FLORIDA DEPARTMENT OF TRANSPORTATION
State Materials Office
5007 NE 39th Avenue
Gainesville, Florida 32609

August 22, 2017

Florida Method of Test
for
INITIAL SAMPLING OF CONCRETE FROM REVOLVING DRUM TRUCK MIXERS OR AGITATORS

Designation: FM 5-501

1. SCOPE

1.1 This method describes a procedure for obtaining early samples of fresh concrete from revolving drum truck mixers or agitators in order to provide a preliminary evaluation of the condition of the concrete before discharge of the batch. The samples so obtained are considered adequate for determining air content, slump, temperature, and water/cementitious ratio for quality control purposes only. Samples are not to be used for acceptance samples for determination of pay.

2. REFERENCED DOCUMENTS

2.1 ASTM Standards:

ASTM C143 Slump of Portland Cement Concrete
ASTM C231 Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C173 Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C 1064 Test Method for Temperature of Freshly Mixed Portland Cement Concrete

3. PROCEDURE

3.1 Take a 1/2 cu. ft. sample after not less than 2 cubic feet and not more than 6 cubic feet of concrete have been discharged from the batch being sampled.

3.2 Pass a suitable container through the entire discharge stream (repeated passes may be necessary to secure the size sample desired). Or,

3.3 Divert the entire stream into a suitable container.

3.4 Remix the sample to insure uniformity.

4. TESTING

4.1 Start tests for slump, air content, and temperature within 5 minutes after the sampling is completed. In order to have the time to start all tests within the 5

minute period, the slump test should usually be started first. Measure the slump in accordance with ASTM C143. Determine the air content in accordance with ASTM C173 or ASTM C231. Determine temperature in accordance with ASTM C1064.

4.2 Determine the water/cementitious ratio using the attached instructions and example (water/cementitious ratio calculation) as a guide.

4.3 A website (app) may be used to determine the water/cementitious ratio in lieu of the attached instructions. The website (app) must be initially verified by comparing the results from the website (app) with calculation from this method. Use of the website (app) does not relieve the inspector of knowing how to manually calculate the water/cementitious ratio using this method.

Note: The elapsed time shall not exceed 10 minutes between the beginning and the end of the water/cementitious ratio calculation.

Note: The water/cementitious ratio calculation must be completed prior to placement of the load.

5. REPORT

5.1 Record all test results, action(s) taken, direction(s) given or adjustments made on Control of Concrete Form.

WATER CEMENTITIOUS RATIO CALCULATION

To calculate a water/cementitious ratio, first determine the amount of free water on the coarse and fine aggregate. These quantities can be determined from information recorded on delivery tickets sent to the job site. Divide the coarse aggregate total weight by the free water percent plus 1.00. This gives you the saturated surface dry (SSD) weight of the aggregate. Then, subtract the SSD aggregate weight from the total aggregate weight you started with. The result equals weight of free water on the coarse aggregate. Repeat these calculations for the fine aggregate. Take free water calculations four places past the decimal and round to three places.

The next step is to calculate the amount of batch water. Multiply the gallons of batch water by 8.33. Take batch water calculations four places past the decimal and round to three places.

Weight of water added at the job site is also necessary to compute the

water/cementitious ratio. Multiply the gallons added by 8.33 to get pounds of added water. Take added water calculations four places past the decimal and round to three places.

Next, add pounds of free water on coarse aggregate, pounds of free water on fine aggregate, pounds of batch water and pounds of water added at the job site, to determine the total pounds of water contained in the concrete.

Divide the total water in pounds by the cementitious material (cement or cement and pozzolan) in the mix. This result is the water/cementitious ratio. Take this final calculation three places past the decimal and round back two places.

EXAMPLE

Delivery Ticket Information:

Coarse Aggregate	1722.0000 pounds	1% free water
Fine Aggregate	1172.0000 pounds	6% free water
Batch Water	21.0000 gallons	
Added Water	0.0000 gallons	
Fly Ash (Pozzolan)	125.0000 pounds	
Cement	533.0000 pounds	

NOTE: All weights in this example are for 1.0 cubic yard.

1) COARSE AGGREGATE

TOTAL WEIGHT		FREE WATER + 1.00	SSD WEIGHT
1722.0000	/ 1.01	= 1704.9505	

1722.0000	TOTAL AGGREGATE WEIGHT
-1704.9505	SSD AGGREGATE WEIGHT
17.0495	POUNDS OF FREE WATER ON COARSE AGGREGATE

17.050 ROUNDED OFF

2) FINE AGGREGATE

TOTAL WEIGHT FREE WATER + 1.00 SSD WEIGHT
1172.0000 / 1.06 = 1105.6604

1172.0000 TOTAL AGGREGATE WEIGHT
-1105.6604 SSD AGGREGATE WEIGHT
66.3396 POUNDS OF FREE WATER ON FINE AGGREGATE

66.340 ROUNDED OFF

3) BATCH WATER

21.0000 GALLONS OF BATCH WATER
* 8.33 POUNDS PER GALLON OF WATER
174.9300 POUNDS OF BATCH WATER

174.930 ROUNDED OFF

4) ADDED WATER

00.0000 GALLONS OF BATCH WATER
* 8.33 POUNDS PER GALLON OF WATER
00.0000 POUNDS OF BATCH WATER

00.000 ROUNDED OFF

5) TOTAL WATER

17.050
66.340
174.930
+00.000
258.320

6) CEMENT

533.0000 POUNDS OF CEMENT

7) FLY ASH(Pozzolan)

125.0000 POUNDS OF ADDED FLY ASH (Pozzolan)

8) TOTAL CEMENTITIOUS MATERIAL

533.0000	CEMENT
+125.0000	FLY ASH
658.0000	POUNDS OF CEMENTITIOUS MATERIAL
658.0000	ROUNDED OFF

9) WATER/CEMENTITIOUS RATIO

TOTAL WATER	/ CEMENT	
258.320	/ 658.000	= .393

.39 W/C RATIO ROUNDED OFF