SunTrax Connected/Automated Test Facility - Infield Construction
CWR Contracting - 2023 Nominated Project

Specifications Committee Meeting Packet

For the Specification Committee of the Asphalt Contractors Association of Florida, Inc

April 19th, 2023 @ 10:00AM (EST)

SunTrax Test Facility
100 Transformation Way
Auburndale, Florida

Virtual Teams Link: Click here to join the meeting

Meeting Agenda

ANTI-TRUST POLICY OF THE ASPHALT CONTRACTORS ASSOCIATION OF FLORIDA, INC

The antitrust laws seek to preserve a free competitive economy in the United States and in commerce with foreign countries. As a general rule, competitors may not restrain competition among themselves through understandings or agreements as to the price, the production, or the distribution of their products or services, or other agreements which unreasonably restrict competition. With some exceptions, competitors may not act in concert to restrict the competitive capabilities or opportunities of their competitors, their suppliers, or their customers.

The antitrust laws, however, are often of unclear applicability, and in certain circumstances unlawful agreements can be inferred from circumstantial evidence. Furthermore, penalties for violating the antitrust laws are severe. The guidelines set forth below are designed to avoid even the appearance of questionable activity by the Association and its members.

ACAF through its meeting activities brings together representatives of competitors throughout the industry. The subject matters of ACAF's activities are technical or educational in nature. Nevertheless, ACAF's Board of Directors recognizes the remote possibility that the Association and its activities can be abused and be seen by those unaware of or determined to violate the law as providing an opportunity for anticompetitive conduct. Through this statement of policy, the ACAF Board reiterates its unequivocal support for the policy of competition served by the antitrust laws and uncompromising intent as individual companies and as an Association to comply strictly in all respects with those laws governing competitive activities.

At all meetings of the Asphalt Contractors Association of Florida's Board of Directors and committees, as well as all association-sponsored seminars, conferences, webinars and task force and working group sessions and among Association members, the following will not be discussed:

- Individual company prices, price changes, price differentials, markups, discounts, credit terms, etc.
- Individual company data on costs, production, capacity, inventories, sales, labor, supplies, etc.
- Agreements on terms of sale, warranties, or contract provisions.
- What constitutes a "fair profit level."
- Standardization or stabilization of prices.
- Pricing procedures or formulas.
- Confidential future marketing or pricing plans.
- Control of sales.
- Allocation of customers or geographic division of markets – agreements not to compete.
- Refusal to deal with a company because of its pricing or distribution practices.
- Whether or not the pricing practices of any industry member are unethical or constitute an unfair trade practice.

- Information concerning any individual company's costs, profits, inventory, market share, or other commercial information of a non-public nature.

Notwithstanding the prohibitions on certain cooperation between competitors described above, Association members may be immunized from antitrust liability when they cooperate to influence governmental action, such as joint legislative or regulatory initiatives. It should be viewed as very limited permission to influence jointly any branch of the government. It is important to remember that the doctrine immunizes cooperating competitors from liability only from any harm to competition that is caused by the resulting governmental action. It does not immunize competitors who behave or share information improperly at any time, even if they are doing so in the course of influencing law- or policymakers. For example, competitors may not share future pricing moves with each other in preparation for an effort to convince a lawmaking body to set a price floor for an industry.

Further, if the Association embarks on the development of specific product standards or a code of ethics for its members or the compilation of industry statistics, such activities shall be developed and conducted in a manner consistent with applicable antitrust laws with the prior approval of the Board of Directors of the Association and advice of counsel. To avoid even the appearance of questionable activity, as well as to guard against inadvertent conduct, Association meetings should observe the following guidelines and procedures:

- A written agenda will be prepared and adhered to.
- Accurate minutes of every meeting will be prepared and approved.
- Minutes of the meeting will be distributed to all committee members.
- In case of doubt about the propriety of a discussion, or a particular topic of discussion, Association counsel will be consulted.
- If a member has a reservation concerning remarks or discussion at an Association meeting, that member should state the reservation.

Revised March 2020

CONFLICT OF INTEREST POLICY

Article I. Purpose

The purpose of a conflict-of-interest policy is to protect the Association's interest when it is contemplating entering into a transaction or arrangement that might benefit the private interest of one of its officers or directors, or might result in a possible excess benefit transaction. This policy is intended to supplement, but not replace, any applicable state and federal laws governing conflicts of interest.

Article II. Definitions

1. Interested Person

An Interested Person is any director, principal officer, or member of a committee with governing board-delegated powers who has a direct or indirect Financial Interest, as defined below.

2. Financial Interest

A person has a Financial Interest if the individual has, directly or indirectly, any actual or potential ownership, investment, or compensation arrangement with the Asphalt Contractors Association of Florida, Inc or with any entity that conducts transactions with the Asphalt Contractors Association of Florida, Inc.

A Financial Interest is not necessarily a conflict of interest in all cases. Under Article III, Section 2 of IRS Form 1023, a person with a Financial Interest may have a conflict of interest only if the appropriate governing board or committee decides that a conflict of interest exists.

Article III. Procedures

1. Duty to disclose

In connection with any actual or possible conflict of interest, an Interested Person must disclose the existence of the Financial Interest and be given the opportunity to disclose all material facts to the directors and members of the committees with governing board-delegated powers considering the proposed transaction

or arrangement. In an effort to aid such disclosure, each member (board, committee, or staff) shall complete a conflict-of-interest questionnaire as circumstances warrant, but no less frequently than annually.

2. Determining whether a conflict of interest exists

The board shall review each member questionnaire and any other disclosures regarding the Financial Interests of its members and vote on whether a conflict of interest exists.

3. Procedures for addressing the conflict of interest

After exercising due diligence, the governing board or committee shall determine whether the organization can obtain with reasonable effort a more advantageous transaction or arrangement from a person or entity that would not produce a conflict of interest.

If an alternative transaction or arrangement is not possible, the governing board or committee shall determine by a majority vote of the disinterested directors whether the transaction or arrangement is in the best interests of the organization, for its own benefit, and fair and reasonable. Based on these determinations, the board or committee shall make its decision on whether to enter into the transaction or arrangement.

4. Disciplinary action

If the committee has reason to believe an individual has failed to disclose actual or potential conflicts of interest, it will inform the member and allow him/her to explain the alleged failure to disclose. If the committee still has reason to believe a conflict of interest exists after the alleged conflict is explained, it will take corrective action.

CONFLICT-OF-INTEREST QUESTIONNAIRE

The following questionnaire must be completed annually by all members and affiliates of Asphalt Contractors Association of Florida, Inc. Answers to this questionnaire should relate to relationships that occur from 1 September 2022 through 31 August 2023. Once you have completed this questionnaire, please sign and date in the space provided and return it to:

Mark Musselman
Asphalt Contractors
Association of Florida, Inc

1007 E. Desoto Park Drive
(850)222-7300
acaf@acaf.org

1. Are you an officer of an organization that conducts business or has a relationship with the Asphalt Contractors Association of Florida, Inc other than through the normal business of the Association?

   Yes No

   If yes, please define.

2. Have you ever served on the board of a business in which the Asphalt Contractors Association of Florida, Inc invests?

   Yes No

   If yes, please define.

3. Do you have a family relationship with anyone who has a noted relationship with the Asphalt Contractors Association of Florida, Inc? Family connections include an individual's spouse, parent, child, grandparent, grandchild, great-grandchild, and sibling. The spouses of any children, grandchildren, great-grandchildren, and siblings are considered family relationships as well.

   Yes No

   If yes, please define.

4. Have you participated, directly or indirectly, in any employment agreement, compensation relationship, or any other arrangement/investment opportunity with a third-party vendor doing

business with the Asphalt Contractors Association of Florida, Inc that has resulted or could result in personal benefit to you?

Yes No

If yes, please define.

5. Have you received, directly or indirectly, any salary payments, loans, or gifts of any kind or any free service, discounts, or other fees from any person/organization engaged in any transaction with the Asphalt Contractors Association of Florida, Inc?

Yes No

If yes, please define.

6. Do you share ownership of a business that does business with the Asphalt Contractors Association of Florida, Inc? Ownership means voting power in a corporation, profits interest in a partnership, or beneficial interest in a trust.

Yes No

If yes, please define.

Signature Please fill out sign-up sheet Date_____

Print name_____

SPECIFICATIONS COMMITTEE MEMBERS

Name	Company	Email	Phone
David Allain	ACAF	dallain@acaf.org	(205) 616-8758
Johnny Blankenship	Masci General Contractors	jblankenship@mascigc.com	(352) 638-6816
Tracey Boggs	Anderson Columbia Co., Inc.	Tracey.Boggs@andersoncolumbia.com	(850) 209-6854
Jency Carmenate	General Asphalt Company, Inc.	jency@generalasphalt.com	(786) 509-1005
Tim Carter	P&S Paving	tcarter@pandspavinginc.com	(386) 624-3208
Eron Chambers	Hubbard Construction	eron.chambers@hubbard.com	(407) 623-3865
Grant Cool	The de Moya Group, Inc.	grant.cool@demoya.com	(305) 322-5597
Mickey Cox	Ajax Paving Industries	mcox@ajaxpaving.com	(813) 394-1760
Carl Dempsey	Asphalt Technologies Inc.	Carl.Dempsey@andersoncolumbia.com	(386) 752-4921
Joe Donaruma	Preferred Materials, Inc.	Joseph.Donaruma@preferredmaterials.com	(904) 813-0650
Rick Fort	Preferred Materials, Inc.	Richard.Fort@preferredmaterials.com	(941) 650-6230
Jeff James	The Middlesex Corporation	jjames@middlesexco.com	(407) 515-3568
Julio Leganoa	Halley Engineering Cont.	jleganoa@halleyeng.com	(305) 877-5243
Albert Lopez	General Asphalt Company, Inc.	Albert@generalasphalt.com	(305) 796-8955
Steve McReynolds	ATS/Duval	SMcReynolds@ats.consulting	(904) 349-9722
Joe Meier	The Middlesex Corporation	jmeier@middlesexco.com	(407) 427-7076
Carl Moorefield	Hubbard Construction	Carl.Moorefield@hubbard.com	(407) 947-2416
Mark Musselman	ACAF	mmusselman@acaf.org	(850) 445-6981
Tanya Nash	ATS	TNash@ats.consulting	(904) 510-3072
Darren Phillips	CWR Contracting	dphillips@cwrcontracting.com	(850) 545-9156
Patrick Pienkos	Ranger Construction	patrick.pienkos@rangerconstruction.com	(772) 215-8096
Renato Reis	Ranger Construction	renato.reis@rangerconstruction.com	(772) 215-8096
William Whitehurst	V.E. Whitehurst and Sons	william@vewhitehurst.com	(352) 538-7530
Mike Woodford	V.E. Whitehurst and Sons	Mikew@vewhitehurst.com	(352) 318-5234

SPECIFICATIONS COMMITTEE AGENDA

Wednesday, April 19th, 2023

1:00 – 5:00pm EST

1. Call to Order, Tim Carter - Chair
2. Recognition of Anti-Trust Policy
3. Recognition of Conflict-of-Interest Policy
4. Minutes from Previous Meeting
5. Discussion with Greg Sholar and Rich Hewitt, FDOT. 10:30AM-Noon.
6. New Business
    1. July 2023/2024 Standard Specifications Book
    2. Sections 234, 337 Specification Changes Proposed by FDOT
    3. LAP334 Specifications
    4. Contractor Proposed Topics
    5. Scheduling Next Specifications Meeting
7. Adjournment

MINUTES FROM PREVIOUS MEETING

Mon. December 12th, 2022
1:00PM – 5:00M EST
Caribe Royale Orlando
8101 World Center Dr, Orlando, FL 32821
Hibiscus Meeting Room
Committee Members and Guests in attendance:

- In-Person
  - David Allain – ACAF
  - Tracey Boggs – Anderson Columbia
  - Tim Carter – P&S Paving
  - Mickey Cox – AJAX Paving Industries
  - Carl Dempsey – Asphalt Technologies, Inc.
  - David Henry – Anderson Columbia
  - Damon Markwell – Ranger Construction
  - Steve McReynolds – Asphalt Testing Solutions & Engineering
  - Julio Leganoa – Halley Engineering Contractors
- Virtual (Teams)
  - Rich Hewitt – FDOT
  - Howard Moseley – FDOT
  - Greg Sholar – FDOT
  - Wayne Rilko – FDOT
  - Joe Meier – Middlesex Co.
  - Eron Chambers – Hubbard Construction
  - Carl Moorefield – Hubbard Construction
  - Jeff James – Middlesex Co.
  - Darren Phillips – CWR Contracting
  - Patrick Pienkos – Ranger Construction

- **Call to Order**
  - Chair Carter calls the meeting to order at 1:00 PM.
- **Acknowledgement of Anti-Trust Policy**
  - Chair Carter recognizes ACAFs Anti-Trust Policy. Unanimous consent is given to agree to adhere to its direction.
- **Acknowledgement of Conflict-of-Interest Policy**
  - Chair Carter recognizes ACAFs Conflict of Interest Policy. Unanimous consent is given.
- **FDOT Discussion**
  - Thick Lift Paving topic discussed having success on the Turnpike in certain projects. Current objective is to pave a thick structural lift, and top it off with a thin structural lift to get smoothness. Requirements of the final structural lift to get smoothness will loosen as experience is gained by many contractors. NO ISSUE.
    - Rich – Only RSE on the final structural lift. Ride Number (RN) spec pulls RSE but phasing out of that soon.
  - Research at State Materials Office
    - Cracking Studies on Aramid Fibers. NO COMMENTS.
  - Wayne Rilko – Districts are being pushed by SMO to ensure all new specs (Bill of Lading for tack) is done correctly. No Issues from DOT or Contractors.
  - Greg Sholar – Asphalt Test Road Update.
    - Base Studies, Reflective Crack Studies, Superpave 5.
    - FC-2 modernized to FC-5 and will be called FC-Q.
  - Failing Binder samples at plants has been reported by FDOT. SMO recommends that we keep an eye on how valves are cleaned after tanker trucks unload material.
  - Requested increase in RAP content from 30-35% for PG 58-22 binder.
    - SMO to keep the RAP contents the same for now, to prevent brittle mixtures, but will continue to keep an eye on the possibility of increasing in the future.

- **New Business**
  - Technical Director Allain works through the LAP334 specification with committee to provide SMO with recommendations for changes to more current practices for county specifications.
  - Technical Director Allain introduces the work in progress for the Florida Asphalt Specifications for Counties and Municipalities (FASCM) book to the committee members.
- **Next Meeting Date**
  - Potential Location and Date: SunTrak, Late Spring
- **Meeting Adjourned at 4:30 PM**

Action Items:

- **TD Allain will propose suggested LAP334 specification revisions to the SMO at a later date and update the specifications committee on the responses.**

NEW BUSINESS

- July 2023/24 Standard Specifications:
  Asphalt Specs that will be in effect July 1st, 2023

See attached documents:

Appendix A
E-Ticketing: Section 320 Revisions
E-Ticketing: Section 330 Revisions

Appendix B
Spreadrate Tolerance Adjustment: Section 330 Revisions

Appendix C
Traffic Level/Mix Design Adjustments: Section 334 Revisions

Appendix D
Friction Course Design Adjustments: Section 337 Revisions

Appendix E
Friction Course Design Adjustments: Section 916 Revisions

- July 2024/25 Specifications: Proposed Revisions

See attached documents:

Appendix F

Section 234: Superpave Asphalt Base Revisions

Appendix G

Section 337: Asphalt Concrete Friction Courses Revisions

➢ LAP334 Specification Revisions

See attached documents:

Appendix H

LAP334: Asphalt Concrete for LAP

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX A

(Please provide all information - incomplete forms will be returned)

Date: 7/20/22

Originator: Richard Hewitt, Wayne Rilkc

Telephone: 386-943-5305

email: richard.hewitt@dot.state.fl.us

Office: State Construction Office

Specification Section: 320

Article/Subarticle: 3.2

Associated Section(s) Revisions: 330-2

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted	
Standard Plans Index	○	◉	Rick Jenkins/Joshua Turley	7/20/
Traffic Engineering Manual	○	◉	Javier Ponce	7/20/
FDOT Design Manual	○	◉	Gevin McDaniel	7/20/
Construction Project Administration Manual	○	◉	Tim Lattner	7/20/
Basis of Estimate/Pay Items	○	◉	Ryan Gray	7/20/
Structures Design Guidelines	○	◉	Ben Goldsberry	7/20/
Approved Product List	○	◉	Karen Byram	7/20/
Materials Manual	○	◉	Tim Counts	7/20/
Maintenance Specs	○	◉	Scott Arnold	7/20/

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? (Select)

Synopsis: Summarize the changes:

Allows contractor to use electronic ticketing (e-ticketing) for asphalt in lieu of paper tickets.
The time period between truck scale checks shall not exceed 35 days.
Deliver polymer-modified asphalt binders to the asphalt plant at a temperature not to exceed 355°F.

Justification: Why does the existing language need to be changed?

Asphalt e-Ticketing provides safety benefits as it eliminates the need to walk between traffic and paving equipment to obtain tickets for truckloads of asphalt delivered to projects. It is permitted by DCE Memo, and now are placing it in Standard Specs.
A finite time between truck scale checks is necessary.
The maximum binder temperature is based manufacturers' data.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Contact the State Specifications Office for assistance in completing this form.

Daniel Strickland 850-414-4130 Daniel.Strickland@dot.state.fl.us Rebecca Arcia 850-414-4155 Rebecca.Arcia@dot.state.fl.us
Darla Hunsicker 850-414-4114 Darla.Hunsicker@dot.state.fl.us Valencia Cunningham 850-414-4101 Valencia.Cunningham@dot.state.fl.us

HOT MIX ASPHALT - PLANT METHODS AND EQUIPMENT.
(REV 7-25-22)

ARTICLE 320-3 is deleted and the following substituted:

320-3 Requirements for All Plants.

320-3.1 General: Design, manufacture, coordinate, and operate the asphalt plant in a manner that will consistently produce a mixture within the required tolerances and temperatures specified.

320-3.2 Asphalt Plant Ticketing Systems: The Contractor shall use either a paper ticketing system or an electronic ticketing (E-Ticketing) system.

320-3.2.1 Electronic Weigh Systems for Paper Ticketing: Equip the asphalt plant with an electronic weigh system that has an automatic printout, is certified every six months by an approved certified scale technician, and meets monthly comparison checks with certified truck scales as specified in 320-3.2.1.4. Weigh all plant produced hot mix asphalt on the electronic weigh system, regardless of the method of measurement for payment.

Include, as a minimum, the following information on the printed delivery ticket:

1. Sequential load number
2. Project number
3. Date
4. Name and location of plant
5. Mix design number
6. Place for hand-recording mix temperature
7. Truck number
8. Gross, tare, and net tonnage per truck (as applicable)
9. Daily total tonnage of mix for the mix design

Print the delivery ticket with an original and at least one copy. Furnish the original to the Engineer at the plant and one copy to the Engineer at the paving site.

Utilize any one of the following three electronic weigh systems.

320-3.2.1.1 Electronic Weigh System on the Truck Scales: Provide an electronic weigh system on all truck scales, which is equipped with an automatic recordation system that is approved by the Engineer. Use scales of the type that directly indicate the total weight of the loaded truck. Use scales meeting the requirements for accuracy, condition, etc., of the Bureau of Weights and Measures of the Florida Department of Agriculture, and re-certify such fact every six months, either by the Bureau of Weights and Measures or by a registered scale technician.

320-3.2.1.2 Electronic Weigh System on Hoppers Beneath a Surge or Storage Bin: Provide an electronic weigh system on the hopper (hopper scales or load cells) beneath the surge or storage bin, which is equipped with an automatic recordation system approved by the Engineer.

320-3.2.1.3 Automatic Batch Plants with Printout: For batch plants, provide an approved automatic printer system which will print the individual or cumulative weights of aggregate and liquid asphalt delivered to the pugmill and the total net weight of the asphalt mix measured by hopper scales or load cell type scales. Use the automatic printer system only in conjunction with automatic batching and mixing control systems that have been approved by the Engineer.

320-3.2.1.4 Monthly Electronic Weigh System Comparison Checks: Check the accuracy of the electronic weighing system at the commencement of production and thereafter ~~at least every 30 days during production~~ by one of the following two methods and maintain a record of the weights in the Scale Check Worksheet. The time period between scale checks shall not exceed 35 calendar days.

320-3.2.1.4.1 Electronic Weigh System on Truck Scales:

1. The Engineer will randomly select a loaded truck of asphalt mix, a loaded aggregate haul truck, or another vehicle type approved by the Engineer and record the truck number and gross weight from the Contractor's delivery ticket.

2. Weigh the selected truck on a certified truck scale, which is not owned by the Contractor and record the gross weight for the comparison check. If another certified truck scale is not available, the Engineer may permit another set of certified truck scales owned by the Contractor to be used. The Engineer may elect to witness the scale check.

3. The gross weight of the loaded truck as shown on the Contractor's delivery ticket will be compared to the gross weight of the loaded truck from the other certified truck scale. The maximum permissible deviation is 8 pounds per ton of load, based on the certified truck scale weight.

4. If the distance from the asphalt plant to the nearest certified truck scale is enough for fuel consumption to affect the accuracy of the comparison checks, a fuel adjustment may be calculated by using the truck odometer readings for the distance measurement, and 6.1 miles per gallon for the fuel consumption rate, and 115 ounces per gallon for fuel weight.

5. During production, when an additional certified truck scale is not available for comparison checks, the Engineer may permit the Contractor to weigh the truck on his certified scales used during production and then weigh it on another certified truck scale, as soon the other scale is available for the comparison checks.

In addition to the periodic checks as specified above, check the scales at any time the accuracy of the scales becomes questionable. When such inaccuracy does not appear to be sufficient to seriously affect the weighing operations, the Engineer will allow a period of two calendar days for the Contractor to conduct the required scale check. However, in the event the indicated inaccuracy is sufficient to seriously affect the mixture, the Engineer may require immediate shut-down until the accuracy of the scales has been checked and necessary corrections have been made. Include the cost of all scale checks in the bid price for asphalt concrete, at no additional cost to the Department.

320-3.2.1.4.2. Electronic Weigh System on Hoppers Beneath a Surge or Storage Bin and Automatic Batch Plants with Printout:

1. The Engineer will randomly select a loaded truck of asphalt mix and record the truck number, and the net weight of the asphalt mix from the Contractor's delivery ticket.

2. Weigh the selected truck on a certified truck scale, which is not owned by the Contractor and record the gross weight for the comparison check. If another certified truck scale is not available, the Engineer may permit another set of certified truck scales owned by the Contractor to be used. The Engineer may elect to witness the scale check.

3. Deliver the asphalt mix to the project, then weigh the selected empty truck on the same certified truck scales. Record the tare weight of the truck.

4. Compare the net weight of the asphalt mix from the delivery ticket to the calculated net weight of the asphalt mix as determined by the certified truck scale weights. The maximum permissible deviation is 8 pounds per ton of load, based on the certified truck scale weight.

5. Use the fuel adjustment as specified in 320-3.2.4.1(4), when the distance from the asphalt plant to the nearest certified truck scale is enough for fuel consumption to affect the accuracy of the comparison checks.

6. During production, when an additional certified truck scale is not available for comparison checks, the Engineer may permit the Contractor to load a truck with aggregate from the pugmill, surge or storage bin, and follow the above procedures to conduct the comparison checks as soon as certified truck scale is available.

If the check shows a greater difference than the tolerance specified above, then recheck on a second set of certified scales. If the check and recheck indicate that the printed weight is out of tolerance, have a certified scale technician check the electronic weigh system and certify the accuracy of the printer. While the system is out of tolerance and before its adjustment, the Engineer may allow the Contractor to continue production only if provisions are made to use a set of certified truck scales to determine the truck weights.

320-3.2.2 Electronic Weigh Systems for E-Ticketing: Equip the asphalt plant with an electronic weigh system that has an automatic printout, is certified every six months by an approved certified scale technician, and meets monthly comparison checks with certified truck scales as specified in 320-3.2.2.3. Weigh all plant produced hot mix asphalt on the electronic weigh system, regardless of the method of measurement for payment.

Include, as a minimum, the following information in the electronic delivery ticket:

1. Sequential load number
2. Project's Financial Identification Number (FIN)
3. Date
4. Name and location of plant
5. Mix design number
6. Separate, individual, data entry locations for recording mix temperature by:
    a. Plant QC
    b. Plant VT
    c. Roadway QC
    d. Roadway VT
7. Truck number
8. Gross, tare, and net tonnage per truck
9. Daily cumulative tonnage of mix for the mix design

320-3.2.2.1 Electronic Ticketing (E-Ticketing) System: Provide an e-Ticketing System (including any necessary software and hardware) capable of monitoring, collecting, storing, and reporting the information required by the Contract for all loads of asphalt mix delivered to the project. After each truck is loaded, electronically record and use a web service to upload the ticket information to the E-ticketing software database. The E-ticketing system shall provide each truck load's ticket information to users of the e-ticketing software.

E-ticketing software must provide the Engineer the ability to access real-time monitoring of asphalt truck load ticket information as described herein.

The e-Ticketing system shall be integrated with the Load Read-Out scale system at the asphalt plant site.

The e-ticketing system shall have offline capabilities to prevent data loss in the event of power loss or loss of connectivity.

320-3.2.2.1.1 E-Ticketing System Construction Requirements: Install and operate equipment in accordance with the manufacturer's specifications.

320-3.2.2.1.2 Data Deliverables: Provide to the Engineer a means of gathering report summaries by way of iOS or Android apps, web pages, or any other method at the disposal of the Engineer. The Engineer may request data at any time during paving operations. In addition to providing reports referenced in this specification, provide monthly reports, as well as, a final, end of project report in the e-ticketing software and in a comma separated value (.csv) file. Provide all e-ticketing database data required in this Section in the monthly and end of project reports and .csv files.

320-3.2.2.1.3 Real-Time Continuous e-Ticketing Data Items: Provide the Engineer access to the e-Ticketing system data viewer which displays the following information in real-time with a web-based or App-based system compatible with iOS, Windows, or Android environments:

1. Each Truck:
    a. Unique Truck ID
    b. Sequential Truck Load Number
    c. Mix Design Number
    d. Net Weight of material being transported (to the nearest 0.01 ton)
    e. Running Daily Total of Net Weight of material being transported (to the nearest 0.01 ton)
    f. Project's Financial Identification Number
2. Project Location

320-3.2.2.1.4 Daily Summary: Provide the following summary information to the Engineer electronically within 4 hours of beginning operations on the next working day:

1. List of Individual Loads
    a. Contractor Name
    b. Project's Financial Identification Number (FIN)
    c. Unique Truck ID
    d. Sequential Load Number
    e. Net Weight for Payment (nearest 0.01 tons)
    f. Net Weight of Waste (nearest 0.01 tons)
    g. Date Paved
    h. Mix Temperature Measurements (Plant QC, Plant VT, Roadway QC, and Roadway VT)
    i. Time Loaded at Plant site

320-3.2.2.2: Electronic Weigh Systems: Utilize any one of the following three electronic weigh systems.

320-3.2.2.2.1 Electronic Weigh System on the Truck Scales: Provide an electronic weigh system on all truck scales, which is equipped with an automatic recordation system that is approved by the Engineer. Use scales of the type that directly indicate

the total weight of the loaded truck. Use scales meeting the requirements for accuracy, condition, etc., of the Bureau of Weights and Measures of the Florida Department of Agriculture, and re-certify such fact every six months, either by the Bureau of Weights and Measures or by a registered scale technician.

320-3.2.2.2.2 Electronic Weigh System on Hoppers Beneath a Surge or Storage Bin: Provide an electronic weigh system on the hopper (hopper scales or load cells) beneath the surge or storage bin, which is equipped with an automatic recordation system approved by the Engineer.

320-3.2.2.2.3 Automatic Batch Plants: For batch plants, provide an electronic weigh system, which is equipped with an automatic recordation system, that is approved by the Engineer, which will directly indicate the individual or cumulative weights of aggregate and liquid asphalt delivered to the pugmill and the total net weight of the asphalt mix measured by hopper scales or load cell type scales. Use the electronic systems only in conjunction with automatic batching and mixing control systems that have been approved by the Engineer.

320-3.2.2.3 Monthly Electronic Weigh System Comparison Checks: Check the accuracy of the electronic weighing system at the commencement of production and thereafter by one of the following three methods and maintain a record of the weights in the Scale Check Worksheet. The time period between scale checks shall not exceed 35 calendar days.

320-3.2.2.3.1. Electronic Weigh System on Truck Scales:

1. The Engineer will randomly select a loaded truck of asphalt mix, a loaded aggregate haul truck, or another vehicle type approved by the Engineer and record the truck number and gross weight from the Contractor's delivery ticket.

2. Weigh the selected truck on a certified truck scale, which is not owned by the Contractor and record the gross weight for the comparison check. If another certified truck scale is not available, the Engineer may permit another set of certified truck scales owned by the Contractor to be used. The Engineer may elect to witness the scale check.

3. The gross weight of the loaded truck as shown on the Contractor's delivery ticket will be compared to the gross weight of the loaded truck from the other certified truck scale. The maximum permissible deviation is 8 pounds per ton of load, based on the certified truck scale weight.

4. If the distance from the asphalt plant to the nearest certified truck scale is enough for fuel consumption to affect the accuracy of the comparison checks, a fuel adjustment may be calculated by using the truck odometer readings for the distance measurement, and 6.1 miles per gallon for the fuel consumption rate, and 115 ounces per gallon for fuel weight.

5. During production, when an additional certified truck scale is not available for comparison checks, the Engineer may permit the Contractor to weigh the truck on his certified scales used during production and then weigh it on another certified truck scale, as soon as the other scale is available for the comparison checks.

In addition to the periodic checks as specified above, check the scales at any time the accuracy of the scales becomes questionable. When such inaccuracy does not appear to be sufficient to seriously affect the weighing operations, the Engineer will allow a period of two calendar days for the Contractor to conduct the required scale check. However, in the event the indicated inaccuracy is sufficient to seriously affect the mixture, the Engineer may

require immediate shut-down until the accuracy of the scales has been checked and necessary corrections have been made. Include the cost of all scale checks in the bid price for asphalt concrete, at no additional cost to the Department.

320-3.2.2.3.2. Electronic Weigh System on Hoppers Beneath a Surge or Storage Bin:

1. The Engineer will randomly select a loaded truck of asphalt mix and record the truck number, and the net weight of the asphalt mix from the Contractor's delivery ticket.

2. Weigh the selected truck on a certified truck scale, which is not owned by the Contractor and record the gross weight for the comparison check. If another certified truck scale is not available, the Engineer may permit another set of certified truck scales owned by the Contractor to be used. The Engineer may elect to witness the scale check.

3. Deliver the asphalt mix to the project, then weigh the selected empty truck on the same certified truck scales. Record the tare weight of the truck.

4. Compare the net weight of the asphalt mix from the delivery ticket to the calculated net weight of the asphalt mix as determined by the certified truck scale weights. The maximum permissible deviation is 8 pounds per ton of load, based on the certified truck scale weight.

5. Use the fuel adjustment as specified in 320-3.2.2.3.1(4), when the distance from the asphalt plant to the nearest certified truck scale is enough for fuel consumption to affect the accuracy of the comparison checks.

6. During production, when an additional certified truck scale is not available for comparison checks, the Engineer may permit the Contractor to load a truck with aggregate from the pugmill, surge or storage bin, and follow the above procedures to conduct the comparison checks as soon as certified truck scale is available.

If the check shows a greater difference than the tolerance specified above, then recheck on a second set of certified scales. If the check and recheck indicate that the printed weight is out of tolerance, have a certified scale technician check the electronic weigh system and certify the accuracy of the printer. While the system is out of tolerance and before its adjustment, the Engineer may allow the Contractor to continue production only if provisions are made to use a set of certified truck scales to determine the truck weights.

320-3.2.2.3.3. Electronic Weigh System on Hoppers Beneath a Surge or Storage Bin and Automatic Batch Plants with Printout:

1. The Engineer will randomly select a loaded truck of asphalt mix and record the truck number, and the net weight of the asphalt mix from the Contractor's delivery ticket.

2. Weigh the selected truck on a certified truck scale, which is not owned by the Contractor and record the gross weight for the comparison check. If another certified truck scale is not available, the Engineer may permit another set of certified truck scales owned by the Contractor to be used. The Engineer may elect to witness the scale check.

3. Deliver the asphalt mix to the project, then weigh the selected empty truck on the same certified truck scales. Record the tare weight of the truck.

4. Compare the net weight of the asphalt mix from the delivery ticket to the calculated net weight of the asphalt mix as determined by the certified truck scale weights. The maximum permissible deviation is 8 pounds per ton of load, based on the certified truck scale weight.

5. Use the fuel adjustment as specified in 320-3.2.1.4.1(4), when the distance from the asphalt plant to the nearest certified truck scale is enough for fuel consumption to affect the accuracy of the comparison checks.

6. During production, when an additional certified truck scale is not available for comparison checks, the Engineer may permit the Contractor to load a truck with aggregate from the pugmill, surge or storage bin, and follow the above procedures to conduct the comparison checks as soon as certified truck scale is available.

If the check shows a greater difference than the tolerance specified above, then recheck on a second set of certified scales. If the check and recheck indicate that the weight on the E-Ticket is out of tolerance, have a certified scale technician check the electronic weigh system and certify the accuracy of the E-Ticketing system. While the system is out of tolerance and before its adjustment, the Engineer may allow the Contractor to continue production only if provisions are made to use a set of certified truck scales to determine the truck weights.

320-3.3 Asphalt Binder: Meet the following requirements:

320-3.3.1 Transportation: Deliver the asphalt binder to the asphalt plant at a temperature not to exceed 370°F, and equip the transport tanks with sampling and temperature sensing devices meeting the requirements of 300-3.2.

320-3.3.2 Storage: Equip asphalt binder storage tanks to heat the liquid asphalt binder to the temperatures required for the various mixtures. Heat the material in such a manner that no flame comes in contact with the binder. Heat or insulate all pipe lines and fittings. Use a circulating system of adequate size to ensure proper and continuous circulation during the entire operating period. Locate a thermometer, reading from 200 to 400°F, either in the storage tank or in the asphalt binder feed line. Maintain the asphalt binder in storage within a range of 230 to ~~370~~355°F in advance of mixing operations. Locate a sampling device on the discharge piping exiting the storage tank or at a location as approved by the Engineer. Provide a metal can of one quart capacity for binder sampling at the request of the Engineer.

320-3.4 Aggregate: Meet the following requirements:

320-3.4.1 Stockpiles: Place each aggregate component in an individual stockpile, and separate each from the adjacent stockpiles, either by space or by a system of bulkheads. Prevent the intermingling of different materials in stockpiles at all times. Identify each stockpile, including RAP, as shown on the mix design.

Form and maintain stockpiles in a manner that will prevent segregation. If a stockpile is determined to be segregated, discontinue the use of the material on the project until the appropriate actions have been taken to correct the problem.

320-3.4.2 Blending of Aggregates: Stockpile all aggregates prior to blending or placing in the cold feed bins. If mineral filler or hydrated lime is required in the mix, feed or weigh it in separately from the other aggregates.

320-3.4.2.1 Cold Feed Bin: Provide a separate cold feed bin for each component of the fine and coarse aggregate required by the mix design. Equip the cold feed bins with accurate mechanical means for feeding the aggregate uniformly into the dryer in the proportions required for the finished mix to maintain uniform production and temperature. When using RAP as a component material, prevent any oversized RAP from being incorporated into the completed mixture by the use of: a grizzly or grid over the RAP bin; in-line roller or impact crusher; screen; or other suitable means. If oversized RAP material appears in the completed

recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

Use separate bin compartments in the cold aggregate feeder that are constructed to prevent any spilling or leakage of aggregate from one cold feed bin to another. Ensure that each cold feed bin compartment has the capacity and design to permit a uniform flow of aggregates. Mount all cold feed bin compartments over a feeder of uniform speed, which will deliver the specified proportions of the separate aggregates to the drier at all times. If necessary, equip the cold feed bins with vibrators to ensure a uniform flow of the aggregates at all times.

320-3.4.2.2 Gates and Feeder Belts: Provide each cold feed bin compartment with a gate and feeder belt, both of which are adjustable to assure the aggregate is proportioned to meet the requirements of the mix design.

320-3.4.3 Screening Unit: Remove any oversized pieces of aggregate by the use of a scalping screen. Do not return this oversized material to the stockpile for reuse unless it has been crushed and reprocessed into sizes that will pass the scalping screen. Ensure that the quantity of aggregates being discharged onto the screens does not exceed the capacity of the screens to actually separate the aggregates into the required sizes.

320-3.5 Dryer: Provide a dryer of satisfactory design for heating and drying the aggregate. Use a dryer capable of heating the aggregate to within the specified temperature range for any mix, and equip the dryer with an electric pyrometer placed at the discharge chute to automatically register the temperature of the heated aggregates.

320-3.6 Asphalt Binder Control Unit: Provide a satisfactory means, either by weighing, metering, or volumetric measuring, to obtain the proper amount of asphalt binder material in the mix, within the tolerance specified for the mix design.

320-3.7 Contractor's Responsibilities: Acceptance of any automatic delivery ticket printout, electronic weight delivery ticket, other evidence of weight of the materials or approval of any particular type of material or production method will not constitute agreement by the Department that such matters are in accordance with the Contract Documents and it shall be the Contractor's responsibility to ensure that the materials delivered to the project are in accordance with the Contract Documents.

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX A

(Please provide all information - incomplete forms will be returned)

Date: 6/9/22

Originator: Richard Hewitt

Telephone: 386-943-5305

email: richard.hewitt@dot.state.fl.us

Office: State Construction Office

Specification Section: 330

Article/Subarticle: 2

Associated Section(s) Revisions: 320-3.2

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	Rick Jenkins/Joshua Turley
Traffic Engineering Manual	○	◉	Javier Ponce
FDOT Design Manual	○	◉	Gevin McDaniel
Construction Project Administration Manual	○	◉	Tim Lattner
Basis of Estimate/Pay Items	○	◉	Ryan Gray
Structures Design Guidelines	○	◉	Ben Goldsberry
Approved Product List	○	◉	Karen Byram
Materials Manual	○	◉	Tim Counts
Maintenance Specs	○	◉	Scott Arnold

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? (Select)

Synopsis: Summarize the changes:

Allows contractor to use electronic ticketing (e-ticketing) for asphalt in lieu of paper tickets.

Justification: Why does the existing language need to be changed?

Asphalt e-Ticketing provides safety benefits as it eliminates the need to walk between traffic and paving equipment to obtain tickets for truckloads of asphalt delivered to projects. It is permitted by DCE Memo, and now are placing it in Standard Specs.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Contact the State Specifications Office for assistance in completing this form.

Daniel Strickland 850-414-4130 Daniel.Strickland@dot.state.fl.us Rebecca Arcia 850-414-4155 Rebecca.Arcia@dot.state.fl.us
Darla Hunsicker 850-414-4114 Darla.Hunsicker@dot.state.fl.us Valencia Cunningham 850-414-4101 Valencia.Cunningham@dot.state.fl.us

HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS.
(REV 6-9-22)

SUBARTICLE 330-2.1 is deleted and the following substituted:

330-2 Quality Control (QC) Requirements.

330-2.1 Minimum QC Requirements: Perform as a minimum, the following activities necessary to maintain process control and meet Specification requirements:

1. Pavement Density: Monitor the pavement temperature with an infrared temperature device so compaction is completed before the surface temperature of the pavement drops to the extent that effective compaction may not be achieved or the rollers begin to damage the pavement. Monitor the roadway density with either 6-inch diameter roadway cores, a nuclear density gauge, or other density measuring device, at a minimum frequency of once per 1,500 feet of pavement.

2. Mix Temperature: Determine the mix temperature at the roadway for the first five loads and one out of every five loads thereafter.

3. Mix Spread Rate: Monitor the mix spread rate at the beginning of each day's production, and as needed to control the operations, at a minimum of once per 200 tons placed. When determining the spread rate, use, at a minimum, an average of five truckloads of mix.

4. Pavement Texture: Monitor the pavement texture to minimize pavement segregation. Use density gauges, infrared temperature measurement devices, or roadway cores at the beginning of each day's production, and as necessary, both at truck exchanges and during normal paving operations.

5. Reporting: Ensure the accuracy of the QC Roadway Reports on the Department's approved form to reflect the actual surface area of the finished work and be in compliance with the requirements of the Contract Documents.

6. Electronic Ticketing (E-Ticketing): When E-Ticketing is used, provide a tablet computer on site with the Paving Operation capable of running the E-Ticketing system software outlined in Section 320. Use the E-ticketing software to obtain truck ticket information and record mix temperatures. Use the E-ticketing data for entry into the Asphalt Roadway – Daily Report of Quality Control.

330-2.2 Personnel Qualifications: Provide QC Technicians in accordance with Section 105.

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX B

(Please provide all information - incomplete forms will be returned)

Date: 6/9/22

Originator: Richard Hewitt

Telephone: 386-943-5305

email: richard.hewitt@dot.state.fl.us

Office: State Construction Office

Specification Section: 330

Article/Subarticle: 6.1.5.1

Associated Section(s) Revisions:

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	Rick Jenkins/Joshua Turley
Traffic Engineering Manual	○	◉	Dana Knox
FDOT Design Manual	○	◉	Gevin McDaniel
Construction Project Administration Manual	○	◉	Tim Lattner
Basis of Estimate/Pay Items	○	◉	Ryan Gray
Structures Design Guidelines	○	◉	Ben Goldsberry
Approved Product List	○	◉	Karen Byram
Materials Manual	○	◉	Tim Counts
Maintenance Specs	○	◉	Scott Arnold

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? (Select)

Synopsis: Summarize the changes:

Making average spreadrate tolerance consistent with maximum pay quantity tolerance.

Justification: Why does the existing language need to be changed?

Avoid confusion with average spreadrate tolerance being different from maximum pay quantity tolerance.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Contact the State Specifications Office for assistance in completing this form.

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HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS.
(REV 6-9-22)

SUBARTICLE 330-6.1 is deleted and the following substituted:

330-6 Placing Mixture.

330-6.1 Requirements Applicable to All Pavement Types:

330-6.1.1 Alignment of Edges: Place all asphalt mixtures by the stringline method to obtain an accurate, uniform alignment of the pavement edge. As an exception, pavement edges adjacent to curb and gutter or other true edges do not require a stringline. Control the unsupported pavement edge to ensure it will not deviate from the stringline more than plus or minus 1.5 inches.

330-6.1.2 Paving Width: If necessary due to the traffic requirements, place the mixture in strips in such a manner as to provide for the passage of traffic. As an option, where the road is closed to traffic, place the mixture to the full width with machines traveling in echelon.

330-6.1.3 Mix Temperature: Maintain the mix temperature at the time of paving within the master range as defined in 320-6.3. Take mix temperatures on the roadway at the minimum frequency indicated in 320-6.3. Any load, or portion of a load, of asphalt mix on the roadway with a temperature outside of the master range shall be rejected for use on the project. Immediately notify the Engineer of the rejection.

Remove any windrow material not meeting the temperature requirements of 320-6.3.2 from the area of deficient temperature and replace with new asphalt meeting the temperature requirements.

330-6.1.4 Speed of Paver: Establish the forward speed of the asphalt paver based on the rate of delivery of the mix to the roadway, but not faster than the optimum speed needed to adequately compact the pavement.

330-6.1.5 Thickness and Spread Rate of Layers: Construct each layer as defined in the following Table 330-2:

Table 330-2	
Thickness and Target Spread Rate Requirements	
Mix Type	Specification Section and Article
Type SP	334-1
Type FC	337-8
Type B	234-8
ATPB	287-8

330-6.1.5.1 Thickness Control: Ensure the spread rate is within plus or minus ~~5~~10% of the target spread rate. When determining the spread rate, use, at a minimum, an average of five truckloads of mix and at a maximum, an average of 10 truckloads of mix, except for windrow paving, use an average of three truckloads of mix. When the average spread rate is beyond plus or minus ~~5~~10% of the target spread rate, monitor the thickness of the pavement layer closely and adjust the construction operations.

When the average spread rate for two consecutive days is beyond plus or minus ~~5~~10% of the target spread rate, stop the construction operation until the issue is resolved.

330-6.1.5.2 Maximum Spread Rate Tolerances: When an individual spread rate, measured in accordance with 330-6.1.5.1, is beyond plus or minus 20% of the target spread rate, stop the construction operation until the issue is resolved. Address the unacceptable pavement in accordance with 330-9.5. The following areas are exempt from a work stoppage based solely on the calculated spread rate: median crossovers, turnouts, variable thickness overbuild courses, leveling courses, miscellaneous asphalt pavement, as well as, turn lanes and ramps less than 1,000 feet.

As an exception, the Engineer may allow the Contractor to leave areas in place if it is determined by the Engineer that the deficiency is not a significant detriment to the pavement quality. For areas of deficient thickness, a reduction to the pay item quantity will be made in accordance with 330-9.5.2.

330-6.1.6 Correcting Defects: Before starting any rolling, check the surface; correct any irregularities; remove all drippings, sand accumulations from the screed, and fat spots from any source; and replace them with satisfactory material. Do not skin patch. When correcting a depression while the mixture is hot, scarify the surface and add fresh mixture.

330-6.1.7 Hand Work: In limited areas where the use of the paver is impossible or impracticable, the Contractor may place and finish the mixture by hand.

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX C

(Please provide all information - incomplete forms will be returned)

Date: 6/23/22

Office: State Materials Office

Originator: Wayne Rilko

Specification Section: 334

Telephone: (352) 955-6314

Article/Subarticle: -1.4.1; -3.2.1; -5.9.5

email: wayne.rilko@dot.state.fl.us

Associated Section(s) Revisions: Standard Spec. 337-4.2

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	●	Rick Jenkins/Joshua Turley 6/23/
Traffic Engineering Manual	○	●	Javier Ponce 6/23/
FDOT Design Manual	●	○	Gevin McDaniel 6/23/
Construction Project Administration Manual	○	●	Scott Arnold 6/23/
Basis of Estimate/Pay Items	○	●	Ryan Gray 6/23/
Structures Design Guidelines	○	●	Ben Goldsberry 6/23/
Approved Product List	○	●	Karen Byram 6/23/
Materials Manual	○	●	Tim Counts 6/23/
Maintenance Specs	○	●	Deanna Hutchison 6/23/

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? YES

Synopsis: Summarize the changes:

Allow the use of SP-9.5 mm mixtures in Traffic Level E applications. The minimum layer thickness shall be 1.25 inches.

Delete language prohibiting the use of more than four mix designs per nominal maximum aggregate size per traffic level per binder grade per year.

Justification: Why does the existing language need to be changed?

Recently completed contract research determined that SP-9.5 mm mixtures perform equal to or better than SP-12.5 mm mixtures. The use of SP-9.5 mixtures may result in a decrease in the cost of aggregates used in these applications. Possible Bulletin.

Material availability challenges may force a contractor to switch mixes or mix components in order to complete the project. This will also simplify payment. Bulletin.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

The Flexible Pavement Design Manual.

Contact the State Specifications Office for assistance in completing this form.

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SUPERPAVE ASPHALT CONCRETE.
(REV 8-2-22)

SUBARTICLE 334-1.4 is deleted and the following substituted:

334-1.4 Thickness: The total thickness of the Type SP asphalt layers will be the plan thickness as shown in the Contract Documents. Before paving, propose a thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan thickness. For construction purposes, the plan thickness and individual layer thickness will be converted to spread rate based on the maximum specific gravity of the asphalt mix being used, as well as the minimum density level, as shown in the following equation:

Spread rate (lb/yd^2) = $t \times G_{mm} \times 43.3$

Where: t = Thickness (in.) (plan thickness or individual layer thickness)

G_{mm} = Maximum specific gravity from the verified mix design

The weight of the mixture shall be determined as provided in 320-3.2. For target purposes only, spread rate calculations should be rounded to the nearest whole number.

Note: Plan quantities are based on a G_{mm} of 2.540, corresponding to a spread rate of 110 lb/yd^2-in. Pay quantities will be based on the actual maximum specific gravity of the mix being used.

334-1.4.1 Layer Thicknesses: The allowable layer thicknesses for Type SP Asphalt Concrete mixtures are as follows:

Type SP-9.5.....1 to 1-1/2 inches
Type SP-12.5.....1-1/2 to 3 inches
Type SP-19.0..... 2 to 4 inches

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on mixes when used as a structural course:

Type SP-9.5 - Limited to the top two structural layers, two layers maximum.

Type SP-9.5 - Do not ~~use~~place less than 1-1/2 inches thick for Traffic Level -E applications.

Type SP-19.0 - Do not use for the final (top) structural layer below FC-5 mixtures. Type SP-19.0 mixtures are permissible for the layer directly below FC-9.5 and FC-12.5 mixtures. Do not use for the final (top) layer of shoulders.

334-1.4.2 Additional Requirements: The following requirements also apply to Type SP Asphalt Concrete mixtures:

1. A minimum 1-1/2 inch initial lift is required over an Asphalt Membrane Interlayer (AMI).

2. When construction includes the paving of adjacent shoulders (less than or equal to 5 feet wide), the layer thickness for the upper pavement layer and shoulder must be the same and paved in a single pass, unless called for differently in the Contract Documents.

3. All overbuild layers must be Type SP Asphalt Concrete designed at the traffic level as stated in the Contract Documents. Use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum and maximum allowable thicknesses will be as specified below, unless called for differently in the Contract Documents.

Type SP-9.5..... 3/8 to 2 inches
Type SP-12.5..... 1/2 to 3 inches
Type SP-19.0.....1-1/2 to 4 inches

4. Variable thickness overbuild layers constructed using a Type SP-9.5 or SP-12.5 mixtures may be tapered to zero thickness provided the contract documents require a minimum of 1-1/2 inches of dense-graded mix placed over the variable thickness overbuild layer.

SUBARTICLE 334-3.2 is deleted and the following substituted:

334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO R 35, except as noted herein. Prior to the production of any asphalt mixture, submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. For all mix designs, include representative samples of all component materials, including asphalt binder. Allow the Director of the Office of Materials a maximum of four weeks to either conditionally verify or reject the mix as designed.

At no additional cost to the Department, for a Type SP mix the following Traffic Level substitutions are allowed:

Traffic Level E can be substituted for Traffic Level C.
Traffic Level C can be substituted for Traffic Level B.

The same traffic level and binder type that is used for the mainline traffic lanes may be placed in the shoulder at no additional cost to the Department, even if the conditions stated above are not met for the shoulder.

~~Do not use more than four mix designs per nominal maximum aggregate size per traffic level per binder grade per year, where the year starts at the Notice to Proceed. Exceeding this limitation will result in a maximum Composite Pay Factor (CPF) of 1.00 as defined in 334-8.2 for all designs used beyond this limit.~~

Warm mix technologies (additives, foaming techniques, etc.) listed on the Department's website may be used in the production of the mix. The URL for obtaining this information, if available, is:- https://www.fdot.gov/materials/laboratory/asphalt/index.shtm.

When warm mix technologies are used, for mixtures containing a PG 52--28, PG 58--22, or PG 67--22 binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 285°F or less. For mixtures containing a PG 76--22 or High Polymer binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 305°F or less.

The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer will no longer allow the use of the mix design.

334-3.2.2 Mixture Gradation Requirements: Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements

defined in this specification and conform to the gradation requirements at design as defined in AASHTO M 323. Aggregates from various sources may be combined.

334-3.2.2.1 Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M 323, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M 323. Fine mixes are defined as having a gradation that passes above the primary control sieve control point and above the maximum density line for all sieve sizes smaller than the primary control sieve and larger than the No. 30 sieve.

334-3.2.3 Aggregate Consensus Properties: For Traffic Level C and E mixtures, meet the following consensus properties at design for the aggregate blend.
Aggregate consensus properties do not apply to Traffic Level B mixtures.

334-3.2.3.1 Coarse Aggregate Angularity: When tested in accordance with ASTM D5821, meet the percentage of fractured faces requirements specified in AASHTO M 323.

334-3.2.3.2 Fine Aggregate Angularity: When tested in accordance with AASHTO T 304, Method A, meet the uncompacted void content of fine aggregate specified in AASHTO M 323.

334-3.2.3.3 Flat and Elongated Particles: When tested in accordance with ASTM D4791, (with the exception that the material passing the 3/8-inch sieve and retained on the No. 4 sieve shall be included), meet the requirements specified in AASHTO M 323. Measure the aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (shortest dimension) of the aggregate particles.

334-3.2.3.4 Sand Equivalent: When tested in accordance with AASHTO T 176, meet the sand equivalent requirements specified in AASHTO M 323.

334-3.2.4 Gyratory Compaction: Compact the design mixture in accordance with AASHTO T 312, with the following exception: use the number of gyrations at N_{design} as defined in Table 334-4. Measure the inside diameter of gyratory molds in accordance with AASHTO T 312.

Table 334-4
Gyratory Compaction Requirements

Traffic Level	N_{design} Number of Gyrations
B	65
C	75
E	100

334-3.2.5 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M 323, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M 323. $N_{initial}$ and $N_{maximum}$ requirements are not applicable.

334-3.2.6 Moisture Susceptibility:

1. For all traffic levels, use a liquid anti-strip agent listed on the APL at the specified dosage rate. Hydrated lime may be used instead of the liquid anti-strip agent.

2. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi in accordance with FM 1-T 283.

334-3.2.7 Additional Information: In addition to the requirements listed above, provide the following information with each proposed mix design submitted for verification:

1. The design traffic level and the design number of gyrations (N_{design}).
2. The source and description of the materials to be used.
3. The Department source number and the Department product code of the aggregate components furnished from a Department approved source.
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.
6. The bulk specific gravity (G_{sb}) value for each individual aggregate and RAP component, as identified in the Department's aggregate control program.
7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.
8. A target temperature for the mixture at the plant (mixing temperature) and a target temperature for the mixture at the roadway (compaction temperature) in accordance with 320-6.3. Do not exceed a target temperature of 340°F for High Polymer asphalt binders, 330°F for PG 76-22 asphalt binders, and 315°F for unmodified asphalt binders.
9. Provide the physical properties at the optimum asphalt content, which must conform to all specified requirements.
10. The name of the Construction Training Qualification Program (CTQP) Qualified Mix Designer.
11. The ignition oven and maximum specific gravity (G_{mm}) calibration factors.
12. The warm mix technology, if used.

SUBARTICLE 334-5.9 is deleted and the following substituted:

334-5.9 Minimum Acceptable Quality Levels:

334-5.9.1 PFs 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 CPFs 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 CPFs Less Than 0.80 and Greater Than or Equal to 0.75: If the CPF 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 CPFs Less Than 0.75: If the CPF 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 in accordance with Section 6 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 CPF as determined by 334-8, or as determined by the Engineer.

If the defective material is due to a high air void failure, gradation, asphalt binder content or density failure, upon the 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 may require 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. For materials that are defective due to low 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 QC, PC or IV test results. Any additional PC samples obtained in the same work shift after an IV sample has been obtained shall include enough material for three complete sets of tests (PC, IV and IV check samples) in the event the Contractor requests using the PC test results for engineering analysis or delineation. These additional PC samples must compare with verified IV test results as determined by the comparison process of 334-5.7.1 in order to be used for engineering analysis or delineation. Exceptions to this requirement shall be approved by the Engineer.

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX D

(Please provide all information - incomplete forms will be returned)

Date: 6/23/22

Office: State Materials Office

Originator: Wayne Rilko

Specification Section: 337

Telephone: (352) 955-6314

Article/Subarticle: -3.3.1; -4.1; -4.2

email: wayne.rilko@dot.state.fl.us

Associated Section(s) Revisions: 334-1.4.1

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	Rick Jenkins/Joshua Turley 6/23/
Traffic Engineering Manual	○	◉	Javier Ponce 6/23/
FDOT Design Manual	○	◉	Gevin McDaniel 6/23/
Construction Project Administration Manual	○	◉	Scott Arnold 6/23/
Basis of Estimate/Pay Items	○	◉	Ryan Gray 6/23/
Structures Design Guidelines	○	◉	Ben Goldsberry 6/23/
Approved Product List	○	◉	Karen Byram 6/23/
Materials Manual	○	○	Tim Counts 6/23/
Maintenance Specs	○	◉	Deanna Hutchison 6/23/

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? YES

Synopsis: Summarize the changes:

Table 337-1 FC-5 Gradation.
Table 337-2 FC-5 Percent Binder Content.
-4.2 An FC-9.5 may be substituted for the FC-12.5 at no additional cost.

Justification: Why does the existing language need to be changed?

Examination of current FC-5 mix designs shows the range for the percentage passing the 3/8" sieve should be changed from 55-75% to 60-75%.

Examination of current FC-5 mix designs shows the range for percent binder content for crushed granite and/or granitic gneiss should be changed from 5.5-7.5% to 6.0-7.5% and that the percent binder content for crushed limestone and/or shell rock should be changed from

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Revisions will also be required to the Flexible Pavement Design Manual.

Contact the State Specifications Office for assistance in completing this form.

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ASPHALT CONCRETE FRICTION COURSES.
(REV 6-23-22)

SUBARTICLE 337-3.3 is deleted and the following substituted:

337-3.3 Grading Requirements:

337-3.3.1 FC-5: Use a mixture having a gradation at design within the ranges shown in Table 337-1.

Table 337-1 FC-5 Gradation Design Range									
3/4 inch	1/2 inch	3/8 inch	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
100	85-100	~~55~~60-75	15-25	5-10	--	--	--	--	2-5

337-3.3.2 FC-9.5: Meet the design gradation requirements for a SP-9.5 Superpave fine mix as defined in 334-3.2.2.

337-3.3.3 FC-12.5: Meet the design gradation requirements for a SP-12.5 Superpave fine mix as defined in 334-3.2.2.

ARTICLE 337-4 is deleted and the following substituted:

337-4 Mix Design.

337-4.1 FC-5: The Department will design the FC-5 mixtures. Furnish the materials and all appropriate information (source, gradation, etc.) as specified in 334-3.2.7. The Department will have three weeks to design the mix.

The Department will establish the design binder content for FC-5 within the following ranges based on aggregate type:

Table 337-2 FC-5 Percent Binder Content	
Aggregate Type	Percent Binder Content
Crushed Granite and/or Granitic Gneiss	~~5.5~~6.0 - 7.5
Crushed Limestone and/or Shell Rock	~~6.0~~6.5 - 8.0

337-4.2 FC-9.5 and FC-12.5: Provide a mix design conforming to the requirements of 334-3.2 unless otherwise designated in the plans. Where the plans call for an FC-12.5, an FC-9.5 may be substituted for the FC-12.5 at no additional cost provided the thickness requirements of 334-1.4.1 are met.

337-4.3 Revision of Mix Design: For FC-5, FC-9.5 and FC-12.5, meet the requirements of 334-3.3. For FC-5, all revisions must fall within the gradation limits defined in Table 337-1.

ORIGINATION FORM
Proposed Revisions to the Specifications

APPENDIX E

(Please provide all information - incomplete forms will be returned)

Date: 6/23/22

Originator: Wayne Rilko

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Office: State Materials Office

Specification Section: 916

Article/Subarticle: -3.2

Associated Section(s) Revisions: None

Will the proposed revision require changes to:

Publication	Yes	No	Office Staff Contacted
Standard Plans Index	○	◉	Rick Jenkins/Joshua Turley 6/23/
Traffic Engineering Manual	○	◉	Javier Ponce 6/23/
FDOT Design Manual	○	◉	Gevin McDaniel 6/23/
Construction Project Administration Manual	○	◉	Scott Arnold 6/23/
Basis of Estimate/Pay Items	○	◉	Ryan Gray 6/23/
Structures Design Guidelines	○	◉	Ben Goldsberry 6/23/
Approved Product List	○	◉	Karen Byram 6/23/
Materials Manual	◉	○	Tim Counts 6/23/
Maintenance Specs	○	◉	Deanna Hutchison 6/23/

Will this revision necessitate any of the following:

Design Bulletin ☐ **Construction Bulletin** ☐ **Estimates Bulletin** ☐ **Materials Bulletin** ☐

Have all references to internal and external publications in this Section been verified for accuracy? YES

Synopsis: Summarize the changes:

Add FM 5-624 Re-emulsification of Asphalt Emulsions to the Requirements.

Justification: Why does the existing language need to be changed?

Testing in accordance with the new FM shall be one of the minimum test requirements.

Do the changes affect either of the following types of specifications (Hover over type to go to site.):

Special Provisions ☐ **Developmental Specifications** ☐

List Specifications Affected: (ex. SP3270301, Dev330TL, Dev334TL etc.)

Materials Manual Volume II, Section 3.4.6.3. Language added, "testing will include a laboratory evaluation for re-e

Contact the State Specifications Office for assistance in completing this form.

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BITUMINOUS MATERIALS.
(REV 6-23-22)

ARTICLE 916-2 is deleted and the following substituted:

916-2 Superpave PG Asphalt Binder.

916-2.1 Requirements: Superpave Performance Graded (PG) asphalt binders, identified as PG 52-28, PG 58-22, PG 67-22, polymer modified asphalt (PMA) binders, PG 76-22 (PMA) and High Polymer, and asphalt rubber binders (ARB), PG 76-22 (ARB), shall meet the requirements of 916-2 and AASHTO 332~~-20~~. When the Contract Documents specify either a PG 76-22 (PMA), PG 76-22 (ARB), or PG 76-22 binder, either binder can be used interchangeably at no additional cost to the Department. All PG asphalt binders shall meet the following additional requirements:

1. The intermediate test temperature at 10 rad/sec. for the Dynamic Shear Rheometer (DSR) test (AASHTO T 315~~-20~~) shall be 26.5ºC for PG grades PG 67 and higher.
2. An additional high temperature grade of PG 67 is added for which the high test temperature at 10 rad/sec for the DSR test (AASHTO T 315~~-20~~) shall be 67ºC.
3. All PG asphalt binders having a high temperature designation of PG 67 or lower shall be prepared without modification.
4. All PMA binders having a high temperature designation higher than PG 67 shall only be produced with a styrene-butadiene-styrene (SBS) or styrene-butadiene (SB) elastomeric polymer modifier and the resultant binder shall meet all requirements of this Section.
5. Polyphosphoric acid may be used as a modifier not exceeding 0.75% by weight of asphalt binder for PG 76-22 (PMA) and PG 76-22 (ARB) binders. Polyphosphoric acid may not be used in High Polymer binder.
6. PG 76-22 (ARB) shall meet the additional requirements of 916-2.1.1.
7. All PG asphalt binders having a high temperature designation of PG 67 or lower shall not have a high temperature true grade more than 5.9°C higher than the specified PG grade, (for example, if a PG 58-22 is specified, do not supply a PG 64-22 or higher).
8. The use of waste oil is prohibited in the modification of any PG binder grade. Waste oil shall be defined as recycled oil products that have not been processed through a vacuum tower and have an initial boiling point of 385°C (725°F) or lower when tested in accordance with ASTM D6352~~-19~~.
9. Re-refined engine oil bottoms (REOB)/vacuum tower asphalt extenders (VTAE) may be used as a modifier not exceeding 8.0% by weight of asphalt binder. REOB/VTAE are materials as defined in Asphalt Institute document IS-235.

For all PG binder used in all hot mix asphalt, silicone may be added to the PG binder at the rate of 25 cubic centimeters of silicone mixed to each 5,000 gallons of PG binder. If a disbursing fluid is used in conjunction with the silicone, the resultant mixture containing the full 25 cubic centimeters of silicone shall be added in accordance with the manufacturer's recommendation. The blending of the silicone with the PG binder shall be done by the supplier prior to the shipment. When the asphalt binder will be used with a foaming warm mix technology, refer to the technology supplier's guidance on the addition of silicone.

Where an anti-strip additive is required, the anti-strip additive shall meet the requirements of 916-4. The anti-strip additive shall be introduced into the PG binder by the supplier during loading.

916-2.1.1 Additional Requirements for PG 76-22 (ARB): The following additional requirements apply only to PG 76-22 (ARB):

1. The asphalt binder shall contain a minimum of 7.0% ground tire rubber (GTR) by weight of asphalt binder.
2. The GTR shall meet the requirements of Section 919.
3. Polymer modification is optional for PG 76-22 (ARB).

916-2.1.2 High Polymer Binder Blending: Existing high polymer binder may be blended in an asphalt producer's storage tank to make a PG 76-22 binder provided the following requirements are met:

1. Notify the State Materials Office (SMO) and the local District Materials Office prior to blending.
2. Follow the blending instructions of the high polymer binder supplier.
3. Submit a sample of the blended binder to a SMO approved laboratory for testing. Provide test results to the SMO.
4. Use the newly blended binder only after approval from the SMO.

916-2.2 Compliance with Materials Manual: Producers of Superpave PG binders shall meet the requirements of Section 3.5, Volume II of the Department's Material Manual, which may be viewed at the following URL: https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section35V2.shtm.

916-2.3 Reporting: Specification compliance testing results shall be reported for the tests in Table 916-1 below, unless noted otherwise. Quality control (QC) testing results shall be reported for original binder DSR (G/sin δ and phase angle, as applicable).

Table 916-1 SUPERPAVE PG ASPHALT BINDER		
Test and Method	Conditions	Specification Minimum/Maximum Value
Superpave PG Asphalt Binder Grade		Report
APL Number		Report
Modifier (name and type)	Polymer, Ground Tire Rubber with Approved Product List (APL) number, Sulfur, PPA, REOB, and any Rejuvenating Agents	Report
Original Binder		
Solubility, AASHTO T 44~~-14 (2018)~~	in Trichloroethylene	Minimum 99.0% (Not applicable for PG 76-22 (ARB))
Flash Point, AASHTO T 48~~-18~~	Cleveland Open Cup	Minimum 450ºF
Rotational Viscosity, AASHTO T 316~~-19~~	275ºF	Maximum 3 Pa·s[(a)]
Dynamic Shear Rheometer [(b)], AASHTO T 315~~-20~~	$G^*/\sin\delta$	Minimum 1.00 kPa
	Phase Angle, δ[(c)] PG 76-22 (PMA) and PG 76-22 (ARB)[(d)]	Maximum 75 degrees
Separation Test, ASTM D7173~~-20~~ and Softening Point, AASHTO T 53~~-09 (2018)~~	163±5°C 48 hours	Maximum 15°F (PG 76-22 (ARB) only)
Rolling Thin Film Oven Test Residue (AASHTO T 240~~-13 (2017)~~)		
Rolling Thin Film Oven, AASHTO T 240~~-13 (2017)~~	Mass Change %	Maximum 1.00
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$ AASHTO T 350~~-19~~	Grade Temperature (Unmodified binders only)	"S" = 4.50 kPa^{-1} max
Multiple Stress Creep Recovery, $J_{nr,\ 3.2}$[(d, e, f)] AASHTO T 350~~-19~~	67°C (Modified binders only) 76°C (High Polymer binder only)	"V" = 1.00 kPa^{-1} max Maximum $J_{nr,diff}$ = 75% 0.10 kPa^{-1} max
Multiple Stress Creep Recovery, %Recovery[(d, e)] AASHTO T 350~~-19~~	67°C (Modified binders only) 76°C (High Polymer binder only)	$\%R_{3.2} \geq 29.371\ (J_{nr,\ 3.2})^{-0.2633}$ $\%R_{3.2} \geq 90.0$

Table 916-1 SUPERPAVE PG ASPHALT BINDER		
Pressure Aging Vessel Residue (AASHTO R- 28~~-12 (2016)~~)		
Dynamic Shear Rheometer, AASHTO T 315~~-20~~	$G^*\sin\delta$, 10 rad/sec.	Maximum 6,000 kPa (g,h)
Creep Stiffness, AASHTO T 313~~-20~~	S (Stiffness), @ 60 sec. m-value, @ 60 sec.	Maximum 300 MPa Minimum 0.300
ΔTc, ASTM D7643~~-16~~	20 hours PAV aging S (Stiffness), @ 60 sec. m-value, @ 60 sec.	ΔTc ≥ -5.0°C

(a) Binders with values higher than 3 Pa·s should be used with caution and only after consulting with the supplier as to any special handling procedures, including pumping capabilities.
(b) Dynamic Shear Rheometer (AASHTO T 315~~-20~~) shall be performed on original binders for the purposes of QC testing only. The original binder G*/sin δ shall be performed at grade temperature. Grade temperature for High Polymer binder is 76°C.
(c) The original binder phase angle (AASHTO T 315~~-20~~) shall be performed at grade temperature.
(d) AASHTO T 315~~-19~~ and AASHTO T 350~~-20~~ will be performed at a 2-mm gap for PG 76-22 (ARB).
(e) All binders with a high temperature designation >67 will be tested at 67°C. PG 76-22 (PMA) and PG 76-22 (ARB) shall pass a "V" grade per AASHTO M 332~~-20~~.
(f) A maximum Jnr diff = 75% does not apply for any Jnr value ≤ 0.50 kPa-1.
(g) For 5000 kPa ≤ G*sin δ ≤6,000 kPa, the phase angle, δ, shall be a minimum of 42°.
(h) For PG 67 or higher grades, perform the PAV residue testing at 26.5°C.

SUBARTICLE 916-3.2 is deleted and the following substituted:

916-3.2 Requirements: Use a prime coat meeting the requirements of AASHTO M 140~~-20~~ for anionic emulsions, AASHTO M 208~~-18~~ or AASHTO M 316~~-19~~ for cationic emulsions, or as specified in the Producer's QC Plan. For anionic emulsions, the cement mixing test will be waived. For tack products, the minimum testing requirements shall include percent residue, naphtha content (as needed), one-day storage stability, sieve test, Saybolt Furol viscosity, original DSR, re-emulsification (FM 5-624), and solubility (on an annual basis). Residue testing shall be performed on residue obtained from distillation, AASHTO T 59~~-16~~ or low-temperature evaporation (AASHTO R 78~~-16~~) ~~(2020)~~.

At the direction of the Engineer, sample tack from the distributor used on the project at a minimum frequency of once per project per product. The sample shall be tested by the Department for the following specified material properties: percent residue, contaminants, and the residue property G*/sin δ. Should any of the test results fail the specification requirements, the tack material will be considered defective and shall not to be used on Department projects unless waived by the Engineer. Should a tack sample fail specifications, the Engineer may require three 6-inch diameter roadway cores be obtained from the day of production from which the tack sample was obtained. The roadway cores shall be tested for bond strength in accordance with FM 5-599. Individual bond strength results less than 80 psi will require removal and replacement. Failing bond strength results may result in bond strength testing for additional areas represented by the failing tack material.

APPENDIX F

SECTION 234
SUPERPAVE ASPHALT BASE

234-1 Description.

Construct a Superpave asphalt concrete base course as defined in these Specifications. Base course mixes are designated as Type B-12.5. The Contractor may use any Superpave mix (Type SP-9.5, SP-12.5, or SP-19.0) of Traffic Level B, C, or E~~a Type SP-12.5 mixture (Traffic Level B, C, or E) or a Type SP-19.0 mixture (Traffic Level B, C, or E)~~, in lieu of a Type B-12.5 at no additional cost to the Department.

Obtain Superpave asphalt base from a plant that is currently on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

234-2 Materials.

234-2.1 General: Use materials that conform to the requirements of Division III. Specific references are as follows:

Superpave PG Asphalt Binder .....Section 916
Coarse Aggregate, Stone, Slag or
Crushed Gravel .....Section 901
Fine Aggregate.....Section 902

234-2.2 Reclaimed Asphalt Pavement (RAP): RAP may be used as a component material of the asphalt mixture provided the requirements of 334-2.3 are met.

234-3 General Composition of Mixture.

234-3.1 General: Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

234-3.2 Mix Design: Unless otherwise specified, design the mix such that all requirements for a Type SP-12.5, Traffic Level B or C mixture as specified in Section 334 are met.

234-3.2.1 Gradation Classification: Use a fine mix as defined in 334-3.2.2.1.

234-3.2.2 Aggregate Consensus Properties: Meet the aggregate consensus properties at design as specified in 334-3.2.3. Meet the criteria specified for a depth of top of pavement layer from surface of greater than 4 inches.

234-3.2.3 Mix Design Revisions: Meet the requirements of 334-3.3.

234-4 Contractor's Process Control.

Meet the requirements of 320-2, 330-2 and 334-4.

234-5 Acceptance of the Mixture.

The mixture will be accepted in accordance with the requirements of 334-5. Use the permissible variations from longitudinal and transverse grades as specified in 200-7.

234-6 Plant, Methods and Equipment.

Meet requirements of Section 320, with the following modifications:

234-6.1 Paving Equipment: A motor grader may be used to spread the first course of multiple course bases when the subgrade will not support the use of a mechanical spreader. The Engineer will not require mechanical spreading and finishing equipment for the construction of base widening strips less than 6 feet in width or where the shape or size of the area will not accommodate mechanical spreading and finishing equipment.

234-6.2 Compaction Equipment: In areas where standard rollers cannot be accommodated, vibratory rollers supplemented with trucks, motor graders, or other compaction equipment approved by the Engineer may be used.

234-7 Construction Requirements.

234-7.1 General: Meet the general construction requirements of Section 330, with the following modifications:

234-7.1.1 Temperature Limitations: Spread the mixture only when the air temperature is at least 40ºF. Do not place the material on frozen subgrade.

234-7.1.2 Tack Coat: Unless otherwise authorized by the Engineer, apply a tack coat between successive layers of base material.

234-7.1.3 Thickness of Layers: Construct each course in layers, such that the compacted thickness is in compliance with the layer thicknesses in 234-8.1.1 and spread rate tolerance in 234-8.2.

234-8 Thickness Requirements.

234-8.1 General: The total thickness of the Type B asphalt layers will be the plan thickness as shown in the Contract Documents. Before paving, propose a thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan thickness. For construction purposes, the plan thickness and individual layer thickness will be converted to spread rate based on the maximum specific gravity of the asphalt mix being used, as well as the minimum density level, as shown in the following equation:

Spread rate (lbs. per square yard) = t x G_{mm} x 43.3

Where: t = Thickness (in.) (Plan thickness or individual layer thickness)

G_{mm} = Maximum specific gravity from the verified mix design

The weight of the mixture shall be determined as provided in 320-3.2. For target purposes only, spread rate calculations should be rounded to the nearest whole number.

234-8.1.1 Layer Thicknesses: The allowable layer thicknesses for asphalt base mixtures are as follows:

Type B-12.5, SP-9.5, SP-12.5...……1-1/2 to 3-1/2 inches

Type SP-19.0……2 to 4 inches

234-8.2 Spread Rate Tolerance: Control the average spread rate on a daily basis to within plus or minus 5% of the target spread rate for the individual layers established by the Engineer. When the average daily spread rate is outside this tolerance from the target, adjust the spread rate to the required value established by the Engineer. The Engineer will periodically verify the spread rate at the job site during the paving operation.

234-8.3 Allowable Deficiencies: The Engineer will allow a maximum deficiency from the specified spread rate for the total thickness as follows:

1. For pavement of a specified thickness of 2-1/2 inches or more: 50 pounds per square yard.

2. For pavement of a specified thickness of less than 2-1/2 inches: 25 pounds per square yard.

234-8.4 Pavement Exceeding Allowable Deficiency in Spread Rate: Where the deficiency in spread rate for the total thickness is in excess of 50 pounds per square yard for pavements with a specified thickness of 2-1/2 inches or more, or in excess of 25 pounds per square yard for pavements with a specified thickness of less than 2-1/2 inches, the Engineer may require removal and replacement at no cost or may require a correction as specified in 234-8.5. The Engineer may require the Contractor to core the pavement for thickness in order to determine the area of pavement with deficient thickness.

As an exception to the above, the Contractor may leave pavement outside the main roadway in place without compensation when the Engineer allows, even though the deficiency exceeds the tolerance as specified above.

The Department will not compensate the Contractor for any pavement removed or for the work of removing such pavement.

234-8.5 Correcting Deficiency by Adding New Surface Material: In the event the total thickness as determined by the spread rate is excessively deficient as defined above and if approved by the Engineer for each particular location, correct the deficient thickness by adding new surface material and compacting it using a rolling pattern as approved by the Engineer. The Engineer will determine the area to be corrected and the thickness of new material added. Perform all overlaying and compacting at no expense to the Department.

234-9 Method of Measurement.

The quantity to be paid for will be the plan quantity. For each pay item, the pay area will be adjusted based upon the following formula:

Pay Area = Surface Area (actual tonnage placed/adjusted plan quantity tonnage).

Where: The adjusted plan quantity tonnage is calculated by multiplying the plan quantity square yards (including any Engineer approved quantity revisions) times the spread rate as defined in 234-8.1 and dividing by 2,000 pounds per ton, except the pay item's tonnage-weighted average G_{mm} is used instead of the design G_{mm} as defined in 234-8.1.

The pay area shall not exceed 110% of the designed surface area.

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9 2.1.2.

234-10 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including the applicable requirements of Sections 320, 330 and 334. The bid price for the asphalt mix will include the cost of the liquid asphalt binder and the tack coat application as directed in 300-8.

Payment will be made under:

Item No. 285- 7- Optional Base - per square yard.

APPENDIX G

Style Definition: Section Heading

SECTION 337
ASPHALT CONCRETE FRICTION COURSES

337-1 Description.

Construct an asphalt concrete friction course pavement with the type of mixture specified in the Contract Documents, or when offered as alternates, as selected. This Section specifies mixes designated as FC-5, FC-9.5, and FC-12.5.

Obtain Superpave asphalt concrete friction course from a plant that is currently on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105. Producers must meet the plant and equipment requirements of Section 320, as modified herein. Meet the general construction requirements of Section 330, as modified herein.

337-2 Materials.

337-2.1 General Requirements: Meet the requirements specified in Division III as modified herein. The Engineer will base continuing approval of material sources on field performance. Warm mix technologies (additives, foaming techniques, etc.) listed on the Department's website may be used in the production of the mix. The URL for obtaining this information is: https://www.fdot.gov/materials/laboratory/asphalt/index.shtm.

337-2.2 Asphalt Binder: Meet the requirements of Section 916, and any additional requirements or modifications specified herein for the various mixtures.

337-2.3 Coarse Aggregate: Meet the requirements of Section 901, and any additional requirements or modifications specified herein for the various mixtures.

337-2.4 Fine Aggregate: Meet the requirements of Section 902, and any additional requirements or modifications specified herein for the various mixtures.

337-2.5 Hydrated Lime: Meet the requirements of AASHTO M 303, Type 1. Provide certified test results for each shipment of hydrated lime indicating compliance with the specifications.

337-2.6 Liquid Anti-Strip Additive: Meet the requirements of 916-4 and be listed on the Department's Approved Product List (APL).

337-2.7 Fiber Stabilizing Additive (Required for FC-5 only): Use either a mineral or cellulose fiber stabilizing additive. Meet the following requirements:

337-2.7.1 Mineral Fibers: Use mineral fibers (made from virgin basalt, diabase, or slag) treated with a cationic sizing agent to enhance the disbursement of the fiber, as well as to increase adhesion of the fiber surface to the bitumen. Meet the following requirements for physical properties:

1. Size Analysis
   - Average fiber length: 0.25 inch (maximum)
   - Average fiber thickness: 0.0002 inch (maximum)
2. Shot Content (ASTM C612)
   - Percent passing No. 60 Sieve: 90 - 100
   - Percent passing No. 230 Sieve: 65 - 100

Provide certified test results for each batch of fiber material indicating compliance with the above tests.

337-2.7.2 Cellulose Fibers: Use cellulose fibers meeting the following requirements:

1. Fiber length: 0.25 inch (maximum)
2. Sieve Analysis
    a. Alpine Sieve Method
        Percent passing No. 100 sieve: 60-80
    b. Ro-Tap Sieve Method
        Percent passing No. 20 sieve: 80-95
        Percent passing No. 40 sieve: 45-85
        Percent passing No. 100 sieve: 5-40
3. Ash Content: 18% non-volatiles (plus or minus 5%)
4. pH: 7.5 (plus or minus 1.0)
5. Oil Absorption: 5.0% (plus or minus 1.0) (times fiber weight)
6. Moisture Content: 5.0% by weight (maximum)

Provide certified test results for each batch of fiber material indicating compliance with the above tests.

337-3 General Composition of Mixes.

337-3.1 General: Use a bituminous mixture composed of aggregate (coarse, fine, or a mixture thereof), asphalt binder, and in some cases, fibers and/or hydrated lime. Size, uniformly grade and combine the aggregate fractions in such proportions that the resulting mix meets the requirements of this Section.

337-3.2 Specific Component Requirements by Mix:

337-3.2.1 FC-5:

337-3.2.1.1 Aggregates: Use an aggregate blend which consists of either 100% ~~crushed granite and/or granitic gneiss~~Class A friction aggregate or 100% ~~crushed limestone and/or crushed shell rock~~Class B and/or C aggregates in accordance with Table 337-1. Do not blend ~~granite and/or granitic gneiss with limestone and/or shell rock~~Class A aggregate with Class B or C aggregate for FC-5 mixtures.

A list of aggregates approved for use in friction course may be available on the Department's website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/.

337-3.2.1.2 Asphalt Binder: Use an asphalt binder as called for in the Contract Documents meeting the requirements of Section 916. High polymer binder may be substituted in a mixture with PG 76-22 binder at no additional cost to the Department.

337-3.2.1.3 Hydrated Lime: Add hydrated~~the~~ lime at a dosage rate ~~of 1.0% by weight of the total dry aggregate to mixes containing granite or granitic gneiss from Georgia or Alabama. Add the lime at a dosage of 1.5% by weight of the total dry aggregate to mixes containing any amount of granite from Nova Scotia~~in accordance with Table 337-1.

337-3.2.1.4 Liquid Anti-Strip Additive: Use a liquid anti-strip additive at the approved dosage rate as indicated on the APL for all mixtures.

337-3.2.1.5 Fiber Stabilizing Additive: Add either mineral fibers at a dosage rate of 0.4% by weight of the total mix, or cellulose fibers at a dosage rate of 0.3% by weight of total mix.

337-3.2.2 FC-9.5 and FC-12.5:

337-3.2.2.1: Aggregates: Use an aggregate blend of approved friction course aggregates ~~that consists of crushed granite, crushed granitic gneiss, crushed limestone, crushed shell rock, or a combination of the above~~in accordance with Table 337-1. ~~As an exception, mixes that contain a minimum of 60% of approved friction course aggregates of~~

~~crushed granite and/or crushed granitic gneiss may either contain: up to 40% fine aggregate from other sources of aggregate not approved for friction courses or a combination of~~For classifications that allow non-friction aggregate, up~~up~~ to 20% RAP and the remaining fine aggregate from other sources of aggregate not approved for friction courses may be used. Mixtures utilizing High Polymer (HP) binder are not allowed to contain RAP.

A list of aggregates approved for use in friction course may be available on the Department's website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/.

337-3.2.2.2: Asphalt Binder: Use an asphalt binder as called for in the Contract Documents meeting the requirements of Section 916. High polymer binder may be substituted in a mixture with PG 76-22 binder at no additional cost to the Department.

Table 337-1
Friction Aggregate Classification

Classification	Minimum percentage of approved friction course aggregates for FC-5 mixtures	Minimum percentage of approved friction course aggregates for FC-9.5 and FC-12.5 mixtures	Percentage of hydrated lime required in FC-5 mixtures
A	100	100	0
B	100	60	1.0
C	100	60	1.5

Commented [SG1]: This column is included for two reasons: 1) it makes things crystal clear, 2) if we ever allow RAP in FC-5, we have a place to handle it.

337-3.3 Grading Requirements:

337-3.3.1 FC-5: Use a mixture having a gradation at design within the ranges shown in Table 337-~~1~~2.

Table 337-~~1~~2
FC-5 Gradation Design Range

3/4 inch	1/2 inch	3/8 inch	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200
100	85-100	60-75	15-25	5-10	--	--	--	--	2-5

337-3.3.2 FC-9.5: Meet the design gradation requirements for a SP-9.5 Superpave fine mix as defined in 334-3.2.2.

337-3.3.3 FC-12.5: Meet the design gradation requirements for a SP-12.5 Superpave fine mix as defined in 334-3.2.2.

337-4 Mix Design.

337-4.1 FC-5: The Department will design the FC-5 mixtures. Furnish the materials and all appropriate information (source, gradation, etc.) as specified in 334-3.2.7. The Department will have three weeks to design the mix.

The Department will establish the design binder content for FC-5 within the following ranges based on aggregate type:

Table 337-~~2~~3
FC-5 Percent Binder Content

Aggregate ~~Type~~Classification	Percent Binder Content
~~Crushed Granite and/or Granitic Gneiss~~A	6.5 – 8.0
~~Crushed Limestone and/or Shell Rock~~B or C	6.0 – 7.5

337-4.2 FC-9.5 and FC-12.5: Provide a mix design conforming to the requirements of 334-3.2 unless otherwise designated in the plans. Where the plans call for an FC-12.5, an FC-9.5 may be substituted for the FC-12.5 at no additional cost provided the thickness requirements of 334-1.4.1 are met.

337-4.3 Revision of Mix Design: For FC-5, FC-9.5 and FC-12.5, meet the requirements of 334-3.3. For FC-5, all revisions must fall within the gradation limits defined in Table 337-~~1~~2.

337-5 Contractor's Process Control.

Provide the necessary process control of the friction course mix and construction in accordance with the applicable provisions of 320-2, 330-2 and 334-4.

The Engineer will monitor the spread rate periodically to ensure uniform thickness. Perform quality control procedures for daily monitoring and control of spread rate variability. If the spread rate varies by more than 5% of the spread rate set by the Engineer in accordance with 337-8, immediately make all corrections necessary to bring the spread rate into the acceptable range.

337-6 Acceptance of the Mixture.

337-6.1 FC-9.5 and FC-12.5: Meet the requirements of 334-5.

337-6.2 FC-5: Meet the requirements of 334-5 with the following exceptions:

1. The mixture will be accepted with respect to gradation ($P_{3/8}$, P_{4}, and P_{8}), and

asphalt binder content (P_b) only.

2. Testing in accordance with AASHTO T 312 and FM 1-T 209 (and conditioning prior to testing) will not be required as part of 334-5.1.1.

3. The standard LOT size of FC-5 will be 2,000 tons, with each LOT subdivided into four equal sublots of 500 tons each.

4. The Between-Laboratory Precision Values described in Table 334-7 are modified to include ($P_{-3/8}$, P_{-4}, and P_{-8}) with a maximum difference per FM 1-T 030 (Figure 2).

5. Table 334-6 (Master Production Range) is replaced by Table 337-~~3~~4.

6. The mixture will be accepted on the roadway with respect to surface tolerance in accordance with 334-5.8. No density testing will be required for these mixtures.

Table 337-~~3~~4
FC-5 Master Production Range

Characteristic	Tolerance (1)
Asphalt Binder Content (%)	Target ± 0.60
Passing 3/8 inch Sieve (%)	Target ± 7.50
Passing No. 4 Sieve (%)	Target ± 6.00
Passing No. 8 Sieve (%)	Target ± 3.50
(1) Tolerances for sample size of n = 1 from the verified mix design	

337-6.2.1 Individual Test Tolerances for FC-5 Production: Terminate the LOT if any of the following Quality Control (QC) failures occur:

1. An individual test result of a sublot for asphalt binder content does not meet the requirements of Table 337-~~3~~4,

2. Two consecutive test results within the same LOT for gradation on any of the following sieve sizes ($P_{-3/8}$, P_{-4}, and P_{-8}) do not meet the requirements of Table 337-~~3~~4. The two consecutive failures must be on the same sieve.

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 QC Managers and/or Asphalt Plant Level II Technicians responsible for the decision to resume production after a QC failure, as identified in Section 105. 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 QC failure is not addressed as defined above, the Engineer's approval will be required prior to resuming production after any future QC 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 337-12.3) for each quality characteristic.

337-7 Special Construction Requirements.

337-7.1 Hot Storage of FC-5 Mixtures: When using surge or storage bins in the normal production of FC-5, do not leave mixtures containing mineral fibers in the surge or storage bin

for more than one hour. Do not leave mixtures containing cellulose fibers in the surge or storage bin for more than 1-1/2 hours.

337-7.2 Longitudinal Grade Controls for Open-Graded Friction Courses: On FC-5, use either longitudinal grade control (skid, ski or traveling stringline) or a joint matcher.

337-7.3 Temperature Requirements for FC-5:

337-7.3.1 Air Temperature at Laydown: Meet the requirements of Table 330-1.

337-7.3.2 Temperature of the Mix: Heat and combine the asphalt binder and aggregate in a manner to produce a mix having a temperature, when discharged from the plant, meeting the requirements of 320-6.3. Meet all requirements of 330-6.1.3 at the roadway. The target mixing temperature shall be established by the Contractor. The target mixing temperature may be reduced when using warm mix technology.

337-7.4 Compaction of FC-5: Provide two, static steel-wheeled rollers, with an effective compactive weight in the range of 135 to 200 pounds per linear inch (PLI), determined as follows:

$$\text{PLI} = \frac{\text{Total Weight of Roller (pounds)}}{\text{Total Width of Drums (inches)}}$$

(Any variation of this equipment requirement must be approved by the Engineer.) Establish an appropriate rolling pattern for the pavement in order to effectively seat the mixture without crushing the aggregate. In the event that the roller begins to crush the aggregate, reduce the number of coverages or the PLI of the rollers. If the rollers continue to crush the aggregate, use a tandem steel-wheel roller weighing not more than 135 PLI of drum width.

337-7.5 Temperature Requirements for FC-9.5 and FC-12.5:

337-7.5.1 Air Temperature at Laydown: Meet the requirements of Table 330-1.

337-7.5.2 Temperature of the Mix: Heat and combine the asphalt binder and aggregate in a manner to produce a mix having a temperature, when discharged from the plant, meeting the requirements of 320-6.3. Meet all requirements of 330-6.1.3 at the roadway.

337-7.6 Prevention of Adhesion: To minimize adhesion to the drum during the rolling operations, the Contractor may add a small amount of liquid detergent to the water in the roller.

At intersections and in other areas where the pavement may be subjected to cross-traffic before it has cooled, spray the approaches with water to wet the tires of the approaching vehicles before they cross the pavement.

337-7.7 Transportation Requirements of Friction Course Mixtures: Cover all loads of friction course mixtures with a tarpaulin, or waterproof cover, meeting requirements of 320-7.

337-8 Thickness of Friction Courses.

337-8.1 FC-9.5 and FC-12.5: The thickness of the friction course layer will be the plan thickness as shown in the Contract Documents. For construction purposes, the plan thickness will be converted to spread rate as defined in 334-1.4.

Plan quantities are based on a G_{mm} of 2.540, corresponding to a spread rate of 110 lb/yd^2-in. Pay quantities will be based on the actual maximum specific gravity of the mix being used.

337-8.2 FC-5: The total thickness of the FC-5 layer will be the plan thickness as shown in the Contract Documents. For construction purposes, the plan thickness will be converted to

spread rate based on the combined aggregate bulk specific gravity of the asphalt mix being used as shown in the following equation:

$$\text{Spread rate (lb/yd}^2\text{)} = t \times G_{sb} \times 40.5$$

Where: t = Thickness (in.) (Plan thickness)

G_{sb} = Combined aggregate bulk specific gravity from the verified mix design

The weight of the mixture shall be determined as provided in 320-3.2.

Plan quantities are based on a G_{sb} of 2.635, corresponding to a spread rate of 80 pounds per square yard for a 3/4 inch layer. Pay quantities will be based on the actual combined aggregate bulk specific gravity (G_{sb}) of the mix being used.

337-9 Special Equipment Requirements for FC-5.

337-9.1 Fiber Supply System: Use a separate feed system to accurately proportion the required quantity of fibers into the mixture in such a manner that uniform distribution is obtained. Interlock the proportioning device with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes. Control the proportion of fibers to within plus or minus 10% of the amount of fibers required. Provide flow indicators or sensing devices for the fiber system, interlocked with plant controls so that an alarm will be activated if introduction of the fiber fails. Stop production of the asphalt mixture and resume production once the fiber supply system is operating correctly.

When a batch plant is used, add the fiber to the aggregate in the weigh hopper or as approved and directed by the Engineer. Increase the batch dry mixing time by 8 to 12 seconds, or as directed by the Engineer, from the time the aggregate is completely emptied into the pugmill. Ensure that the fibers are uniformly distributed prior to the addition of asphalt binder into the pugmill.

When a drum-mix plant is used, add and uniformly disperse the fiber with the aggregate prior to the addition of the asphalt binder. Add the fiber in such a manner that it will not become entrained in the exhaust system of the drier or plant.

337-9.2 Hydrated Lime Supply System: For FC-5 mixes containing ~~granite,~~Class B or C aggregate, use a separate feed system to accurately proportion the required quantity of hydrated lime into the mixture in such a manner that uniform coating of the aggregate is obtained prior to the addition of the asphalt binder. Add the hydrated lime in such a manner that it will not become entrained in the exhaust system of the drier or plant. Interlock the proportioning device with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure that all mixture produced is properly treated with hydrated lime. Control the proportion of hydrated lime to within plus or minus 10% of the amount of hydrated lime required. Provide flow indicators or sensing devices for the hydrated lime system, interlocked with plant controls so that an alarm will be activated if introduction of the hydrated lime fails. Stop production of the asphalt mixture and resume production once the hydrated lime supply system is operating correctly. The addition of the hydrated lime to the aggregate may be accomplished by Method A or B as follows:

337-9.2.1 Method A - Dry Form: Add hydrated lime in a dry form to the mixture according to the type of asphalt plant being used.

When a batch plant is used, add the hydrated lime to the aggregate in the weigh hopper or as approved and directed by the Engineer. Increase the batch dry mixing time

by eight to twelve seconds, or as directed by the Engineer, from the time the aggregate is completely emptied into the pugmill. Uniformly distribute the hydrated lime prior to the addition of asphalt binder into the pugmill.

When a drum-mix plant is used, add and uniformly disperse the hydrated lime to the aggregate prior to the addition of the asphalt binder. Add the hydrated lime in such a manner that it will not become entrained in the exhaust system of the drier or plant.

337-9.2.2 Method B - Hydrated Lime/Water Slurry: Add the required quantity of hydrated lime (based on dry weight) in a hydrated lime/water slurry form to the aggregate. Provide a solution consisting of hydrated lime and water in concentrations as directed by the Engineer. Use a plant equipped to blend and maintain the hydrated lime in suspension and to mix it with the aggregates uniformly in the proportions specified.

337-9.3 Hydrated Lime Pretreatment: For FC-5 mixes containing ~~granite~~Class B or C aggregate, as an alternative to 337-9.2, pretreat the aggregate with hydrated lime prior to incorporating the aggregate into the mixture. Use a feed system to accurately proportion the aggregate and required quantity of hydrated ~~lime, and~~lime and mix them in such a manner that uniform coating of the aggregate is obtained. Control the proportion of hydrated lime to within plus or minus 10% of the amount required. Aggregate pretreated with hydrated lime in this manner shall be incorporated into the asphalt mixture within 45 days of pretreatment.

337-9.3.1 Hydrated Lime Pretreatment Methods: Pretreat the aggregate using one of the following two methods:

Pretreatment Method A - Dry Form: Add the required quantity of hydrated lime in a dry form to the aggregate. Assure that the aggregate at the time of pretreatment contains a minimum of 3% moisture over saturated surface dry (SSD) conditions. Utilize equipment to accurately proportion the aggregate and hydrated lime and mix them in such a manner as to provide a uniform coating.

Pretreatment Method B - Hydrated Lime/Water Slurry: Add the required quantity of hydrated lime (based on dry weight) in a hydrated lime/water slurry form to the aggregate. Provide a solution consisting of hydrated lime and water in a concentration to provide effective treatment. Use equipment to blend and maintain the hydrated lime in suspension, to accurately proportion the aggregate and hydrated lime/water slurry, and to mix them to provide a uniform coating.

337-9.3.2 Blending QC Records: Maintain adequate QC records for the Engineer's review for all pretreatment activities. Include as a minimum the following information (for each batch or day's run of pretreatment): pretreatment date, aggregate certification information, certified test results for the hydrated lime, aggregate moisture content prior to blending, as-blended quantities of aggregate and hydrated lime, project number, customer name, and shipping date.

337-9.3.3 Certification: In addition to the aggregate certification, provide a certification with each load of material delivered to the hot mix asphalt plant, that the material has been pretreated in conformance with these specifications. Include also the date the material was pretreated.

337-10 Failing Material.

Meet the requirements of 334-5.9. For FC-5, use the Master Production Range defined in Table 337-~~3~~ 4 in lieu of Table 334-6.

337-11 Method of Measurement.

For the work specified under this Section (including the pertinent provisions of Sections 320 and 330), the quantity to be paid for will be the weight of the mixture, in tons. For each pay item, the pay quantity will be based on the quantity placed on the project, limited to 110% of the adjusted plan quantity for the pay item. For dense-graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design G_{mm} stated in 334-1.4, then multiplying it by the tonnage-weighted average G_{mm} of the mixes used for the pay item. For open graded mixes, the adjusted plan quantity will be determined by dividing the pay item's original plan quantity (including any Engineer approved quantity revisions) by the design G_{sb} stated in 337-8.2, then multiplying it by the tonnage-weighted average G_{sb} of the mixes used for the pay item.

The bid price for the asphalt mix will include the cost of the asphalt binder (asphalt rubber (or polymer), asphalt cement, ground tire rubber, anti-stripping additive, blending and handling) and the tack coat application as directed in 300-8, as well as fiber stabilizing additive and hydrated lime (if required). There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix. The weight will be determined as provided in 320-3.2 (including the provisions for the automatic recordation system).

Prepare and submit a Certification of Quantities to the Engineer in accordance with 9-2.1.2.

337-12 Basis of Payment.

337-12.1 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).

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 individual quality characteristics. The pay adjustment will be computed by multiplying a Composite Pay Factor for the LOT by the bid price per ton.

337-12.2 FC-9.5 and FC-12.5: Meet the requirements of 334-8.

337-12.3 FC-5: Meet the requirements of 334-8 with the following exceptions:

1. Pay factors will be calculated for asphalt binder content and the percentages passing the 3/8 inch, the No. 4, and the No. 8 sieves only.
2. Table 337-~~4~~ 5 replaces Table 334-8.
3. Table 337-~~5~~ 6 replaces Table 334-9.
4. The Composite Pay Factor equation in 334-8.3 is replaced with the following:

CPF = [(0.20 x PF 3/8 inch) + (0.30 x PF No. 4) + (0.10 x PF No. 8) + (0.40 x PF AC)]

Table 337-45 Small Quantity Pay Table for FC-5		
Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content (%)		
1.05	0.00-0.25	0.00-0.18
1.00	0.26-0.50	0.19-0.35
0.90	0.51-0.60	0.36-0.42
0.80	>0.60	>0.42
3/8 inch Sieve (%)		
1.05	0.00-3.25	0.00-2.30
1.00	3.26-6.50	2.31-4.60
0.90	6.51-7.50	4.61-5.30
0.80	>7.50	>5.30
No. 4 Sieve (%)		
1.05	0.00-2.50	0.00-1.77
1.00	2.51-5.00	1.78-3.54
0.90	5.01-6.00	3.55-4.24
0.80	>6.00	>4.24
No. 8 Sieve (%)		
1.05	0.00-1.50	0.00-1.06
1.00	1.51-3.00	1.07-2.12
0.90	3.01-3.50	2.13-2.47
0.80	>3.50	>2.47

Table 337-56 Specification Limits for FC-5	
Quality Characteristic	Specification Limits
Asphalt Binder Content (%)	Target ± 0.45
Passing 3/8 inch sieve (%)	Target ± 6.00
Passing No. 4 sieve (%)	Target ± 4.50
Passing No. 8 sieve (%)	Target ± 2.50

337-12.4 Payment: Payment will be made under:

Item No. 337- 7- Asphaltic Concrete Friction Course - per ton.

APPENDIX H

334 ASPHALT CONCRETE FOR LAP (CLASS - D). (REV 3-2-22) (FA 7-2-21) (7-22)

SECTION 334 is deleted and the following substituted:

SECTION 334
ASPHALT CONCRETE FOR LAP (OFF-SYSTEM)

334-1 Description.

334-1.1 General: Construct a~~n~~ Superpave Asphalt Concrete pavement based on the type of work specified in the Contract and the Asphalt Work Categories as defined below. Meet the applicable requirements for plants, equipment, and construction requirements as defined below. Use an asphalt concrete mix that meets the requirements of this specification.

334-1.2 Asphalt Work Mix Categories: Construction of Asphalt Concrete Pavement will fall into one of the following work categories:

334-1.2.1 Asphalt Work Category 1: Includes the construction of bike paths and miscellaneous asphalt.

334-1.2.2 Asphalt Work Category 2: Includes the construction of new turn lanes, paved shoulders and other non-mainline pavement locations.

334-1.2.3 Asphalt Work Category 3: Includes the construction of new mainline pavement lanes, milling and resurfacing.

334-1.3 Mix Types: Use the appropriate mix type as shown in Table 334-1.

Table 334-1
Mix Types

Asphalt Work Category	Mix Types	Traffic Level	ESALs (millions)
1	Type SP-9.5(1)	~~A~~B	<0.3
2	Structural Mixes: Types SP-9.5 or SP-12.5(1) Friction Mixes: Types FC-9.5 or FC-12.5(1)	B	0.3 to <3
3	Structural Mixes: Types SP-9.5 or SP-12.5 Friction Mixes: Types FC-9.5 or FC-12.5	C	≥3

(1) Equivalent mixes may be approved as determined by the Engineer. For example, Marshall S-III mixture type is equivalent to Superpave SP-9.5, Marshall S-I is equivalent to Superpave SP-12.5, and Marshall FC-3 is equivalent to Superpave FC-9.5.

~~For a Traffic Level A mixture, meet the mix design criteria for a Traffic Level B mixture and for a Traffic Level D mixture meet the mix design criteria for a Traffic Level E mixture.~~

At no additional cost to the Department, for a Type SP mix the following Traffic Level substitutions are allowed:

~~Traffic Level E can be substituted for Traffic Level D.~~

Traffic Level ~~D or~~ E can be substituted for Traffic Level C.

Traffic Level C can be substituted for Traffic Level B.

~~Traffic Level B or C can be substituted for Traffic Level A.~~

334-1.4 Gradation Classification: Asphalt concrete mixtures are classified as -fine and are defined in Standard Specification 334-3.2.2.

The equivalent AASHTO nominal maximum aggregate size Superpave mixes are as follows:

Type SP-9.5, FC-9.5 ..... 9.5 mm
Type SP-12.5, FC-12.5 ..... 12.5 mm

334-1.5 Thickness: The total pavement thickness of the asphalt concrete pavement layers will be the plan thickness as shown in the Contract Documents. Before paving, propose a thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan thickness. For construction purposes, the plan thickness and individual layer thickness will be converted to spread rate using the following equation:

$$\text{Spread rate (lbs/yd}^2\text{)} = t \times G_{mm} \times 43.3$$

where: t = Thickness (in.) (Plan thickness or individual layer thickness)
G_{mm} = Maximum specific gravity from the mix design

For target purposes only, spread rate calculations shall be rounded to the nearest whole number.

334-1.5.1 Layer Thicknesses: Unless otherwise called for in the Contract Documents, the allowable layer thicknesses for asphalt concrete mixtures are as follows:

Type SP-9.5, FC-9.5 ..... 1 to 1-1/2 inches
Type SP-12.5..... 1-1/2 to 3 inches
Type FC-12.5 ..... 1-1/2 to 2-1/2 inches

334-1.5.2 Additional Requirements: The following requirements also apply to asphalt Concrete mixtures:

1. When construction includes the paving of adjacent shoulders (less than or equal to 5 feet wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless otherwise called for in the Contract Documents.

2. For overbuild layers, use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum and maximum allowable thicknesses will be as specified below, unless called for differently in the Contract Documents.

Type SP-9.5..... 3/8 to 2 inches
Type SP-12.5..... 1/2 to 3 inches
Type SP-19.0..... 1-1/2 to 4 inches

3. Variable thickness overbuild layers constructed using a Type SP-9.5 or SP-12.5 mixtures may be tapered to zero thickness provided the contract documents require a minimum of 1-1/2 inches of dense-graded mix placed over the variable thickness overbuild layer.

334-1.6 Weight of Mixture: The weight of the mixture shall be determined as provided in 320-3.2 of the Florida Department of Transportation (FDOT) specifications.

334-2 Materials.

334-2.1 Superpave Asphalt Binder: Unless specified elsewhere in the Contract Documents, use an asphalt binder grade as determined from Table 334-2. If the Contract calls for an alternative binder, meet the requirements of FDOT Specification 916.

334-2.2 Aggregate: Use aggregate capable of producing a quality pavement. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

For Type FC mixes, use an aggregate blend that consists of approved friction course aggregates that consists of crushed granite, crushed granitic gneiss, crushed limestone, crushed shell rock, or a combination of the above. As an exception, mixes that contain a minimum of 60% of approved friction course aggregates of crushed granite and/or crushed gneiss may either contain: up to 40% fine aggregate from other sources of aggregate not approved for friction courses or a combination of up to 20% RAP and the remaining fine aggregate from other sources of aggregate not approved for friction courses. Mixtures utilizing High Polymer (HP) binder are not allowed to contain RAP.

A list of aggregates approved for use in friction courses may be available on the FDOT's State Materials Office website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/.

334-2.3 Reclaimed Asphalt Pavement (RAP) Material:

334-2.3.1 General requirements: RAP may be used as a component of the asphalt mixture subject to the following requirements:

1. Limit the amount of RAP material used in the mix to a maximum of 50% by weight of total aggregate.

2. Assume full responsibility for the design, production and construction of asphalt mixes which incorporate RAP as a component material.

3. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.

4. Provide RAP material having a minimum average asphalt binder content of 4.0% by weight of ~~total mix~~RAP. As an exception, when using fractionated RAP, the minimum average asphalt binder content for the coarse portion of the RAP shall be 2.5% by weight of the coarse portion of the RAP. The coarse portion of the RAP shall be the portion of the RAP retained on the No. 4 sieve. The Engineer may sample the stockpile to verify that this requirement is met.

4. When using RAP as a component material, prevent any oversized RAP from being incorporated into the completed mixture by the use of a grizzly or grid over the RAP bin; in-line roller or impact crusher; screen; or other suitable means. If oversized RAP material appears in the completed recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

334-2.3.2 Material Characterization: Assume responsibility for establishing the asphalt binder content, gradation, ~~viscosity~~ and bulk specific gravity (G_{sb}) of the RAP material based on a representative sampling of the material.

334-2.3.3 Asphalt Binder for Mixes with RAP: Select the appropriate asphalt binder grade based on Table 334-2

Table 334-2
Asphalt Binder Grade for Mixes Containing RAP

Percent RAP	Asphalt Binder Grade
0 - 15	PG 67-22
16 - 30	PG 58-22
≥ 30	PG 52-28

334-3 Composition of Mixture.

334-3.1 General: Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO R 35, except as noted herein. Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Prior to the production of any asphalt mixture, obtain the Engineer's conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. As an exception to these requirements, use a currently approved FDOT Mix Design.

Warm mix technologies (additives, foaming techniques, etc.) listed on the Department's website may be used in the production of the mix. The URL for obtaining this information, if available, is: https://www.fdot.gov/materials/laboratory/asphalt/index.shtm.

When warm mix technologies are used, for mixtures containing a PG 52-28, PG 58-22, or PG 67-22 binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 285°F or less. For mixtures containing a PG 76-22 or High Polymer binder, a mixture will be considered a warm mix asphalt design if the mixing temperature is 305°F or less.

The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his/her discretion, the Engineer may no longer allow the use of the mix design.

334-3.2.2 Mixture Gradation Requirements: Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M 323. Aggregates from various sources may be combined.

334-3.2.2.1 Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M. Fine mixes are defined as having a gradation that passes above the primary control sieve control point and above the maximum density line for all sieve sizes smaller than the primary control sieve and larger than the No. 30 sieve. Use only fine mixes.

334-3.2.3 Gyratory Compaction: Compact the design mixture in accordance with AASHTO T 312, with the following exception: use the number of gyrations at N_{design} as defined in Standard Specification Table 334-4. Measure the inside diameter of gyratory molds in accordance with AASHTO T 312.

334-3.2.4 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M 323. $N_{initial}$ and $N_{maximum}$ requirements are not applicable.

334-3.2.5 Moisture Susceptibility:

1. For all traffic levels, use a liquid anti-strip agent listed on the APL at the specified dosage rate. Hydrated lime may be used instead of the liquid anti-strip agent.

2. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi in accordance with FM 1-T 283.

334-3.2.6 Additional Information: In addition to the requirements listed above, provide the following information on each mix design:

1. The design traffic level and the design number of gyrations (N_{design}).
2. The source and description of the materials to be used.
3. The Department source number and the FDOT product code of the aggregate components furnished from an FDOT approved source (if required).
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.
6. The bulk specific gravity (G_{sb}) value for each individual aggregate and RAP component, as identified in the Department's aggregate control program.
7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.
8. A target temperature for the mixture at the plant (mixing temperature) and a target temperature for the mixture at the roadway (compaction temperature). Do not exceed a target temperature of 340°F for High Polymer asphalt binders, 330°F for PG 76-22 asphalt binders, and 315°F for unmodified asphalt binders.
9. Provide the physical properties at the optimum asphalt content, which must conform to all specified requirements.
10. The name of the Construction Training Qualification Program (CTQP) mix designer.
11. The ignition oven and maximum specific gravity (Gmm) calibration factors.
12. The warm mix technology, if used.

334-4 Producer Process Control (PC).

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.

334-5 General Construction Requirements.

334-5.1 Weather Limitations: Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the laying operations.

334-5.2 Limitations of Paving Operations:

334-5.2.1 General: Place the mixture only when the surface upon which it is to be placed has been previously prepared, is intact, firm, dry, clean, and the tack or prime coat, with acceptable spread rate, is properly broken or cured. Do not place friction course until the adjacent shoulder area has been dressed and grassed.

334-5.2.2 Ambient Air Temperature: Place the mixture only when the air temperature in the shade and away from artificial heat meets the requirements of Table 334-3.

The minimum ambient temperature requirement may be reduced by 5ºF when using warm mix technology, if mutually agreed to by both the Engineer and the Contractor.

Table 334-3 Ambient Air Temperature Requirements for Paving	
Layer Thickness or Asphalt Binder Type	Minimum Temperature (°F)
≤ 1 inch	50
Any mixture > 1 inch containing a PG asphalt binder with a high temperature designation ≥ 76°C	45
Any mixture > 1 inch containing a PG asphalt binder with a high temperature designation < 76°C	40
~~FC-5~~[1]	~~65~~

[1] ~~As an exception, place the mixture at temperatures no lower than 60ºF, only when approved by the Engineer based on the Contractor's demonstrated ability to achieve a satisfactory surface texture and appearance of the finished surface. For mixtures containing PG 76-22 binder, the minimum ambient temperature may be further reduced to 55ºF when using warm mix technology, if agreed to by both the Engineer and the Contractor.~~

334-5.3 Mix Temperature: Heat and combine the ingredients of the mix in such a manner as to produce a mixture with a temperature at the plant and at the roadway, within a range of plus or minus 30ºF from the target temperature as shown on the mix design. Reject all loads outside of this range. Reject any load or portion of a load of asphalt mix at the plant or at the roadway with a temperature outside of its respective master range shown in Table334-4. Notify the Engineer of the rejection immediately.

Table 334-4 Mix Temperature Master Range Tolerance	
Location	Acceptable Temperature Tolerance
Plant	Mixing Temperature ±30 F
Roadway (mix in truck)	Compaction Temperature ±30°F

334-5.4 Transportation of the Mixture: Transport the mixture in trucks of tight construction, which prevents the loss of material and the excessive loss of heat and previously cleaned of all foreign material. After cleaning, thinly coat the inside surface of the truck bodies with soapy water or an asphalt release agent as needed to prevent the mixture from adhering to the beds. Do not allow excess liquid to pond in the truck body. Do not use a release agent that will contaminate, degrade, or alter the characteristics of the asphalt mix or is hazardous or detrimental to the environment. Petroleum derivatives (such as diesel fuel), solvents, and any product that dissolves asphalt are prohibited. Provide each truck with a tarpaulin or other waterproof cover mounted in such a manner that it can cover the entire load when required. When in place, overlap the waterproof cover on all sides so that it can be tied down. Cover each load during cool and cloudy weather and at any time it appears rain is likely during transit with a tarpaulin or waterproof cover. Cover and tie down all loads of friction course mixtures.

334-5.5 Surface Preparation:

334-5.5.1 Cleaning: Before placing the mixture, clean the surface of the base or underlying pavement of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

334-5.5.2 Patching and Leveling Courses: As shown in the plans, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.

334-5.5.3 Application over Surface Treatment: Where an asphalt mix is to be placed over a surface treatment, sweep and dispose of all loose material from the paving area.

334-5.5.4 Tack Coat: Use a rate of application as defined in Table 334-5. Control application rate within plus or minus 0.01 gallon per square yard of the target application rate. The target application rate may be adjusted by the Engineer to meet specific field conditions. Determine the rate of application as needed to control the operation. When using PG 52-28, multiply the target rate of application by 0.6.

Table ~~300-2~~334-5
Tack Coat Application Rates

Asphalt Mixture Type	Underlying Pavement Surface	Target Tack Rate (gal/yd^2)[1]
Base Course, Structural Course, Dense-Graded Friction Course, Open-Graded Friction Course	Newly Constructed Asphalt Layers	0.06
	Milled Asphalt Pavement Surface, Oxidized and Cracked Asphalt Pavement, Concrete Pavement	0.09

Note 1: Target tack application rates greater than those specified may be used upon approval of the Engineer.

When using a meter to control the tack or prime application rate, manually measure the volume in the tank at the beginning and end of the application area for a specific target application rate. Perform this operation at a minimum frequency of once per production shift. Resolve any differences between the manually measured method and the meter to ensure the target application rate is met in accordance with this Section. Adjust the application rate if the manually measured application rate is greater than plus 0.02 or minus 0.01 gallons per square yard when compared to the target application rate.

334-5.5.5 Curing and Time of Application: Apply tack coat sufficiently in advance of placing bituminous mix to permit drying, but do not apply tack coat so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material.

334-5.5.6 Protection: Keep the tack coat surface free from traffic until the subsequent layer of bituminous hot mix has been laid.

334-6 Placing Mixture:

334-6.1 Alignment of Edges: Place all asphalt mixtures by the stringline method to obtain an accurate, uniform alignment of the pavement edge. As an exception, pavement edges adjacent to curb and gutter or other true edges do not require a stringline. Control the unsupported pavement edge to ensure that it will not deviate from the stringline more than plus or minus 1.5 inches.

334-6.2 Rain and Surface Conditions: Immediately cease transportation of asphalt mixtures from the plant when rain begins at the roadway. Do not place asphalt mixtures while

rain is falling, or when there is water on the surface to be covered. Once the rain has stopped, standing water has been removed from the tacked surface to the satisfaction of the Engineer, and the temperature of the mixture caught in transit still meets the requirements as specified in 334-5.3, the Contractor may then place the mixture caught in transit.

334-6.3 Checking Depth of Layer: Check the depth of each layer at frequent intervals to ensure a uniform spread rate that will meet the requirements of the Contract.

334-6.4 Hand Work: In limited areas where the use of the paver is impossible or impracticable, the Contractor may place the mixture by hand.

334-6.5 Spreading and Finishing: Upon arrival, dump the mixture in the approved paver, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, is secured. Carry a uniform amount of mixture ahead of the screed at all times.

334-6.6 Thickness Control: Ensure the spread rate is within 5% of the target spread rate, as indicated in the Contract. When determining the spread rate, use, at a minimum, an average of five truckloads of mix and at a maximum, an average of 10 truckloads of mix. When the average spread rate is beyond plus or minus 5% of the target spread rate, monitor the thickness of the pavement layer closely and adjust the construction operations.

When the average spread rate for two consecutive days is beyond plus or minus 5% of the target spread, stop the construction operation at any time until the issue is resolved.

The Engineer will allow a maximum deficiency from the specified spread rate for the total thickness as follows:

1. For pavement of a specified thickness of 2-1/2 inches or more: 50 pounds per square yard.
2. For pavement of a specified thickness of less than 2-1/2 inches: 25 pounds per square yard.

Address the unacceptable pavement in accordance with 334-5.10.4, unless an alternative approach is agreed upon by the Engineer.

334-6.7 Leveling Courses:

334-6.7.1 Patching Depressions: Before spreading any leveling course, fill all depressions in the existing surface as shown in the plans.

334-6.7.2 Spreading Leveling Courses: Place all courses of leveling with an asphalt paver or by the use of two motor graders, one being equipped with a spreader box. Other types of leveling devices may be used upon approval by the Engineer.

334-6.7.3 Rate of Application: When using Type SP-9.5 (fine graded) for leveling, do not allow the average spread of a layer to be less than 50 pounds per square yard or more than 75 pounds per square yard. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the Contractor may vary the rate of application throughout the project as directed by the Engineer. When leveling in connection with base widening, the Engineer may require placing all the leveling mix prior to the widening operation.

334-6.8 Compaction: For each paving or leveling train in operation, furnish a separate set of rollers, with their operators.

When density testing for acceptance is required, select equipment, sequence, and coverages of rolling to meet the specified density requirement. Regardless of the rolling

procedure used, complete the final rolling before the surface temperature of the pavement drops to the extent that effective compaction may not be achieved or the rollers begin to damage the pavement.

No vibratory compaction in the vertical direction will be allowed for layers one inch or less in thickness or, if the Engineer or Contract Documents limit compaction to the static mode only. Compact these layers in the static mode only. Other non-vertical vibratory modes of compaction will be allowed, if approved by the Engineer; however, no additional compensation, cost or time, will be made.

When density testing for acceptance is not required, use a rolling pattern approved by the Engineer.

Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.

334-6.9 Joints.

334-6.9.1 Transverse Joints: Construct smooth transverse joints, which are within 3/16 inch of a true longitudinal profile when measured with a 15 foot manual straightedge. The Engineer may waive straightedge requirements for transverse joints at the beginning and end of the project, at the beginning and end of bridge structures, at manholes, and at utility structures if the deficiencies are caused by factors beyond the control of the Contractor such as no milling requirement, as determined by the Engineer. When smoothness requirements are waived, construct a reasonably smooth transitional joint.

334-6.9.2 Longitudinal Joints: Place each layer of pavement so all longitudinal construction joints are offset 6 to 12 inches laterally between successive layers. Plan offsets in advance so the longitudinal joints of the friction course are not in wheel path areas. The longitudinal joints for friction course layers should be within 6 inches of the lane edge or at the center of the lane. The Engineer may waive these requirements where offsetting is not feasible due to the sequence of construction.

334-6.10 Surface Requirements: Construct a smooth pavement with good surface texture and the proper cross-slope.

334-6.10.1 Texture of the Finished Surface of Paving Layers: Produce a finished surface of uniform texture and compaction with no pulled, torn, raveled, crushed or loosened portions and free of segregation, bleeding, flushing, sand streaks, sand spots, or ripples. Correct any area of the surface that does not meet the foregoing requirements in accordance with 334-6.10.4.

334-6.10.2 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents. Furnish a four-foot-long electronic level accurate to 0.1 degree, approved by the Engineer for the control of cross slope. Make this electronic level available at the jobsite at all times during paving operations.

334-6.10.3 Pavement Smoothness: Construct a smooth pavement meeting the requirements of this Specification. Furnish a 15 foot manual and a 15 foot rolling straightedge meeting the requirements of FM 5-509. Obtain a smooth surface on all pavement courses placed, and then straightedge all layers as required by this Specification.

334-6.10.3.1 Straightedge Testing:

334-6.10.3.1.1 Acceptance Testing: Using a rolling straightedge, test the final (top) layer of the pavement. Test all pavement lanes where the width is constant using a rolling straightedge and document all deficiencies on a form approved by the Engineer.

Notify the Engineer of the location and time of all straightedge testing a minimum of 48 hours before beginning testing.

334-6.10.3.1.2 Final (Top) Pavement Layer: At the completion of all paving operations, straightedge the final (top) layer either behind the final roller of the paving train or as a separate operation. Address all deficiencies in excess of 3/16 inch in accordance with 334-~~5~~6.10.4, unless waived by the Engineer. Retest all corrected areas.

334-6.10.3.1.3 Straightedge Exceptions: Straightedge testing will not be required in the following areas: shoulders, intersections, tapers, crossovers, sidewalks, shared use paths, parking lots, raised crosswalks, speed tables, and similar areas, or in the following areas when they are less than 250 feet in length: turn lanes, acceleration/deceleration lanes and side streets. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets.

As an exception, in the event the Engineer identifies an objectionable surface irregularity in the above areas, straightedge and address all deficiencies in excess of 3/8 inch in accordance with 334-6.10.4.

The Engineer may waive straightedge requirements for transverse joints at the beginning and end of the project, at the beginning and end of bridge structures, at manholes, and at utility structures if the deficiencies are caused by factors beyond the control of the Contractor, as determined by the Engineer. In addition, the Engineer may also waive the straightedging requirements on ramps and superelevated sections where the geometrical orientation of the pavement results in an inaccurate measurement with the rolling straightedge.~~Straightedge testing will not be required in the following areas: shoulders, intersections, tapers, crossovers, sidewalks, bicycle/shared use paths, parking lots and similar areas, or in the following areas when they are less than 250 feet in length: turn lanes, acceleration/deceleration lanes and side streets. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets.~~

~~As an exception, in the event the Engineer identifies an objectional surface irregularity in the above areas, straightedge and address all deficiencies in excess of 3/8 inch in accordance with 334-5.10.4.~~

334-6.10.4 Correcting Unacceptable Pavement: Address all areas of unacceptable pavement at no cost to the Department. Retest all corrected areas and assure the requirements of these Specifications are met.

334-6.10.4.1 Structural Layers: Correct all deficiencies, as defined in the Specifications, in the Type SP structural layers by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane.

The following options only apply if the structural layer is not the final surface layer:

1. As an option for high and low straightedge deficiencies 5/16 of an inch or less, pave over with friction course to correct the deficiency.

2. As an option for high straightedge deficiencies, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency.

3. As an option for low straightedge deficiencies 8/16 of an inch or less, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency.

334-6.10.4.2 Friction Course: Correct deficiencies in the friction course or final surface layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane. As an exception, the Engineer may allow the Contractor to leave these areas in place if it is determined by the Engineer that the deficiency is not a significant detriment to the pavement quality. A reduction to the pay item quantity will be made in accordance with 334-6.10.5.~~Correct deficiencies in the pavement layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane, at no additional cost.~~

334-6.10.5 Reduction in Pay Item Quantity: When the Engineer elects to waive corrections, the Department will reduce the pay quantity for the pay item in question by the amount of material within the defective area. For all mix types, when the measured deficiency lane length is less than 5 feet, use 5 feet for the deficiency lane length when determining the pay reduction. When the pay quantity is in tons, the Department will base the reduction on the volume of material within the defective area (the deficiency lane length by the lane width by layer thickness) multiplied by the maximum specific gravity of the mix as determined through the following equation:

$$\text{Quantity (tons)} = L \times W \times t \times G_{mm} \times 0.0024$$

Where: L = Deficiency Lane length (ft.)
W = Lane width (ft.)
t = Layer thickness (in.)
G_{mm} = Maximum specific gravity from verified mix design

334-7 Acceptance of the Mixture.

334-7.1 General: The asphalt mixture will be accepted based on the Asphalt Work Category as defined below:

1. Asphalt Work Category 1 – Certification by the Contractor as defined in 334-7.2.
2. Asphalt Work Category 2 – Certification and process control testing by the Contractor as defined in 334-7.3
3. Asphalt Work Category 3 – Process control testing by the Contractor and acceptance testing by the Engineer as defined in 334-7.4.

334-7.2 Certification by the Contractor: On Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project meets the requirements of the Specifications. The Engineer may run independent tests to determine the acceptability of the material.

334-7.3 Certification and Process Control Testing by the Contractor: On Asphalt Work Category 2 construction, submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project meets the requirements of the Specifications, along with supporting test data documenting all process control testing as described in 334-67.3.1. If required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the process control testing.

The mix will also require visual acceptance by the Engineer. In addition, the Engineer may run independent tests to determine the acceptability of the material. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer such as but not limited to acceptance at reduced pay, delineation testing to determine the limits of the questionable material, removal and replacement at no cost to the agency, or performing an Engineering analysis to determine the final disposition of the material.

334-7.3.1 Process Control Sampling and Testing Requirements: Perform process control testing at a frequency of once per day. Obtain the samples in accordance with FDOT Method FM 1-T 168. Test the mixture at the plant for gradation (P_{-8} and P_{-200}) and asphalt binder content (P_b). Measure the roadway density with 6 inch diameter roadway cores at a minimum frequency of once per 1,500 feet of pavement with a minimum of three cores per day.

Determine the asphalt binder content of the mixture in accordance with FM 5-563. Determine the gradation of the recovered aggregate in accordance with FM 1-T 030. Determine the roadway density in accordance with FM 1-T 166. The minimum roadway density will be based on the percent of the maximum specific gravity (Gmm) from the approved mix design. If the Contractor or Engineer suspects that the mix design Gmm is no longer representative of the asphalt mixture being produced, then a new Gmm value will be determined from plant-produced mix with the approval of the Engineer. Roadway density testing will not be required in certain situations as described in 334-7.4.1. Assure that the asphalt binder content, gradation and density test results meet the criteria in Table 334-6.

Table 334-6
Process Control and Acceptance Values

Characteristic	Tolerance
Asphalt Binder Content (percent)	Target ± 0.55
Passing No. 8 Sieve (percent)	Target ± 6.00
Passing No. 200 Sieve (percent)	Target ± 1.50
Roadway Density (daily average)	Minimum 91.5% of Gmm
Roadway Density (any single core)	Minimum 88.0 % of Gmm

334-7.4 Process Control Testing by the Contractor and Acceptance Testing by the Engineer: On Asphalt Work Category 3, perform process control testing as described in 334-~~6~~7.3.1. In addition, the Engineer will accept the mixture at the plant with respect to gradation (P_{-8} and P_{-200}) and asphalt binder content (P_b). The mixture will be accepted on the roadway with respect to density. The Engineer will sample and test the material as described in 334-7.3.1. The Engineer will randomly obtain at least one set of samples per day. Assure that the asphalt content, gradation and density test results meet the criteria in Table 334-6. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer such as but not limited to acceptance at reduced pay, delineation testing to determine the limits of the questionable material, removal and replacement at no cost to the agency, or performing an Engineering analysis to determine the final disposition of the material.

334-7.4.1 Acceptance Testing Exceptions: When the total combined quantity of hot mix asphalt for the project, as indicated in the Plans for Type B-12.5, Type SP and Type FC mixtures only, is less than 2,000 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 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, variable thickness overbuild courses, leveling courses, any SP-9.5 or SP-12.5 asphalt layer placed on subgrade with a layer thickness less than or equal to 3 inches, miscellaneous asphalt pavement, shared use paths, crossovers, gore areas, raised crosswalks, speed tables, 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 334-1.5. 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. In addition, density testing for acceptance will not be performed on the following areas when they are less than 500 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes, ramps, or unsignalized side streets with less than four travel lanes and speed limits less than 35 mph. Do not perform density testing for acceptance in situations where the areas requiring density testing is less than 50 tons.

Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer.

Where density testing for acceptance is not required, compact these courses in accordance with a standard rolling procedure (equipment and pattern) as approved by the Engineer. In the event that the rolling procedure deviates from the procedure approved by the Engineer, placement of the mix shall be stopped. ~~When the total quantity of any mix type in the project is less than 500 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may run independent 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, bike/shared use paths, crossovers, gore areas, or any course with a specified thickness less than 1 inch or a specified spread rate less than 100 lb per square yard. 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. In addition, density testing for acceptance will not be performed on the following areas when they are less than 500 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes, or ramps. Do not perform density testing for acceptance in situations where the area requiring density testing is less than 50 tons. Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A random core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer. Compact these courses in accordance with a standard rolling procedure approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix will be stopped.~~

334-8 Method of Measurement.

For the work specified under this Section, the quantity to be paid for will be the weight of the mixture, in tons.

The bid price for the asphalt mix will include the cost of the liquid asphalt and the tack

coat application as specified in 334-5.5.4. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

334-9 Basis of Payment.

334-9.1 General: Price and payment will be full compensation for all the work specified under this Section.