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

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Florida Method of Test
for
MECHANICAL ANALYSIS OF EXTRACTED AGGREGATE

Designation: FM 1-T 030

FM 1-T 030 is identical to AASHTO T 30 except for the following provisions.

1. Eliminate Section 4.8 of AASHTO T 30

2. Eliminate Section 7.1 of AASHTO T 30

3. Replace Section 7.2 of AASHTO T 30 with the following:

   7.2 The residual aggregate from the ignition oven sample should be emptied from the baskets, placed in a pan and weighed. This weight of the residual aggregate should not differ from the weight determined in Section 8.10 of FM 5-563 by more than 0.2%. The residual aggregate shall then be placed in a container and covered with water. Add a sufficient amount of wetting agent to assure a thorough separation of the material finer than the 75 μm sieve from the coarser particles. The contents of the container shall be agitated vigorously and the wash water immediately poured over a nest of two sieves consisting of a No. 10 (2.00 mm) or No. 8 (2.36 mm) sieve superimposed on a No. 200 (75 μm) sieve. The use of a large spoon to stir and agitate the aggregate in the wash water has been found satisfactory. Wetting agents may include any dispersing agent such as Calgon, Joy or other detergent or soap, which will promote the separation of fine material.

4. Replace Section 7.4 of AASHTO T 30 with the following:

   7.4 All material retained on the nested sieves shall be returned to the container. The washed aggregate in the container shall be dried to constant weight at a temperature not to exceed the mixture laboratory compaction temperature + 9°F (+ 5°C) and not less than 221°F (105°C) and weighed to the nearest 0.1 g.

5. Eliminate Section 8.2 of AASHTO T 30

6. Replace Section 9.1 of AASHTO T 30 with the following:

   9.1 The results of the sieve analysis shall be reported as follows: (a) Total percentages passing each sieve, or (b) total percentages retained on each

sieve, or (c) percentages retained between consecutive sieves, depending upon the form of the specifications for the use of the material under test. Percentages shall be reported to the nearest 0.01 percent.

7. Replace Section 10 of AASHTO T 30 with the following:

10. PRECISION

10.1 Within - laboratory variability: Results of two properly conducted tests by the same operator using the same equipment on a split sample should not differ from each other by more than the allowable difference which is obtained from Figure 1. In lieu of Figure 1, Tables 1 and 2 can be used to obtain the allowable difference.

10.2 Between - laboratory variability: Results of two properly conducted tests by two different laboratories, one by each laboratory, on a split sample should not differ from each other by more than the allowable difference which is obtained from Figure 2. In lieu of Figure 2, Tables 3 and 4 can be used to obtain the allowable difference.

10.3 With respect to Figures 1 and 2 and Tables 1 thru 4, Dense Graded mixtures shall refer to all Superpave mixture types. Open graded friction course (OGFC) shall refer to FC-5 mixture types.

EXAMPLE #1: Within-Laboratory Variability

Test result #1 obtained 48.00% passing a certain size sieve and test result #2 obtained 52.00% passing the same size sieve from a split sample.

$$\text{Average of 2 tests} = \frac{48.00 + 52.00}{2} = 50.00\%$$

If using Figure 1, locate 50.00% on the horizontal scale. Read upward to where this value intersects the appropriate curve (dense graded or OGFC). At the point of intersection, read across to the vertical scale to obtain the maximum allowable difference between 2 tests. For a dense graded mix, the maximum allowable difference is 3.50%. For an OGFC mix, the maximum allowable difference is 6.90%. Since the difference, 52.00 – 48.00 = 4.00, exceeds the allowable difference for dense graded mixes (3.50%), the results would not be acceptable. However, the results would be acceptable for an OGFC mix, since 4.00% is less than the allowable difference of 6.90%.

EXAMPLE #2: Between–Laboratory Variability

Lab A obtained 48.00% passing a certain size sieve and Lab B obtained 52.00% passing the same size sieve from a split sample.

$$\text{Average of 2 labs} = \frac{48.00 + 52.00}{2} = 50.00\%$$

If using Figure 2, locate 50.00% on horizontal scale. Read upward to where this value intersects the appropriate curve (dense graded or OGFC). At the point of intersection, read across to the vertical scale to obtain the maximum allowable difference between 2 labs. For a dense graded mix, the maximum allowable difference is 4.60%. For an OGFC mix, the maximum allowable difference is 8.80%. Since the difference, 52.00 – 48.00 = 4.00, is less than either 4.60% or 8.80%, the results are within the expected variability and are acceptable for either a dense graded or OGFC mix.

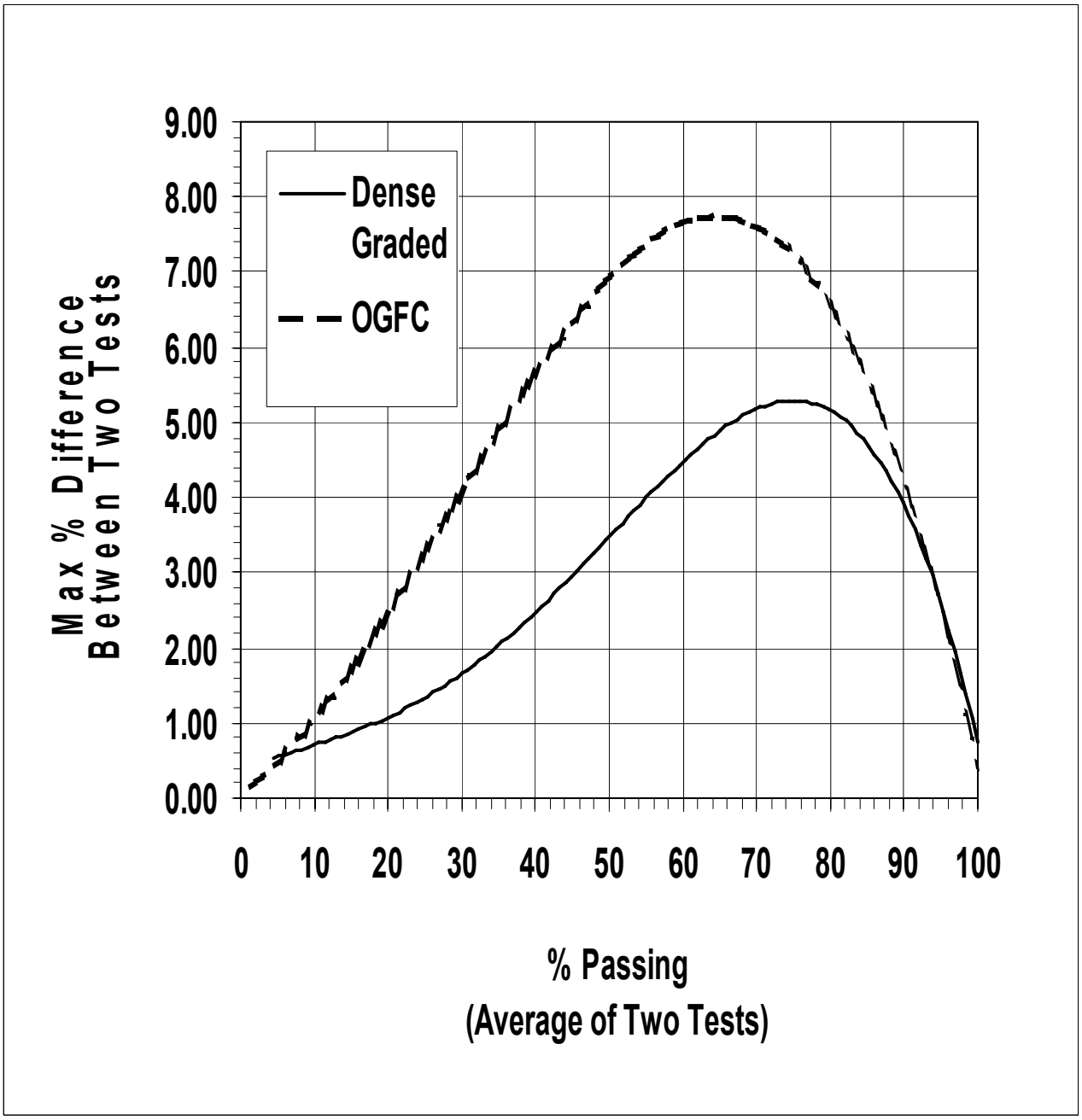

Figure 1 – Within-Laboratory Variability
For Use With Any Size Sieve (3/4 in - #200)

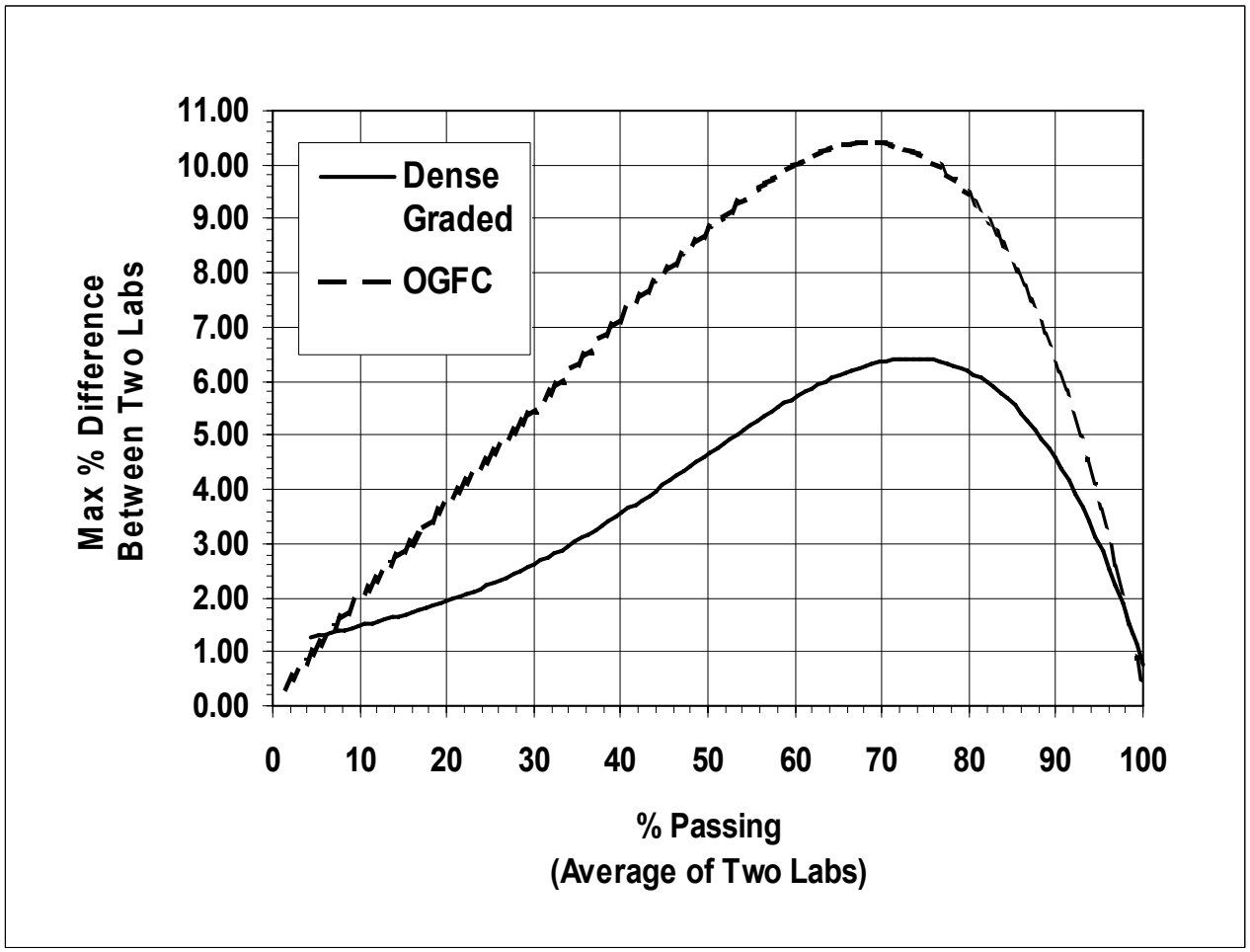

Figure 2 - Between-Laboratory Variability

For Use With Any Size Sieve (3/4 in. - #200)

Table 1 – Within-Laboratory Variability; Dense Graded Mixtures

For Use With Any Size Sieve (3/4 in. - #200)

% Passing (Avg. of Two Tests)	Max % Difference (Between Two Tests)	% Passing (Avg. of Two Tests)	Max % Difference (Between Two Tests)
1	0.41	51	3.59
2	0.45	52	3.70
3	0.48	53	3.80
4	0.52	54	3.91
5	0.55	55	4.01
6	0.58	56	4.11
7	0.61	57	4.21
8	0.64	58	4.31
9	0.68	59	4.40
10	0.71	60	4.50
11	0.74	61	4.59
12	0.77	62	4.68
13	0.81	63	4.76
14	0.84	64	4.84
15	0.88	65	4.91
16	0.91	66	4.99
17	0.95	67	5.05
18	0.99	68	5.11
19	1.03	69	5.16
20	1.08	70	5.21
21	1.13	71	5.25
22	1.17	72	5.29
23	1.23	73	5.31
24	1.28	74	5.33
25	1.34	75	5.33
26	1.39	76	5.33
27	1.45	77	5.32
28	1.52	78	5.30
29	1.58	79	5.26
30	1.65	80	5.22
31	1.72	81	5.16
32	1.80	82	5.09
33	1.88	83	5.01
34	1.95	84	4.91
35	2.04	85	4.80
36	2.12	86	4.67
37	2.21	87	4.52
38	2.29	88	4.36
39	2.39	89	4.19
40	2.48	90	3.99
41	2.57	91	3.77
42	2.67	92	3.54
43	2.77	93	3.29
44	2.87	94	3.01
45	2.97	95	2.71
46	3.07	96	2.40
47	3.17	97	2.05
48	3.28	98	1.69
49	3.38	99	1.30
50	3.49	100	0.88

Table 2 – Within-Laboratory Variability; OGFC Mixtures

For Use With Any Size Sieve (3/4 in. - #200)

% Passing (Avg. of Two Tests)	Max % Difference (Between Two Tests)	% Passing (Avg. of Two Tests)	Max % Difference (Between Two Tests)
1	0.11	51	7.02
2	0.18	52	7.11
3	0.27	53	7.20
4	0.36	54	7.29
5	0.46	55	7.36
6	0.56	56	7.44
7	0.67	57	7.50
8	0.78	58	7.56
9	0.90	59	7.61
10	1.03	60	7.65
11	1.15	61	7.69
12	1.28	62	7.71
13	1.42	63	7.73
14	1.56	64	7.74
15	1.70	65	7.74
16	1.85	66	7.74
17	1.99	67	7.72
18	2.14	68	7.69
19	2.30	69	7.66
20	2.45	70	7.61
21	2.61	71	7.56
22	2.77	72	7.49
23	2.93	73	7.41
24	3.09	74	7.33
25	3.25	75	7.23
26	3.42	76	7.12
27	3.58	77	6.99
28	3.74	78	6.86
29	3.91	79	6.71
30	4.07	80	6.55
31	4.23	81	6.38
32	4.40	82	6.20
33	4.56	83	6.00
34	4.72	84	5.79
35	4.88	85	5.57
36	5.03	86	5.33
37	5.19	87	5.08
38	5.34	88	4.81
39	5.49	89	4.53
40	5.64	90	4.23
41	5.78	91	3.92
42	5.93	92	3.59
43	6.06	93	3.25
44	6.20	94	2.90
45	6.33	95	2.52
46	6.45	96	2.13
47	6.58	97	1.73
48	6.69	98	1.30
49	6.81	99	0.86
50	6.91	100	0.41

Table 3 – Between-Laboratory Variability; Dense Graded Mixtures

For Use With Any Size Sieve (3/4 in. - #200)

% Passing (Avg. of Two Labs)	Max % Difference (Between Two Labs)	% Passing (Avg. of Two Labs)	Max % Difference (Between Two Labs)
1	1.11	51	4.76
2	1.16	52	4.87
3	1.20	53	4.98
4	1.24	54	5.09
5	1.28	55	5.20
6	1.32	56	5.30
7	1.36	57	5.40
8	1.40	58	5.50
9	1.44	59	5.60
10	1.48	60	5.70
11	1.52	61	5.79
12	1.56	62	5.87
13	1.60	63	5.95
14	1.64	64	6.03
15	1.69	65	6.10
16	1.73	66	6.17
17	1.78	67	6.23
18	1.83	68	6.28
19	1.88	69	6.32
20	1.94	70	6.36
21	1.99	71	6.39
22	2.05	72	6.41
23	2.11	73	6.42
24	2.18	74	6.42
25	2.24	75	6.40
26	2.31	76	6.38
27	2.38	77	6.35
28	2.46	78	6.30
29	2.54	79	6.24
30	2.62	80	6.17
31	2.70	81	6.08
32	2.78	82	5.98
33	2.87	83	5.86
34	2.96	84	5.72
35	3.05	85	5.57
36	3.15	86	5.40
37	3.24	87	5.22
38	3.34	88	5.01
39	3.44	89	4.78
40	3.55	90	4.53
41	3.65	91	4.26
42	3.76	92	3.97
43	3.87	93	3.66
44	3.98	94	3.32
45	4.09	95	2.95
46	4.20	96	2.57
47	4.31	97	2.15
48	4.42	98	1.71
49	4.53	99	1.24
50	4.65	100	0.74

Table 4 – Between-Laboratory Variability; OGFC Mixtures

For Use With Any Size Sieve (3/4 in. - #200)

% Passing (Avg. of Two Labs)	Max % Difference (Between Two Labs)	% Passing (Avg. of Two Labs)	Max % Difference (Between Two Labs)
1	0.24	51	8.91
2	0.45	52	9.05
3	0.65	53	9.19
4	0.85	54	9.32
5	1.05	55	9.45
6	1.24	56	9.57
7	1.43	57	9.68
8	1.62	58	9.79
9	1.80	59	9.89
10	1.98	60	9.98
11	2.16	61	10.07
12	2.34	62	10.15
13	2.52	63	10.22
14	2.69	64	10.27
15	2.87	65	10.32
16	3.04	66	10.36
17	3.21	67	10.39
18	3.39	68	10.40
19	3.56	69	10.41
20	3.73	70	10.39
21	3.90	71	10.37
22	4.07	72	10.33
23	4.24	73	10.28
24	4.41	74	10.21
25	4.58	75	10.12
26	4.75	76	10.02
27	4.93	77	9.90
28	5.10	78	9.76
29	5.27	79	9.60
30	5.44	80	9.42
31	5.61	81	9.22
32	5.79	82	9.00
33	5.96	83	8.75
34	6.13	84	8.48
35	6.30	85	8.19
36	6.48	86	7.87
37	6.65	87	7.53
38	6.82	88	7.15
39	6.99	89	6.75
40	7.16	90	6.33
41	7.33	91	5.87
42	7.50	92	5.38
43	7.66	93	4.86
44	7.83	94	4.30
45	7.99	95	3.71
46	8.15	96	3.09
47	8.31	97	2.43
48	8.46	98	1.74
49	8.62	99	1.00
50	8.76	100	0.23