered verified, and payment will be based upon the Contractor's data.

———**334-5.1.4.2 Plant Sampling and Testing Requirements:** Obtain one random sample of mix per subplot in accordance with 334-5.4-1.1 as directed by the Engineer. Test the Quality Control split sample for gradation, asphalt binder content and volumetrics in accordance with 334-5.4-1.1. Complete all Quality Control testing within one working day from the time the samples were obtained.

———**334-5.1.4.3 Roadway Sampling and Testing Requirements:** Obtain five 6 inch diameter roadway cores within 24 hours of placement at random locations as directed by the Engineer within each subplot. Test these Quality Control samples for density ( $G_{mb}$ ) in accordance with 334-5.4-1.1. In situations where it is impractical to cut five cores per subplot, obtain a minimum of three cores per subplot at random locations as identified by the Engineer. Do not obtain cores any closer than 12 inches from an unsupported edge. Maintain traffic during the coring operation; core the roadway, patch the core holes (within three days of coring); and trim the cores to the proper thickness prior to density testing.

———Density for the subplot shall be based on the average value for the cores cut from the subplot with the target density being the maximum specific gravity ( $G_{mm}$ ) of the subplot. Once the average density of a subplot has been determined, do not retest the samples unless approved by the Engineer. Ensure proper handling and storage of all cores until the LOT in question has been accepted.

———**334-5.1.4.4 Individual Test Tolerances for Quality Control**

**Testing:** Terminate the LOT if any of the following Quality Control failures occur:

———1) An individual test result of a subplot for air voids does not meet the requirements of Table -334-5,

———2) The average subplot density for coarse mixes does not meet the requirements of Table -334-5,

———3) Two consecutive test results for gradation ( $P_{200}$  only) do not meet the requirements of Table -334-5,

———4) Two consecutive test results for asphalt binder content do not meet the requirements of Table -334-5,

———5) The average subplot density for two consecutive subplots for fine mixes does not meet the requirements of Table 334-5,

———6) Two core densities for coarse mixes within a subplot are less than 91.00-%percent of  $G_{mm}$ .

———When a LOT is terminated due to a QC failure, stop production of the mixture until the problem is resolved to the satisfaction of the Quality Control Manager(s) and/or Asphalt Plant Level II technician(s) responsible for the decision to resume production after a quality control failure, as identified in 105-8.6.4. In the event that it can be demonstrated that the problem can immediately be or already has been resolved, it will not be necessary to stop production. When a LOT is terminated, make all necessary changes to correct the problem. Do not resume production until

appropriate corrections have been made. -Inform the Engineer of the problem and corrections made to correct the problem. After resuming production, sample and test the material to verify that the changes have corrected the problem. Summarize this information and provide it to the Engineer prior to the end of the work shift when production resumes.

—————In the event that a Quality Control failure is not addressed as defined above, the Engineer's approval will be required prior to resuming production after any future Quality Control failures.

—————Address any material represented by a failing test result in accordance with 334-5.4.9.5. Any LOT terminated under this Subarticle will be limited to a maximum Pay Factor of 1.00 (as defined in 334-8.2) for each quality characteristic.

Characteristic	Tolerance <sup>(1)</sup>
Asphalt Binder Content (percent)	Target $\pm 0.55$
Passing No. 200 Sieve (percent)	Target $\pm 1.50$
Air Voids (percent) Coarse Graded	2.00 - 6.00
Air Voids (percent) Fine Graded	2.30 - 6.00
Density (percent $G_{mm}$ ) <sup>(2)</sup>	
Coarse Graded (minimum)	93.00
Fine Graded (minimum)	90.00

<sup>(1)</sup> Tolerances for sample size of  $n = 1$  from the verified mix design  
<sup>(2)</sup> Based on an average of 5 randomly located cores

—————**334-5.4.5 Verification Testing:** In order to determine the validity of the Contractor's Quality Control test results prior to their use in the Acceptance decision, the Engineer will run verification tests.

—————**334-5.4.5.1 Plant Testing:** At the completion of each LOT, the Engineer will test a minimum of one Verification split sample randomly selected from the LOT. Results of the testing and analysis for the LOT will be made available to the Contractor within one working day from the time the LOT is completed. Verification samples shall be reheated at the target roadway compaction temperature for 1 1/2 hours *plus or minus*  $\pm 5$  -minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.4.1.1.

—————The Verification test results will be compared with the Quality Control test results based on the between-laboratory precision values shown in Table 334-6.

Property	Maximum Difference
$G_{mm}$	0.016
$G_{mb}$ (gyratory compacted samples)	0.022
$G_{mb}$ (roadway cores – fine graded mixture)	0.015

Table 334-6 Between-Laboratory Precision Values	
Property	Maximum Difference
G <sub>mb</sub> (roadway cores – coarse graded mixture)	0.018
P <sub>b</sub>	0.44 percent
P <sub>-200</sub>	FM 1-T 030 (Figure 2)
P <sub>-8</sub>	FM 1-T 030 (Figure 2)

————If all of the specified mix characteristics compare favorably, then the LOT will be accepted, with payment based on the Contractor's Quality Control test data for the LOT.

————If any of the results do not compare favorably, then the Resolution samples from the LOT will be sent to the Resolution laboratory for testing, as described in 334-5.4-6.

————**334-5.4.5.2 Roadway Testing:** At the completion of each LOT, the Engineer will determine the density ( $G_{mb}$ ) of each core (previously tested by Quality Control) as described in 334-5.4-1.1 from the same subplot as the Plant samples. For situations where roadway density is not required for the random subplot chosen, then another subplot shall be randomly chosen for roadway density cores only. Results of the testing and analysis for the LOT will be made available to the Contractor within one working day from the time the LOT is completed.

————The individual Verification test results will be compared with individual Quality Control test results by the Engineer based on the between-laboratory precision values given in Table 334-6.

————If each of the core test results compare favorably, then the LOT will be accepted with respect to density, with payment based on the Contractor's Quality Control test data for the LOT.

————If any of the results do not compare favorably, then the core samples from the LOT will be sent to the Resolution laboratory for testing as specified in 334-5.4-6.

————**334-5.4.6 Resolution System:**

————**334-5.4.6.1 Plant Samples:** In the event of an unfavorable comparison between the Contractor's Quality Control test results and the Engineer's Verification test results on any of the properties identified in Table -334-6, the Resolution laboratory will test all of the split samples from the LOT for only the property (or properties) in question. Resolution samples shall be reheated at the target roadway compaction temperature for 1-1/2 hours *plus or minus*  $\pm$  5 -minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.4-1.1.

————**334-5.4.6.2 Roadway Samples:** In the event of an unfavorable comparison between the Contractor's Quality Control test data and the Engineer's Verification test data on the density results, the Resolution laboratory will test all of the cores from the LOT. Testing will be as described in 334-5.4-1.1. Any damaged roadway cores will not be included in the evaluation; replace damaged cores with additional cores at the direction of the Engineer.

—————**334-5.1.6.3 Resolution Determination:** The Resolution test results (for the property or properties in question) will be compared with the Quality Control test results based on the between-laboratory precision values shown in Table 334-6.

—————If the Resolution laboratory results compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Quality Control results, and the Department will bear the costs associated with Resolution testing. No additional compensation, either monetary or time, will be made for the impacts of any such testing.

—————If the Resolution laboratory results do not compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Resolution test data for the LOT, and the costs of the Resolution testing will be deducted from monthly estimates. No additional time will be granted for the impacts of any such testing. In addition, in the event that the application of the Resolution test data results in a failure to meet the requirements of Table 334-5, address any material represented by the failing test result in accordance with 334-5.1.9.5.

—————In the event of an unfavorable comparison between the Resolution test results and Quality Control test results, make the necessary adjustments to assure that future comparisons are favorable.

—————**334-5.1.7 Independent Verification Testing:**

—————**334-5.1.7.1 Plant:** The Contractor shall provide sample boxes and take samples as directed by the Engineer for Independent Verification testing. Obtain enough material for three complete sets of tests (two samples for Independent Verification testing by the Engineer and one sample for testing by the Contractor). If agreed upon by both the Engineer and the Contractor, only one sample for Independent Verification testing by the Engineer may be obtained. Independent Verification samples will be reheated at the target roadway compaction temperature for 1-1/2 hours *plus or minus* 5 -minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1.1. The Contractor's split sample, if tested immediately after sampling, shall be reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1.1. If the Contractor's sample is not tested immediately after sampling, then the sample shall be reheated at the target roadway compaction temperature for 1-1/2 hours *plus or minus* 5 -minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1.1. The Contractor's test results shall be provided to the Engineer within one working day from the time the sample was obtained.

—————If any of the Independent Verification test results do not meet the requirements of Table -334-5, then a comparison of the Independent Verification test results and the Contractor's test results, if available, will be made. If a comparison of the Independent Verification test results and the Contractor's test results meets the precision values of Table -334-6 for the material properties in question, or if the Contractor's test results are not available, then the Independent Verification test results are considered verified and the Contractor shall cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be

(or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.1.9.5.

———If a comparison of the Independent Verification test results and the Contractor's test results does not meet the precision values of Table -334-6 for the material properties in question, then the second Independent Verification sample shall be tested by the Engineer for the material properties in question. If a comparison between the first and second Independent Verification test results does not meet the precision values of Table -334-6 for the material properties in question, then the first Independent Verification test results are considered unverified for the material properties in question and no action shall be taken.

———If a comparison between the first and second Independent Verification test results meets the precision values of Table -334-6 for the material properties in question, then the first Independent Verification sample is considered verified and the Contractor shall cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.1.9.5.

———The Engineer has the option to use the Independent Verification sample for comparison testing as specified in 334-6.

———**334-5.1.7.2 Roadway:** Obtain five 6 inch diameter roadway cores within 24 hours of placement, as directed by the Engineer, for Independent Verification testing. In situations where it is impractical to cut five cores per subplot, obtain a minimum of three cores per subplot at random locations, as identified by the Engineer. These independent cores will be obtained from the same LOTs and sublots as the Independent Verification Plant samples, or as directed by the Engineer. The density of these cores will be obtained as described in 334-5.1.1.1. If the average of the results for the subplot does not meet the requirements of Table -334-5 for density, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.1.9.5.

———**334-5.1.8 Surface Tolerance:** The asphalt mixture will be accepted on the roadway with respect to surface tolerance in accordance with the applicable requirements of 330-12.

———**334-5.1.9 Minimum Acceptable Quality Levels:**

———**334-5.1.9.1 Pay Factors Below 0.90:** In the event that an individual pay factor for any quality characteristic of a LOT falls below 0.90, take steps to correct the situation and report the actions to the Engineer. In the event that the pay factor for the same quality characteristic for two consecutive LOTs is below 0.90, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Actions taken must be approved by the Engineer before production resumes.

———**334-5.1.9.2 Composite Pay Factors Less Than 0.90 and Greater Than or Equal to 0.80:** If the composite pay factor for the LOT is less than 0.90 and

greater than or equal to 0.80, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Actions taken must be approved by the Engineer before production resumes.

—————**334-5.1.9.3 Composite Pay Factors Less Than 0.80 and Greater Than or Equal to 0.75:** If the composite pay factor for the LOT is less than 0.80 and greater than or equal to 0.75, address the defective material in accordance with 334-5.1.9.5.

—————**334-5.1.9.4 Composite Pay Factors Less Than 0.75:** If the composite pay factor for the LOT is less than 0.75, remove and replace the defective LOT at no cost to the Department, or as approved by the Engineer.

—————**334-5.1.9.5 Defective Material:** Assume responsibility for removing and replacing all defective material placed on the project, at no cost to the Department.

As an exception to the above and upon approval of the Engineer, obtain an engineering analysis by an independent laboratory (as approved by the Engineer) to determine the disposition of the material. The engineering analysis must be signed and sealed by a Professional Engineer licensed in the State of Florida.

The Engineer may determine that an engineering analysis is not necessary or may perform an engineering analysis to determine the disposition of the material.

Any material that remains in place will be accepted with a composite pay factor as determined by 334-8, or as determined by the Engineer.

If the defective material is due to a gradation, asphalt binder content or density failure, upon approval of the Engineer the Contractor may perform delineation tests on roadway cores in lieu of an engineering analysis to determine the limits of the defective material that requires removal and replacement. Prior to any delineation testing, all sampling locations shall be approved by the Engineer. All delineation sampling and testing shall be monitored and verified by the Engineer. The minimum limit of removal of defective material is fifty-feet either side of the failed sample. For materials that are defective due to air voids, an engineering analysis is required.

When evaluating defective material by engineering analysis or delineation testing, at a minimum, evaluate all material located between passing Quality Control, Process Control or Independent Verification test results. Exceptions to this requirement shall be approved by the Engineer.

—————**334-5.2 Option 2 Mixture Acceptance.**

—————**334-5.2.1 General:** ~~The mixture will be accepted with respect to gradation ( $P_g$  and  $P_{200}$ ), asphalt content ( $P_b$ ) and density of roadway cores. Acceptance of the mixture will be based on the Engineer's test results. Acceptance will be on a LOT by LOT basis (for each mix design) based on tests of random samples obtained within each subplot taken at a frequency of one set of samples per subplot. A roadway LOT and a plant production LOT shall be the same. A LOT shall consist of a maximum of four sublots, where a subplot is defined as one day's production. A day's production is defined as a period of time no longer than 24 hours where a minimum of 100 tons of hot mix asphalt for the project (including Type B, Type SP and Type FC) is produced. When less than~~

100 tons of hot mix asphalt for the project (including Type B, Type SP and Type FC) is produced in a day, no acceptance testing will be required. A LOT shall not extend past seven calendar days from the start of the LOT. A LOT shall be complete after four sublots have been produced or seven calendar days have transpired (whichever comes first).

————— If a Traffic Level C mixture is substituted for a Traffic Level B mixture per 334-1.2 and Option 2 was selected, the mixture will be accepted under Option 2.

————— **334-5.2.2 Gradation and Asphalt Content Testing:** The Engineer (or Contractor, if directed by the Engineer) will randomly obtain a minimum of one sample per subplot. The samples shall be obtained in accordance with FM 1-T 168. At the completion of the LOT or seven calendar days (whichever comes first), the Engineer will randomly test one sample for gradation per FM 1-T 030, asphalt content per FM 5-563 and maximum specific gravity per FM 1-T 209.

————— **334-5.2.3 Roadway Density Testing:** Obtain five 6 inch diameter roadway cores within 24 hours of placement at random locations as directed by the Engineer within each subplot. In situations where it is impractical to cut five cores per subplot, obtain a minimum of three cores per subplot at random locations as identified by the Engineer. Do not obtain cores any closer than 12 inches from an unsupported edge. Maintain traffic during the coring operation, core the roadway and patch the core holes (within three days of coring). The Engineer will determine density of the cores from the same subplot as the sample for gradation and asphalt content tested in 334-5.2.2.

————— **334-5.2.4 Acceptance Criteria:** Acceptance will be on a pass/fail basis. Engineer's test results that meet the criteria shown in Table 334-7, Criteria A, will be accepted at full pay.

Characteristic	Tolerance (1)	
	Criteria A	Criteria B
Asphalt Binder Content (percent)	Target $\pm$ 0.55	Target $\pm$ 0.75
Passing No. 8 Sieve (percent)	Target $\pm$ 5.50	Target $\pm$ 10.00
Passing No. 200 Sieve (percent)	Target $\pm$ 1.50	Target $\pm$ 3.50
Density, minimum percent $G_{mm}^{(2)-(3)}$	92.00	90.00

Notes:  
 (1) Tolerances for sample size of n = 1 from the verified mix design.  
 (2) Based on the average value of the roadway cores and  $G_{mm}$  for the sample.  
 (3) If the Engineer (or Contract Documents) limits compaction to the static mode only, no vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer. In either case, the tolerance for Criteria A shall be 91.00 and the tolerance for Criteria B shall be 90.00.

————— **334-5.2.5 Failing Test Results:** Should any of the test result(s) for the sample not meet the criteria given in Table 334-7, Criteria A, then the material for that subplot is considered defective. Cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer). The work can proceed if it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. The Engineer will then test the remaining samples for all

of the characteristics in Table 334-7 to determine the extent of the defective material. The additional samples to be tested are those from the remaining sublots of the LOT. The Contractor has the following options with respect to defective material:

1. Remove and replace the defective material at no cost to the Department.
2. Leave the defective material in place at 75% pay, if approved by the Engineer.
3. Perform delineation testing using a testing plan and a qualified laboratory approved by the Engineer to determine the limits of the defective material. The Engineer reserves the right to witness delineation testing conducted by the approved laboratory. Delineated material not meeting the criteria given in Table 334-7, Criteria A, shall be removed and replaced at no cost to the Department or left in place at 75% pay, if approved by the Engineer.

Should the test result(s) for the sample not meet the criteria given in Table 334-7, Criteria B, the Contractor has the following options with respect to the defective material:

1. Remove and replace the defective material at no cost to the Department.
2. Perform delineation testing using a testing plan and a qualified laboratory approved by the Engineer to determine the limits of the defective material. The Engineer reserves the right to witness delineation testing conducted by the approved laboratory. Delineated material not meeting the criteria given in Table 334-7, Criteria A, but meeting the criteria given in Table 334-7, Criteria B shall be removed and replaced at no cost to the Department or left in place at 75% pay, if approved by the Engineer. Delineated material not meeting the criteria given in Table 334-7, Criteria B shall be removed and replaced at no cost to the Department.

**334-5.2.6 Acceptance Testing Exceptions:** When the total quantity of hot mix asphalt for the project, as indicated on the plans for Type SP and Type FC mixtures only, is less than 2000 tons, the Engineer will accept the mix on the basis of visual inspection, the Engineer may run acceptance tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, variable thickness overbuild courses, leveling courses, first lift of asphalt base course placed on subgrade, asphalt layers placed directly on stabilization layers, miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-10.1.9. In addition, density testing for acceptance will not be performed on the following areas when they are less than 1,000 feet in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes or ramps.

Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) approved by the Engineer or with Standard Rolling Procedure as specified in 330-10.1.2. In the event that the rolling procedure

~~deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.~~

~~————— **334-5.2.7 Surface Tolerance:** The asphalt mixture will be accepted on the roadway with respect to surface tolerance in accordance with the applicable requirements of 330-12.~~

ARTICLE 334-6 (of the Supplemental Specifications) is deleted and the following substituted:

**334-6 Comparison Testing.**

~~For materials accepted under Option 1, a~~ At the start of the project (unless waived by the Engineer) and at other times as determined necessary by the Engineer, provide split samples for comparison testing with the Engineer. The purpose of these tests is to verify that the testing equipment is functioning properly and that the testing procedures are being performed correctly. In the event that the Engineer determines that there is a problem with the Contractor's testing equipment and/or testing procedures, immediately correct the problem to the Engineer's satisfaction. In the event that the problem is not immediately corrected, cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Engineer.

If so agreed to by both the Contractor and the Engineer, the split sample used for comparison testing may also be used for the Quality Control sample. The split sample used for comparison testing will also meet the requirements for Independent Verification Testing described in 334-5.4.7.

~~————— For materials accepted under Option 2, the requirements of this Article do not apply.~~

ARTICLE 334-8 (of the Supplemental Specifications) is deleted and the following substituted:

**334-8 Basis of Payment.**

**334-8.1 General:** Price and payment will be full compensation for all the work specified under this Section (including the applicable requirements of Sections 320 and 330). ~~There will be no pay adjustments for materials accepted in accordance with 334-5.2.~~

~~—————~~ For materials accepted in accordance with 334-5.4, based upon the quality of the material, a pay adjustment will be applied to the bid price of the material as determined on a LOT by LOT basis. The pay adjustment will be assessed by calculating a Pay Factor for the following individual quality characteristics: pavement density, air voids, asphalt binder content, and the percentage passing the No. 200 and No. 8 sieves. The pay adjustment will be computed by multiplying a Composite Pay Factor for the LOT by the bid price per ton. Perform all calculations with the Department's Asphalt Plant - Pay Factor Worksheets ~~(Form No. 675-030-22).~~

**334-8.2 Pay Factors:**

**334-8.2.1 Partial LOTs:** For Partial LOTs where no random sample is obtained due to insufficient tonnage, a Composite Pay Factor of 1.00 shall be applied.

**334-8.2.2 Two or Less Sublot Test Results:** In the event that two or less sublot test results are available for a LOT, Pay Factors will be determined based on *the Small Quantity Pay Table. The Small Quantity Pay Table and Pay Factor calculations are determined in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets.* Table 334-8, using the average of the accumulated deviations from the target value. (Deviations are absolute values with no plus or minus signs.) Use the 1-Test column when there is only one sublot test result and use the 2-Tests column when there are two sublots.

Table 334-8 Small Quantity Pay Table		
Pay Factor	1 Sublot Test Deviation	2 Sublot Test Average Deviation
Asphalt Binder Content		
1.05	0.00-0.23	0.00-0.16
1.00	0.24-0.45	0.17-0.32
0.90	0.46-0.55	0.33-0.39
0.80	>0.55	>0.39
No. 8 Sieve		
1.05	0.00-2.25	0.00-1.59
1.00	2.26-4.50	1.60-3.18
0.90	4.51-5.50	3.19-3.89
0.80	>5.50	>3.89
No. 200 Sieve		
1.05	0.00-0.55	0.00-0.39
1.00	0.56-1.10	0.40-0.78
0.90	1.11-1.50	0.79-1.06
0.80	>1.50	>1.06
Air Voids (Coarse Mixes)		
1.05	0.00-0.55	0.00-0.39
1.00	0.56-1.10	0.40-0.78
0.90	1.11-2.00	0.79-1.41
0.80	2.01-2.25	1.42-1.59
0.70	2.26-2.50	1.60-1.77
0.55	>2.50	>1.77
Air Voids (Fine Mixes)		
1.05	0.00-0.50	0.00-0.35
1.00	0.51-1.00	0.36-0.71
0.90	1.01-1.70	0.72-1.20
0.80	1.71-2.00	1.21-1.41
0.70	2.01-2.50	1.42-1.77
0.55	>2.50	>1.77
Density (Coarse Mixes) Note <sup>(4)</sup>		
1.05	0.00-0.50	0.00-0.35

Table 334-8 Small Quantity Pay Table		
Pay Factor	1 Sublot Test Deviation	2 Sublot Test Average Deviation
1.00	0.51-1.00	0.36-0.71
0.95	1.01-1.50	0.72-1.06
0.90	>1.50	>1.06
Density (Fine Graded Mixtures) Note <sup>(4)</sup>		
1.05	0.00-0.50	0.00-0.35
1.00	0.51-1.00	0.36-0.71
0.95	1.01-2.00	0.72-1.41
0.90	2.01-3.00	1.42-2.12
0.80	>3.00	>2.12

Notes:  
<sup>(4)</sup> Each density test result is the average of five cores. The target density for coarse mixes is 94.50 percent of  $G_{mm}$ . The target density for fine mixes is 93.00 percent of  $G_{mm}$  (92.00 percent when compaction is limited to the static mode or for layers specified to be one inch thick). When compaction is limited to the static mode, no vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer. In this case, the target density for fine mixes is 92.00 percent of  $G_{mm}$ .

**334-8.2.3 Three or More Sublot Test Results:** When three or more sublot test results are available for a LOT, the variability-unknown, standard deviation method will be used to determine the estimated percentage of the LOT that is within *the* specification limits *shown in (Table 334-7). The Percent Within Limits (PWL) is determined in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets.* The number of significant figures used in the calculations will be in accordance with requirements of AASHTO R 11-06, Absolute Method.

**334-8.2.3.1 Percent Within Limits:** The percent within limits (PWL) and Pay Factors for the LOT will be calculated as described below. Variables used in the calculations are as follows:

$x$  = individual test value (sublot)

$n$  = number of tests (sublots)

$s$  = sample standard deviation

$\Sigma(x^2)$  = summation of squares of individual test values

$(\Sigma x)^2$  = summation of individual test values squared

$Q_U$  = upper quality index

$USL$  = upper specification limit (target value plus upper specification limit from Table 334-9)

$Q_L$  = lower quality index

$LSL$  = lower specification limit (target value minus lower specification limit from Table 334-9)

$P_U$  = estimated percentage below the USL

$P_L$  = estimated percentage above the LSL

(1) Calculate the arithmetic mean ( $\bar{X}$ ) of the test values:

$$\bar{X} = \frac{\sum x}{n}$$

(2) Calculate the sample standard deviation (s):

$$s = \sqrt{\frac{n \sum (x^2) - (\sum x)^2}{n(n-1)}}$$

(3) Calculate the upper quality index (Q<sub>U</sub>):

$$Q_U = \frac{USL - \bar{X}}{s}$$

(4) Calculate the lower quality index (Q<sub>L</sub>):

$$Q_L = \frac{\bar{X} - LSL}{s}$$

(5) From Table 334-10, determine the percentage of work below the USL (P<sub>U</sub>).

(6) From Table 334-10, determine percentage of work above the LSL (P<sub>L</sub>)  
 Note: If USL or LSL is not specified, percentages within (USL or LSL) will be 100.

(7) If Q<sub>U</sub> or Q<sub>L</sub> is a negative number, then calculate the percent within limits for Q<sub>U</sub> or Q<sub>L</sub> as follows: enter Table 334-10 with the positive value of Q<sub>U</sub> or Q<sub>L</sub> and obtain the corresponding percent within limits for the proper sample size. Subtract this number from 100.00. The resulting number is the value to be used in the next step (Step 8) for the calculation of quality level.

(8) Calculate the percent within limits (PWL) = (P<sub>U</sub> + P<sub>L</sub>) - 100

(9) Calculate the Pay Factor (PF) for each quality characteristic using the equation given in 334-8.2.3.2.

Table 334-79 Specification Limits	
Quality Characteristic	Specification Limits
Passing No. 8 sieve ( percent)	Target ± 3.1
Passing No. 200 sieve ( percent)	Target ± 1.0
Asphalt Content ( percent)	Target ± 0.40
Air Voids - Coarse Mixes ( percent)	4.00 ± 1.40
Air Voids - Fine Mixes ( percent)	4.00 ± 1.20
Density - Coarse Mixes ( percent of G <sub>mm</sub> ):	94.50 ± 1.30
Density - Fine Mixes ( percent of G <sub>mm</sub> ):	93.00 + 2.00, - 1.20 <sup>(1)</sup>

Note (1): If the Engineer (or Contract Documents) limits compaction to the static mode only, or for all one-inch thick lifts, compaction shall be in the static mode. No vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer. In either case, the specification limits will be as follows: 92.00 + 3.00, -1.20 percent of G<sub>mm</sub>. No additional compensation, cost or time, shall be made.

Table 334-10 Percent Within Limits				
Quality Index	Percent within Limits for Selected Sample Size			
	n=3	n=4	n=5	n=6
0.00	50.00	50.00	50.00	50.00
0.05	51.38	51.67	51.78	51.84
0.10	52.76	53.33	53.56	53.67
0.15	54.15	55.00	55.33	55.50
0.20	55.54	56.67	57.10	57.32
0.25	56.95	58.33	58.87	59.14
0.30	58.37	60.00	60.63	60.94
0.35	59.80	61.67	62.38	62.73
0.40	61.26	63.33	64.12	64.51
0.45	62.74	65.00	65.84	66.27
0.50	64.25	66.67	67.56	68.00
0.55	65.80	68.33	69.26	69.72
0.60	67.39	70.00	70.95	71.41
0.65	69.03	71.67	72.61	73.08
0.70	70.73	73.33	74.26	74.71
0.75	72.50	75.00	75.89	76.32
0.80	74.36	76.67	77.49	77.89
0.85	76.33	78.33	79.07	79.43
0.90	78.45	80.00	80.62	80.93
0.95	80.75	81.67	82.14	82.39
1.00	83.33	83.33	83.64	83.80
1.05	86.34	85.00	85.09	85.18
1.10	90.16	86.67	86.52	86.50
1.15	97.13	88.33	87.90	87.78
1.20	100.00	90.00	89.24	89.01
1.25	100.00	91.67	90.54	90.19
1.30	100.00	93.33	91.79	91.31
1.35	100.00	95.00	92.98	92.37
1.40	100.00	96.67	94.12	93.37
1.45	100.00	98.33	95.19	94.32
1.50	100.00	100.00	96.20	95.19
1.55	100.00	100.00	97.13	96.00
1.60	100.00	100.00	97.97	96.75

Table 334-10 Percent Within Limits				
Quality Index	Percent within Limits for Selected Sample Size			
	n=3	n=4	n=5	n=6
1.65	100.00	100.00	98.72	97.42
1.70	100.00	100.00	99.34	98.02
1.75	100.00	100.00	99.81	98.55
1.80	100.00	100.00	100.00	98.99
1.85	100.00	100.00	100.00	99.36
1.90	100.00	100.00	100.00	99.65
1.95	100.00	100.00	100.00	99.85
2.00	100.00	100.00	100.00	99.97
2.05	100.00	100.00	100.00	100.00
2.10	100.00	100.00	100.00	100.00
2.15	100.00	100.00	100.00	100.00
2.20	100.00	100.00	100.00	100.00
2.25	100.00	100.00	100.00	100.00
2.30	100.00	100.00	100.00	100.00
2.35	100.00	100.00	100.00	100.00
2.40	100.00	100.00	100.00	100.00
2.45	100.00	100.00	100.00	100.00
2.50	100.00	100.00	100.00	100.00
2.55	100.00	100.00	100.00	100.00
2.60	100.00	100.00	100.00	100.00
2.65	100.00	100.00	100.00	100.00

**334-8.2.3.2-1 Pay Factors (PF):** Pay Factors will be calculated by using the following equation:

$$\text{Pay Factor} = (55 + 0.5 \times \text{PWL}) / 100$$

The PWL is determined *in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets* from Step (8) of 334-8.2.3.1.

**334-8.3 Composite Pay Factor (CPF):** A Composite Pay Factor for the LOT will be calculated based on the individual Pay Factors (PF) with the following weighting applied: ~~35% percent~~ Density (D), ~~25% percent~~ Air Voids ( $V_a$ ), ~~25% percent~~ asphalt binder content ( $P_b$ ), ~~10% percent~~ Passing No. 200 ( $P_{200}$ ) and ~~5% percent~~ Passing No. 8 ( $P_8$ ). Calculate the CPF by using the following formula:

$$\text{CPF} = [(0.350 \times \text{PF } D) + (0.250 \times \text{PF } V_a) + (0.250 \times \text{PF } P_b) + (0.100 \times \text{PF } P_{200}) + (0.050 \times \text{PF } P_8)]$$

Where the Pay Factor (PF) for each quality characteristic is determined in either 334-8.2.2 or 334-8.2.3, depending on the number of subplot tests. Note that the number after each multiplication will be rounded to the nearest 0.01.

The pay adjustment shall be computed by multiplying the Composite Pay Factor for the LOT by the bid price per ton.

**334-8.4 Payment:** Payment will be made under:

Item No. 334- 1- Superpave Asphaltic Concrete - per ton.

**SUPERPAVE ASPHALT CONCRETE.**  
**(REV 7-29-10)**

SUBARTICLE 334-1.1 (of the Supplemental Specifications) is deleted and the following substituted:

**334-1.1 General:** Construct a Superpave Asphalt Concrete pavement with the type of mixture specified in the Contract, or when offered as alternates, as selected. Superpave mixes are identified as Type SP-9.5, Type SP-12.5 or Type SP-19.0.

Meet the requirements of Section 320 for plant and equipment. Meet the general construction requirements of Section 330, except as modified herein, including the provision for Quality Control Plans and Quality Control Systems as specified in Section 105.

SUBARTICLE 334-2.3.3 (of the Supplemental Specifications) is deleted and the following substituted:

**334-2.3.3 RAP Stockpile Approval:** Prior to the incorporation of RAP into the asphalt mixture, stockpile the RAP material and obtain approval for the stockpile by one of the following methods:

1. Continuous stockpile: When RAP is obtained from one or multiple sources and is either processed, blended, or fractionated, and stockpiled in a continuous manner, assure an adequate number of test results are obtained for stockpile approval. Test the RAP material for gradation and asphalt content at a minimum frequency of 1 sample per 1000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) and for recovered viscosity at a minimum frequency of 1 sample per 5000 tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. In addition, address in the QC Plan the details and specifics of the processing, sampling, testing and actions to be taken.

2. Non-continuous single stockpile: When an individual stockpile is being constructed, obtain representative samples at random locations and test the RAP material for gradation and asphalt content at a minimum frequency of 1 sample per 1000 tons with a minimum of six test results. Test the RAP material for  $G_{mm}$  (for  $G_{sb}$  determination) and for recovered viscosity at a minimum frequency of 1 sample per 5000 tons with a minimum of two test results. Based on visual inspection and a review of the test data, the Engineer will determine the suitability of the stockpiled material. Once the RAP stockpile has been approved, do not add additional material without prior approval of the Engineer.

Determine the asphalt binder content and gradation of the RAP material in accordance with FM 5-563 and FM 1-T 030, respectively. Extract and recover the asphalt binder from the RAP in accordance with FM 5-524 and FM 3-D 5404, respectively. Determine the viscosity of the recovered asphalt binder in accordance with ASTM D 2171. Establish the  $G_{sb}$  of the RAP material by using one of the following methods:

a. Calculate the  $G_{sb}$  value based upon the effective specific gravity ( $G_{se}$ ) of the RAP material, determined on the basis of the asphalt binder content and maximum specific gravity ( $G_{mm}$ ) of the RAP material. The Engineer will approve the estimated asphalt binder absorption value used in the calculation.

b. Measure the  $G_{sb}$  of the RAP aggregate, in accordance with FM 1-T 084 and FM 1-T 085. Obtain the aggregate by using a solvent extraction method.

ARTICLE 334-4 (of the Supplemental Specifications) is deleted and the following substituted:

#### **334-4 Contractor Process Control.**

Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for process control purposes. Enter all Process Control test data into the Department's Laboratory Information Management System (LIMS) database. The Engineer will not use these test results in the acceptance payment decision.

Address in the Quality Control Plan how Process Control failures will be handled. When a Process Control failure occurs, investigate, at a minimum, the production process, testing equipment and/or sampling methods to determine the cause of the failure, and make any necessary changes to assure compliance with these Specifications. Obtain a follow up sample immediately after corrective actions are taken to assess the adequacy of the corrections. In the event the follow-up Process Control sample also fails to meet Specification requirements, cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Quality Control Manager.

ARTICLE 334-5 (of the Supplemental Specifications) is deleted and the following substituted:

#### **334-5 Acceptance of the Mixture.**

**334-5.1 General:** The mixture will be accepted at the plant with respect to gradation ( $P_{.8}$  and  $P_{.200}$ ), asphalt content ( $P_b$ ), and volumetrics (volumetrics is defined as air voids at  $N_{design}$ ). The mixture will be accepted on the roadway with respect to density of roadway cores. Acceptance will be on a LOT-by-LOT basis (for each mix design) based on tests of random samples obtained within each subplot taken at a frequency of one set of samples per subplot. A roadway LOT and a plant production LOT shall be the same. Acceptance of the mixture will be based on Contractor Quality Control test results that have been verified by the Department.

**334-5.1.1 Sampling and Testing Requirements:** Obtain the samples in accordance with FM 1-T 168. Obtain samples at the plant of a sufficient quantity to be split into three smaller samples; one for Quality Control, one for Verification and one for Resolution testing; each sample at approximately 35 pounds. The split samples for Verification testing and Resolution testing shall be reduced in size and stored in three boxes each. The approximate size of each box must be 12 inches x 8 inches x 4 inches.

Provide, label and safely store sample boxes in a manner agreed upon by the Engineer for future testing.

The asphalt content of the mixture will be determined in accordance with FM 5-563. In the event the FM 5-563 ignition oven goes out of service during production, the Contractor may elect to use a replacement oven at another location for no more than 72 hours while the oven is being repaired. The gradation of the recovered aggregate will be determined in accordance with FM 1-T 030. Volumetric testing will be in accordance with AASHTO T 312-08 and FM 1-T 209. Measure the inside diameter of gyratory molds in accordance with FM 5-585. Prior to testing volumetric samples, condition the test-sized sample for one hour plus or minus five minutes at the target roadway compaction temperature in a covered, shallow, flat pan, such that the mixture temperature at the end of the one hour conditioning period is within plus or minus 20°F of the roadway compaction temperature. Test for roadway density in accordance with FM 1-T 166.

**334-5.1.2 Acceptance Testing Exceptions:** When the total combined quantity of hot mix asphalt for the project, as indicated in the plans for Type SP and Type FC mixtures only, is less than 2000 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may require the Contractor to run process control tests for informational purposes, as defined in 334-4, or may run independent verification tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any asphalt layer placed on subgrade (regardless of type), miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate that converts to less than 1 inch as described in 334-1.4. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only per the requirements of 330-10.1.8. In addition, density testing for acceptance will not be performed on the following areas when they are less than 1,000 feet (continuous) in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes or ramps.

Where density testing for acceptance is not required, compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure (equipment and pattern) as approved by the Engineer or with Standard Rolling Procedure as specified in 330-10.1.2. In the event that the rolling procedure deviates from the procedure approved by the Engineer, or the Standard Rolling Procedure, placement of the mix shall be stopped.

The density pay factor (as defined in 334-8.2) for LOTs where there are areas not requiring density testing for acceptance will be prorated based on a pay factor of 1.00 for the quantity (tonnage) of material in areas not requiring density testing for acceptance and the actual pay factor for the tonnage of material in areas requiring density testing.

**334-5.2 Full LOTs:** Each LOT will be defined (as selected by the Contractor prior to the start of the LOT) as either (1) 2,000 tons, with each LOT subdivided into four equal sublots of 500 tons each, or (2) 4,000 tons, with each LOT subdivided into four equal sublots of 1,000 tons each. As an exception to this, the initial LOT of all new mix designs shall be defined as 2,000 tons, subdivided into four equal sublots of 500 tons

each. Before the beginning of a LOT, the Engineer will develop a random sampling plan for each subplot and direct the Contractor on sample points, based on tonnage, for each subplot during construction.

**334-5.3 Partial LOTs:** A partial LOT is defined as a LOT size that is less than a full LOT. A partial LOT may occur due to the following:

1. The completion of a given mix type or mix design on a project.
2. Closure of the LOT due to time. LOTs will be closed 30 calendar days after the start of the LOT. Time periods other than 30 calendar days may be used if agreed to by both the Engineer and the Contractor.

3. A LOT is terminated per 334-5.4.4.

All partial LOTs will be evaluated based on the number of tests available, and will not be redefined.

**334-5.4 Quality Control Sampling and Testing:** Obtain all samples randomly as directed by the Engineer.

Should the Engineer determine that the Quality Control requirements are not being met or that unsatisfactory results are being obtained, or should any instances of falsification of test data occur, approval of the Contractor's Quality Control Plan will be suspended and production will be stopped.

**334-5.4.1 Lost or Missing Verification/Resolution Samples:** In the event that any of the Verification and/or Resolution samples that are in the custody of the Contractor are lost, damaged, destroyed, or are otherwise unavailable for testing, the minimum possible pay factor for each quality characteristic as described in 334-8.2 will be applied to the entire LOT in question, unless called for otherwise by the Engineer. Specifically, if the LOT in question has more than two sublots, the pay factor for each quality characteristic will be 0.55. If the LOT has two or less sublots, the pay factor for each quality characteristic will be 0.80. In either event, the material in question will also be evaluated in accordance with 334-5.9.5.

If any of the Verification and/or Resolution samples that are in the custody of the Department are lost, damaged, destroyed or are otherwise unavailable for testing, the corresponding Quality Control test result will be considered verified, and payment will be based upon the Contractor's data.

**334-5.4.2 Plant Sampling and Testing Requirements:** Obtain one random sample of mix per subplot in accordance with 334-5.1.1 as directed by the Engineer. Test the Quality Control split sample for gradation, asphalt binder content and volumetrics in accordance with 334-5.1.1. Complete all Quality Control testing within one working day from the time the samples were obtained.

**334-5.4.3 Roadway Sampling and Testing Requirements:** Obtain five 6 inch diameter roadway cores within 24 hours of placement at random locations as directed by the Engineer within each subplot. Test these Quality Control samples for density ( $G_{mb}$ ) in accordance with 334-5.1.1. In situations where it is impractical to cut five cores per subplot, obtain a minimum of three cores per subplot at random locations as identified by the Engineer. Do not obtain cores any closer than 12 inches from an unsupported edge. Maintain traffic during the coring operation; core the roadway, patch the core holes (within three days of coring); and trim the cores to the proper thickness prior to density testing.

Density for the subplot shall be based on the average value for the cores cut from the subplot with the target density being the maximum specific gravity

( $G_{mm}$ ) of the subplot. Once the average density of a subplot has been determined, do not retest the samples unless approved by the Engineer. Ensure proper handling and storage of all cores until the LOT in question has been accepted.

#### **334-5.4.4 Individual Test Tolerances for Quality Control Testing:**

Terminate the LOT if any of the following Quality Control failures occur:

- 1) An individual test result of a subplot for air voids does not meet the requirements of Table 334-5,
- 2) The average subplot density for coarse mixes does not meet the requirements of Table 334-5,
- 3) Two consecutive test results for gradation (P<sub>200</sub> only) do not meet the requirements of Table 334-5,
- 4) Two consecutive test results for asphalt binder content do not meet the requirements of Table 334-5,
- 5) The average subplot density for two consecutive sublots for fine mixes does not meet the requirements of Table 334-5,
- 6) Two core densities for coarse mixes within a subplot are less than 91.00% of  $G_{mm}$ .

When a LOT is terminated due to a QC failure, stop production of the mixture until the problem is resolved to the satisfaction of the Quality Control Manager(s) and/or Asphalt Plant Level II technician(s) responsible for the decision to resume production after a quality control failure, as identified in 105-8.6.4. In the event that it can be demonstrated that the problem can immediately be or already has been resolved, it will not be necessary to stop production. When a LOT is terminated, make all necessary changes to correct the problem. Do not resume production until appropriate corrections have been made. Inform the Engineer of the problem and corrections made to correct the problem. After resuming production, sample and test the material to verify that the changes have corrected the problem. Summarize this information and provide it to the Engineer prior to the end of the work shift when production resumes.

In the event that a Quality Control failure is not addressed as defined above, the Engineer's approval will be required prior to resuming production after any future Quality Control failures.

Address any material represented by a failing test result in accordance with 334-5.9.5. Any LOT terminated under this Subarticle will be limited to a maximum Pay Factor of 1.00 (as defined in 334-8.2) for each quality characteristic.

Characteristic	Tolerance <sup>(1)</sup>
Asphalt Binder Content (percent)	Target $\pm 0.55$
Passing No. 200 Sieve (percent)	Target $\pm 1.50$
Air Voids (percent) Coarse Graded	2.00 - 6.00
Air Voids (percent) Fine Graded	2.30 - 6.00
Density (percent $G_{mm}$ ) <sup>(2)</sup>	
Coarse Graded (minimum)	93.00
Fine Graded (minimum)	90.00

<sup>(1)</sup> Tolerances for sample size of  $n = 1$  from the verified mix design  
<sup>(2)</sup> Based on an average of 5 randomly located cores

**334-5.5 Verification Testing:** In order to determine the validity of the Contractor's Quality Control test results prior to their use in the Acceptance decision, the Engineer will run verification tests.

**334-5.5.1 Plant Testing:** At the completion of each LOT, the Engineer will test a minimum of one Verification split sample randomly selected from the LOT. Results of the testing and analysis for the LOT will be made available to the Contractor within one working day from the time the LOT is completed. Verification samples shall be reheated at the target roadway compaction temperature for 1 1/2 hours plus or minus 5 minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1.

The Verification test results will be compared with the Quality Control test results based on the between-laboratory precision values shown in Table 334-6.

Property	Maximum Difference
$G_{mm}$	0.016
$G_{mb}$ (gyratory compacted samples)	0.022
$G_{mb}$ (roadway cores – fine graded mixture)	0.015
$G_{mb}$ (roadway cores – coarse graded mixture)	0.018
$P_b$	0.44 percent
$P_{-200}$	FM 1-T 030 (Figure 2)
$P_{.8}$	FM 1-T 030 (Figure 2)

If all of the specified mix characteristics compare favorably, then the LOT will be accepted, with payment based on the Contractor's Quality Control test data for the LOT.

If any of the results do not compare favorably, then the Resolution samples from the LOT will be sent to the Resolution laboratory for testing, as described in 334-5.6.

**334-5.5.2 Roadway Testing:** At the completion of each LOT, the Engineer will determine the density ( $G_{mb}$ ) of each core (previously tested by Quality Control) as described in 334-5.1.1 from the same subplot as the Plant samples. For situations where roadway density is not required for the random subplot chosen, then another subplot shall be randomly chosen for roadway density cores only. Results of the testing and analysis for the LOT will be made available to the Contractor within one working day from the time the LOT is completed.

The individual Verification test results will be compared with individual Quality Control test results by the Engineer based on the between-laboratory precision values given in Table 334-6.

If each of the core test results compare favorably, then the LOT will be accepted with respect to density, with payment based on the Contractor's Quality Control test data for the LOT.

If any of the results do not compare favorably, then the core samples from the LOT will be sent to the Resolution laboratory for testing as specified in 334-5.6.

**334-5.6 Resolution System:**

**334-5.6.1 Plant Samples:** In the event of an unfavorable comparison between the Contractor's Quality Control test results and the Engineer's Verification test results on any of the properties identified in Table 334-6, the Resolution laboratory will test all of the split samples from the LOT for only the property (or properties) in question. Resolution samples shall be reheated at the target roadway compaction temperature for 1-1/2 hours plus or minus 5 minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1.

**334-5.6.2 Roadway Samples:** In the event of an unfavorable comparison between the Contractor's Quality Control test data and the Engineer's Verification test data on the density results, the Resolution laboratory will test all of the cores from the LOT. Testing will be as described in 334-5.1.1. Any damaged roadway cores will not be included in the evaluation; replace damaged cores with additional cores at the direction of the Engineer.

**334-5.6.3 Resolution Determination:** The Resolution test results (for the property or properties in question) will be compared with the Quality Control test results based on the between-laboratory precision values shown in Table 334-6.

If the Resolution laboratory results compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Quality Control results, and the Department will bear the costs associated with Resolution testing. No additional compensation, either monetary or time, will be made for the impacts of any such testing.

If the Resolution laboratory results do not compare favorably with all of the Quality Control results, then acceptance and payment for the LOT will be based on the Resolution test data for the LOT, and the costs of the Resolution testing will be deducted from monthly estimates. No additional time will be granted for the impacts of any such testing. In addition, in the event that the application of the Resolution test data results in a failure to meet the requirements of Table 334-5, address any material represented by the failing test result in accordance with 334-5.9.5.

In the event of an unfavorable comparison between the Resolution test results and Quality Control test results, make the necessary adjustments to assure that future comparisons are favorable.

**334-5.7 Independent Verification Testing:**

**334-5.7.1 Plant:** The Contractor shall provide sample boxes and take samples as directed by the Engineer for Independent Verification testing. Obtain enough material for three complete sets of tests (two samples for Independent Verification testing by the Engineer and one sample for testing by the Contractor). If agreed upon by both the Engineer and the Contractor, only one sample for Independent Verification testing by the Engineer may be obtained. Independent Verification samples will be reheated at the target roadway compaction temperature for 1-1/2 hours plus or minus 5 minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1. The Contractor's split sample, if tested immediately after sampling, shall be reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1. If the Contractor's sample is not tested immediately after sampling, then the sample shall be

reheated at the target roadway compaction temperature for 1-1/2 hours plus or minus 5 minutes, reduced to the appropriate testing size, and conditioned and tested as described in 334-5.1.1. The Contractor's test results shall be provided to the Engineer within one working day from the time the sample was obtained.

If any of the Independent Verification test results do not meet the requirements of Table 334-5, then a comparison of the Independent Verification test results and the Contractor's test results, if available, will be made. If a comparison of the Independent Verification test results and the Contractor's test results meets the precision values of Table 334-6 for the material properties in question, or if the Contractor's test results are not available, then the Independent Verification test results are considered verified and the Contractor shall cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.9.5.

If a comparison of the Independent Verification test results and the Contractor's test results does not meet the precision values of Table 334-6 for the material properties in question, then the second Independent Verification sample shall be tested by the Engineer for the material properties in question. If a comparison between the first and second Independent Verification test results does not meet the precision values of Table 334-6 for the material properties in question, then the first Independent Verification test results are considered unverified for the material properties in question and no action shall be taken.

If a comparison between the first and second Independent Verification test results meets the precision values of Table 334-6 for the material properties in question, then the first Independent Verification sample is considered verified and the Contractor shall cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.9.5.

The Engineer has the option to use the Independent Verification sample for comparison testing as specified in 334-6.

**334-5.7.2 Roadway:** Obtain five 6 inch diameter roadway cores within 24 hours of placement, as directed by the Engineer, for Independent Verification testing. In situations where it is impractical to cut five cores per subplot, obtain a minimum of three cores per subplot at random locations, as identified by the Engineer. These independent cores will be obtained from the same LOTs and sublots as the Independent Verification Plant samples, or as directed by the Engineer. The density of these cores will be obtained as described in 334-5.1.1. If the average of the results for the subplot does not meet the requirements of Table 334-5 for density, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Address any material represented by the failing test results in accordance with 334-5.9.5.

**334-5.8 Surface Tolerance:** The asphalt mixture will be accepted on the roadway with respect to surface tolerance in accordance with the applicable requirements of 330-12.

**334-5.9 Minimum Acceptable Quality Levels:**

**334-5.9.1 Pay Factors Below 0.90:** In the event that an individual pay factor for any quality characteristic of a LOT falls below 0.90, take steps to correct the situation and report the actions to the Engineer. In the event that the pay factor for the same quality characteristic for two consecutive LOTs is below 0.90, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Actions taken must be approved by the Engineer before production resumes.

**334-5.9.2 Composite Pay Factors Less Than 0.90 and Greater Than or Equal to 0.80:** If the composite pay factor for the LOT is less than 0.90 and greater than or equal to 0.80, cease production of the asphalt mixture until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Actions taken must be approved by the Engineer before production resumes.

**334-5.9.3 Composite Pay Factors Less Than 0.80 and Greater Than or Equal to 0.75:** If the composite pay factor for the LOT is less than 0.80 and greater than or equal to 0.75, address the defective material in accordance with 334-5.9.5.

**334-5.9.4 Composite Pay Factors Less Than 0.75:** If the composite pay factor for the LOT is less than 0.75, remove and replace the defective LOT at no cost to the Department, or as approved by the Engineer.

**334-5.9.5 Defective Material:** Assume responsibility for removing and replacing all defective material placed on the project, at no cost to the Department.

As an exception to the above and upon approval of the Engineer, obtain an engineering analysis by an independent laboratory (as approved by the Engineer) to determine the disposition of the material. The engineering analysis must be signed and sealed by a Professional Engineer licensed in the State of Florida.

The Engineer may determine that an engineering analysis is not necessary or may perform an engineering analysis to determine the disposition of the material.

Any material that remains in place will be accepted with a composite pay factor as determined by 334-8, or as determined by the Engineer.

If the defective material is due to a gradation, asphalt binder content or density failure, upon approval of the Engineer the Contractor may perform delineation tests on roadway cores in lieu of an engineering analysis to determine the limits of the defective material that requires removal and replacement. Prior to any delineation testing, all sampling locations shall be approved by the Engineer. All delineation sampling and testing shall be monitored and verified by the Engineer. The minimum limit of removal of defective material is fifty-feet either side of the failed sample. For materials that are defective due to air voids, an engineering analysis is required.

When evaluating defective material by engineering analysis or delineation testing, at a minimum, evaluate all material located between passing

Quality Control, Process Control or Independent Verification test results. Exceptions to this requirement shall be approved by the Engineer.

ARTICLE 334-6 (of the Supplemental Specifications) is deleted and the following substituted:

**334-6 Comparison Testing.**

At the start of the project (unless waived by the Engineer) and at other times as determined necessary by the Engineer, provide split samples for comparison testing with the Engineer. The purpose of these tests is to verify that the testing equipment is functioning properly and that the testing procedures are being performed correctly. In the event that the Engineer determines that there is a problem with the Contractor's testing equipment and/or testing procedures, immediately correct the problem to the Engineer's satisfaction. In the event that the problem is not immediately corrected, cease production of the asphalt mixture until the problem is adequately resolved to the satisfaction of the Engineer.

If so agreed to by both the Contractor and the Engineer, the split sample used for comparison testing may also be used for the Quality Control sample. The split sample used for comparison testing will also meet the requirements for Independent Verification Testing described in 334-5.7.

ARTICLE 334-8 (of the Supplemental Specifications) is deleted and the following substituted:

**334-8 Basis of Payment.**

**334-8.1 General:** Price and payment will be full compensation for all the work specified under this Section (including the applicable requirements of Sections 320 and 330).

For materials accepted in accordance with 334-5, based upon the quality of the material, a pay adjustment will be applied to the bid price of the material as determined on a LOT by LOT basis. The pay adjustment will be assessed by calculating a Pay Factor for the following individual quality characteristics: pavement density, air voids, asphalt binder content, and the percentage passing the No. 200 and No. 8 sieves. The pay adjustment will be computed by multiplying a Composite Pay Factor for the LOT by the bid price per ton. Perform all calculations with the Department's Asphalt Plant - Pay Factor Worksheets.

**334-8.2 Pay Factors:**

**334-8.2.1 Partial LOTs:** For Partial LOTs where no random sample is obtained due to insufficient tonnage, a Composite Pay Factor of 1.00 shall be applied.

**334-8.2.2 Two or Less Sublot Test Results:** In the event that two or less sublot test results are available for a LOT, Pay Factors will be determined based on the Small Quantity Pay Table. The Small Quantity Pay Table and Pay Factor calculations are determined in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets.

**334-8.2.3 Three or More Sublot Test Results:** When three or more sublot test results are available for a LOT, the variability-unknown, standard deviation method will be used to determine the estimated percentage of the LOT that is within the specification limits shown in (Table 334-7). The Percent Within Limits (PWL) is determined in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets.

Table 334-7 Specification Limits	
Quality Characteristic	Specification Limits
Passing No. 8 sieve ( percent)	Target ± 3.1
Passing No. 200 sieve ( percent)	Target ± 1.0
Asphalt Content ( percent)	Target ± 0.40
Air Voids - Coarse Mixes ( percent)	4.00 ± 1.40
Air Voids - Fine Mixes ( percent)	4.00 ± 1.20
Density - Coarse Mixes ( percent of $G_{mm}$ ):	94.50 ± 1.30
Density - Fine Mixes ( percent of $G_{mm}$ ):	93.00 + 2.00, - 1.20 <sup>(1)</sup>

Note (1): If the Engineer (or Contract Documents) limits compaction to the static mode only, or for all one-inch thick lifts, compaction shall be in the static mode. No vibratory mode in the vertical direction will be allowed. Other vibratory modes will be allowed, if approved by the Engineer. In either case, the specification limits will be as follows: 92.00 + 3.00, -1.20 percent of  $G_{mm}$ . No additional compensation, cost or time, shall be made.

**334-8.2.3.1 Pay Factors (PF):** Pay Factors will be calculated by using the following equation:

$$\text{Pay Factor} = (55 + 0.5 \times \text{PWL}) / 100$$

The PWL is determined in accordance with the instructions contained within the Department's Asphalt Plant – Pay Factor Worksheets.

**334-8.3 Composite Pay Factor (CPF):** A Composite Pay Factor for the LOT will be calculated based on the individual Pay Factors (PF) with the following weighting applied: 35% Density (D), 25% Air Voids ( $V_a$ ), 25% asphalt binder content ( $P_b$ ), 10% Passing No. 200 ( $P_{.200}$ ) and 5% Passing No. 8 ( $P_{.8}$ ). Calculate the CPF by using the following formula:

$$\text{CPF} = [(0.350 \times \text{PF } D) + (0.250 \times \text{PF } V_a) + (0.250 \times \text{PF } P_b) + (0.100 \times \text{PF } P_{.200}) + (0.050 \times \text{PF } P_{.8})]$$

Where the Pay Factor (PF) for each quality characteristic is determined in either 334-8.2.2 or 334-8.2.3, depending on the number of sublot tests. Note that the number after each multiplication will be rounded to the nearest 0.01.

The pay adjustment shall be computed by multiplying the Composite Pay Factor for the LOT by the bid price per ton.

**334-8.4 Payment:** Payment will be made under:

Item No. 334- 1- Superpave Asphaltic Concrete - per ton.