1003 LAB - FIELD TOLERANCE PROCEDURE - FOR BITUMINOUS, CONCRETE, AND GRADING & BASE

For laboratory testing of bituminous, concrete, or grading and base samples, which have companion test results, use the following procedure.

Note 1: This procedure only applies to specification sieves.

See applicable table 1003 A, B, or C "Bituminous, Concrete, or Grading and Base Allowable Differences (Tolerances) Between Lab & Field Results and within Lab Results"

Flow Chart 1003 "Lab/Field & Inter-Lab Tolerance Flowchart for Bituminous, Concrete, and Grading and Base Aggregates" illustrates the process.

Note 2: Does not to apply to composite results for bituminous or concrete samples.

A) If the field and the companion laboratory test data fall within the criteria listed in Column 1 of the applicable table, either Table 1003 A, B, or C, the lab shall report the test as "Within tolerance".

B) If a field test and companion laboratory test data do not fall within the criteria listed in Column 1, the lab shall perform a retest. If not enough material is available for a retest, report as "Unable to verify, not enough material submitted" with no data on report.

C) If the laboratory retest and the field data fall within the criteria of Column 1, the lab shall report the test as "Within tolerance".

D) If the lab retest and the field data do not fall within the criteria of Column 1 and the difference between the original lab test and its retest is within the criteria of Column 2 for 1st Lab & Retest Lab Testing, report as "Out of tolerance", and report the first lab test, and the field and lab should investigate their procedures and equipment.

E) If the retest and field data do not fall within the criteria of Column 1, and the original lab test and retest data do not fall within the criteria of Column 2, perform a second lab retest. If not enough material is available for a second retest, report as "Unable to verify, not enough material submitted" with no data on report, and the lab should investigate their procedures and equipment.

F) If the second lab retest falls within the criteria of Column 1, the lab shall report the test as "Within tolerance".

G) If the second lab retest does not fall within the criteria of Column 1, and the second retest falls within the limits of Column 3, when compared with either the first lab retest or the original lab test, then report the average of these two values, and report as "Out of tolerance".

H) If the second lab retest does not fall within the criteria of Column 1, and the second retest does not fall within the limits of Column 3, when compared with either the first lab retest or the original lab test, then report as "Unable to verify", with no data on report, and the lab should investigate their procedures and equipment.

If a laboratory is within tolerance, but consistently has test results, which are close to the lab-field tolerance value (column 1), the lab should investigate their procedures and equipment.

Note 3: If a verification sample is submitted without field data, or if field data is not provided at a later time, then the lab should not issue a report.

Table 1003A: Bituminous Aggregates Allowable Differences (Tolerances) Between Lab & Field Results and within Lab Results

	Column 1	Column 2	Column 3
Bituminous (AFT) Gradation Sieve % passing Sieves *(Specification Sieves Only)*	1st Lab Test & Field Test	1st and 2nd Lab Test (Single operator tolerance)	3rd Lab test & 1st or 2nd Lab Test
50 - 9.5 mm [2 inch to 3/8 inch]	6%	4%	2%
4.75 mm [#4]	5%	3%	2%
2.36 mm - 600µm [#8 - #30]	4%	3%	1%
300µm [#50]	3%	2%	1%
150µm[#100]	2%	1%	1%
75µm [#200]	1.2%	0.8%	0.4%
Bituminous (Non-AFT) Gradation Sieve % passing Sieves			
25.0, 19.0, 12.5, 9.5 mm [1", 3/4", 1/2", 3/8"]	6%	4%	2%
4.75 mm [#4]	5%	3%	2%
2.36 mm [#8]	4%	3%	1%
0.075 mm [#200]	2.0%	1.3%	0.6%
Bituminous			
Mixture Bulk Specific Gravity (G_{mb}) **	0.030	0.020	0.010
Mixture Maximum Specific Gravity (G_{mm})	0.019	0.011	0.006
Fine Aggregate Angularity, Uncompacted voids (U) %	1%	0.5%	0.3%
Coarse Aggregate Angularity, % fractured faces (%P)	15%	10%	5%
Aggregate Individual Bulk Specific Gravity both (+4.75mm [+ #4]) or (-4.75mm [- #4])	0.040	0.027	0.013
Tensile Strength Ratio (TSR) %, Traffic	No Lab Field Tolerance, see Bituminous Specifications		
Bituminous Asphalt Binder Content			
Chemical Extraction Methods, %	0.4	0.3	0.1
Incinerator Oven, %	0.3	0.2	0.1

** Of the average of three pucks for Marshall or of the average of two pucks for Gyratory.

Table 1003B: Concrete Allowable Differences (Tolerances) Between Lab & Field Results and Within Lab Results

	Column 1	Column 2	Column 3
Concrete Gradation Sieve % passing Sieves *(Specification Sieves Only)*	1st Lab Test & Field Test	1st and 2nd Lab Test (Single operator tolerance)	3rd Lab test & 1st or 2nd Lab Test
50 - 25 mm [2 inch to 1"]	8%	4%	2%
19-9.5 mm [3/4 inch to 3/8”]	6%	4%	2%
4.75 mm - 425µm [#4 - #40]	4%	3%	1%
300µm [#50]	3%	2%	1%
150µm[#100]	2%	1%	1%
75µm [#200]	0.6%	0.4%	0.2%

Table 1003C: Grading and Base Allowable Differences (Tolerances) Between Lab & Field Results and Within Lab Results

	Column 1	Column 2	Column 3
Grading and Base Gradation Sieve % passing Sieves	1st Lab Test & Field Test	1st and 2nd Lab Test (Single operator tolerance)	3rd Lab test & 1st or 2nd Lab Test
75, 50, 25, 19, & 9.5 mm [3 inch, 2 inch, 1 inch, 3/4", & 3/8"]	6%	4%	2%
4.75 mm, 2.00mm, & 425µm [#4, #10, & #40]	5%	3%	2%
75µm [#200]	2.0%	1.3%	0.7%
Moisture Density Relationship (Proctor)			
Density	3 lbs./ft^3		
Target Moisture	2%		

Flow Chart 1003: Lab/Field & Inter-Lab Tolerance Flowchart for Bituminous, Concrete, and Grading and Base