Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

MIKE DEW
SECRETARY

July 5, 2017

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Re: State Specifications Office
Section: **337**
Proposed Specification: **3370302 Asphalt Concrete Friction Courses.**

Dear Mr. Nguyen:

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

The changes are proposed by Greg Sholar of the State Materials Office (SMO) to update the language.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to dan.hurtado@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Dan Hurtado, P.E.
State Specifications Engineer

DH/dt
Attachment
cc: Florida Transportation Builders' Assoc.
State Construction Engineer

ASPHALT CONCRETE FRICTION COURSES.
(REV 5-19-17)

SUBARTICLE 337-3.2.1.1 is deleted and the following substituted:

337-3.2.1.1 Aggregates: Use an aggregate blend which consists of either 100% crushed granite and/or granitic gneiss, or 100% crushed ~~Oolitic~~ limestone and/or crushed shell rock ~~or 100% other crushed materials (as approved by the Engineer for friction courses per Rule 14-103.005, Florida Administrative Code)~~. Do not blend granite and/or granitic gneiss with limestone and/or shell rock for FC-5 mixtures.

~~Crushed limestone from the Oolitic formation may be used if it contains a minimum of 12% silica material as determined by FM 5-510 and the Engineer grants approval of the source prior to its use.~~

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/.

SUBARTICLE 337-3.2.2.1 is deleted and the following substituted:

337-3.2.2.1: Aggregates: Use an aggregate blend of approved friction course aggregates that consists of crushed granite, crushed granitic gneiss, crushed ~~Oolitic~~ limestone, crushed shell rock ~~other crushed materials (as approved by the Engineer for friction courses per Rule 14-103.005, Florida Administrative Code)~~, or a combination of the above. ~~Crushed limestone from the Oolitic formation may be used if it contains a minimum of 12% silica material as determined by FM 5-510 and the Engineer grants approval of the source prior to its use.~~ 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 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 course may be available on the Department's website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/.

SUBARTICLE 337-4.1 is deleted and the following substituted:

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 two weeks to design the mix.

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

Aggregate Type	Binder Content

Aggregate Type	Binder Content
Crushed Granite and/or Granitic Gneiss	5.5 - 7.5
Crushed Limestone ~~(Oolitic)~~ and/or Shell Rock	6.0 - 8.0

SUBARTICLE 337-6.2 is deleted and the following substituted:

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 312-12 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-~~6~~5 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-~~5~~4 (Master Production Range) is replaced by Table 337-2.

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 337-2 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 337-2,

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 337-2. 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.

ARTI CLE 337-10 is deleted and the following substituted:

337-10 Failing Material.

Meet the requirements of 334-5.9. For FC-5, use the Master Production Range defined in Table 337-2 in lieu of Table 334-~~5~~4.

Subarticle 337-12.3 is deleted and the following substituted:

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 337-3 replaces Table 334-~~7~~6.
3. Table 337-4 replaces Table 334-~~8~~7.
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 337-3
Small Quantity Pay Table for FC-5

Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content (%)		
1.00	0.00-0.50	0.00-0.35
0.90	0.51-0.60	0.36-0.42
0.80	>0.60	>0.42
3/8 inch Sieve (%)		
1.00	0.00-6.50	0.00-4.60
0.90	6.51-7.50	4.61-5.30
0.80	>7.50	>5.30
No. 4 Sieve (%)		
1.00	0.00-5.00	0.00-3.54
0.90	5.01-6.00	3.55-4.24
0.80	>6.00	>4.24
No. 8 Sieve (%)		
1.00	0.00-3.00	0.00-2.12
0.90	3.01-3.50	2.13-2.47
0.80	>3.50	>2.47

Table 337-4 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

ASPHALT CONCRETE FRICTION COURSES.
(REV 5-19-17)

SUBARTICLE 337-3.2.1.1 is deleted and the following substituted:

337-3.2.1.1 Aggregates: Use an aggregate blend which consists of either 100% crushed granite and/or granitic gneiss or 100% crushed limestone and/or crushed shell rock. Do not blend granite and/or granitic gneiss with limestone and/or shell rock 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/.

SUBARTICLE 337-3.2.2.1 is deleted and the following substituted:

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. 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 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 course may be available on the Department's website. The URL for obtaining this information, if available, is: https://mac.fdot.gov/.

SUBARTICLE 337-4.1 is deleted and the following substituted:

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 two weeks to design the mix.

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

Aggregate Type	Binder Content
Crushed Granite and/or Granitic Gneiss	5.5 - 7.5
Crushed Limestone and/or Shell Rock	6.0 - 8.0

SUBARTICLE 337-6.2 is deleted and the following substituted:

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 312-12 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 334-5 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 334-4 (Master Production Range) is replaced by Table 337-2.

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 337-2
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 337-2,

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 337-2. 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.

ARTI CLE 337-10 is deleted and the following substituted:

337-10 Failing Material.

Meet the requirements of 334-5.9. For FC-5, use the Master Production Range defined in Table 337-2 in lieu of Table 334-4.

Subarticle 337-12.3 is deleted and the following substituted:

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 337-3 replaces Table 334-6.
3. Table 337-4 replaces Table 334-7.
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 337-3
Small Quantity Pay Table for FC-5

Pay Factor	1-Test Deviation	2-Test Average Deviation
Asphalt Binder Content (%)		
1.00	0.00-0.50	0.00-0.35
0.90	0.51-0.60	0.36-0.42
0.80	>0.60	>0.42
3/8 inch Sieve (%)		
1.00	0.00-6.50	0.00-4.60
0.90	6.51-7.50	4.61-5.30
0.80	>7.50	>5.30
No. 4 Sieve (%)		
1.00	0.00-5.00	0.00-3.54
0.90	5.01-6.00	3.55-4.24
0.80	>6.00	>4.24
No. 8 Sieve (%)		
1.00	0.00-3.00	0.00-2.12
0.90	3.01-3.50	2.13-2.47
0.80	>3.50	>2.47

Table 337-4
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

Table 337-4 Specification Limits for FC-5	
Quality Characteristic	Specification Limits
Passing No. 8 sieve (%)	Target ± 2.50