Revised: August 26, 2011

GDT 107

A. Scope

For a complete list of GDTs, see the Table of Contents.

Use this test method to determine asphalt plant ratings. The ratings help evaluate the effectiveness of a Contractor's quality control program.

The asphalt plant rating system was developed using the Mixture Control Tolerances established in Section 828 of Georgia's Standard Specifications. This system is designed to provide Industry and the Department with a management tool for measuring the success of the Producer Certification Program and to promote consistency of products.

B. Apparatus

None listed for this test.

C. Sample Size and Preparation

No sample preparation is needed.

D. Procedures

In order to produce the ratings, certain data must be calculated. The following procedures are applicable to producing data for the rating system:

A. Tolerance Band

A tolerance band derived from the tolerances established in Section 828 is used to calculate the rating for all types of asphaltic concrete mixes. The maximum deviation allowed in Section 828 from the Job Mix Formula represents a grade of 70.

Example:

9.5 mm Superpave Type 1

Tolerances established in Section 828

Rating Criteria		Deviation
4.75 mm Sieve	0 = 100	± 5.6 = 70
2.36 mm Sieve	0 = 100	± 4.6 = 70
75 um Sieve	0 = 100	± 2.0 = 70
Asphalt Cement	0 = 100	± 0.4 = 70

B. Rating Standards

Ratings	**Quality of Mixes**
90-100	Excellent
80-89	Good
70-79	Marginal
Below 70	Unacceptable

E. Calculations

A. Determination of Mix Score:

1. A score for each type of asphalt mixture produced by a plant is calculated as follows:

MIX SCORE = (0.6 x Average score for rated sieves) + (0.4 x score for AC content)

**Gradation accounts for 60% of Composite Score and AC accounts for 40%.

Note: If the combined score is < 70, report the combined score. If the combined rating is ≥ 70, but either gradation or AC portion of rating is < 70, show the combined rating as 69.9.

2. The rating criteria for each type mix in order to calculate the mix score are:

MIX	**AC & SIEVES USED**
25 mm Superpave, 19mm SMA	12.5 mm, 2.36 mm, 75 um, AC
19 mm Superpave 12.5 mm PEM 12.5 mm OGFC 12.5 mm SMA 12.5 mm Superpave Open Graded Interlayer (OGI)	9.5 mm, 2.36 mm, 75 um, AC
9.5 mm OGFC 9.5 mm SMA 9.5 mm Superpave Type 1, Type 2	4.75 mm, 2.36 mm, 75 um, AC
4.75 mm	2.36 mm, 75 um, AC
Paver Laid Surface Treatment	
Type A	4.75 mm, 2.36 mm, AC
Type B	4.75 mm, 2.36 mm, AC
Type C	9.5 mm, 2.36 mm, AC

3. A Specification Tolerance Factor (**STF**) is used to determine the score for each rated sieve. The **STF** is derived using the tolerances established in Section 828 of the specifications and assuming that the maximum allowed tolerance for each rated sieve equals a score of 70. The **STF**s for each mix type is listed below.

Superpave

12.5 mm Sieve	0 = 100	± 6.0 = 70	6.0 ÷ 30 = 0.2000 (0.2000 = **STF**)
9.5 mm Sieve	0 = 100	± 5.6 = 70	5.6 ÷ 30 = 0.1870 (0.1870 = **STF**)
4.75 mm Sieve	0 = 100	± 5.6 = 70	5.6 ÷ 30 = 0.1870 (0.1870 = **STF**)
2.36 mm Sieve	0 = 100	± 4.6 = 70	4.6 ÷ 30 = 0.1534 (0.1534 = **STF**)
75 um Sieve	0 = 100	± 2.0 = 70	2.0 ÷ 30 = 0.0670 (0.0670 = **STF**)
Asphalt Cement	0 = 100	± 0.4 = 70	0.4 ÷ 30 = 0.0134 (0.0134 = **STF)**

SMA, OGFC,PEM and OGI

12.5 mm Sieve	0 = 100	± 6.1 = 70	6.1 ÷ 30 = 0.2034 (0.2034 = **STF**)
9.5 mm Sieve	0 = 100	± 5.6 = 70	5.6 ÷ 30 = 0.1870 (0.1870 = **STF**)
4.75 mm Sieve	0 = 100	± 5.7 = 70	5.7 ÷ 30 = 0.1900 (0.1900 = **STF**)
2.36 mm Sieve	0 = 100	± 4.6 = 70	4.6 ÷ 30 = 0.1534 (0.1534 = **STF**)
75 um Sieve	0 = 100	± 2.0 = 70	2.0 ÷ 30 = 0.0670 (0.0670 = **STF**)
Asphalt Cement	0 = 100	± 0.4 = 70	0.4 ÷ 30 = 0.0134 (0.0134 = **STF)**

Paver Laid Surface Treatment

9.5 mm Sieve	0 = 100	± 5.0 = 70	5.0 ÷ 30 = 0.1667 (0.1667= **STF**)

4.75 mm Sieve	0 = 100	± 4.0 = 70	4.0 ÷ 30 = 0.1333 (0.1334 = **STF**)
2.36 mm Sieve	0 = 100	± 4.0 = 70	4.0 ÷ 30 = 0.1333 (0.1334 = **STF**)
300 um Sieve	0 = 100	± 3.0 = 70	3.0 ÷ 30 = 0.1000 (0.1000 = **STF**)
75 um Sieve	0 = 100	± 2.0 = 70	2.0 ÷ 30 = 0.0670 (0.0670 = **STF**)
Asphalt Cement	0 = 100	± 0.4 = 70	0.4 ÷ 30 = 0.0134 (0.0134 = **STF)**

B. Determination of Plant Score:

1 The plant score is determined from the mix scores and the percent of each type mix produced as a function of total production. Acceptance sample results shall be used in determining the monthly asphalt plant rating. Monthly plant ratings shall be based on a minimum of three extractions per mix. If less than three extractions are taken, the mix will not be rated. A monthly rating of less than 70 for any mix will result in an overall monthly plant rating of less than 70.

The score for each rated sieve and AC based on the average absolute deviation from the job mix formula is divided by the specification tolerance factor (**STF**) and then subtracted from 100. Find the score to the nearest one decimal place.

2. PLANT SCORE = The sum of (% of type mix of total production x mix score)

3. Listed below is an example of a plant score that has produced two different mixes, a 9.5 mm Type 1 Superpave and a 12.5 mm Superpave.

a. Example: Type 9.5 mm Superpave Type 1 Produced Tons =1000

Average Absolute Deviation from Job Mix Formula				
Sieves	**4.75 mm**	**2.36 mm**	**75 um**	**AC**
Test 1	0.6	1.3	0.8	0.08
Test 2	1.3	2.8	1.3	0.13
Test 3	3.0	3.4	0.8	0.17
Test 4	1.0	1.9	1.5	0.22
Test 5	3.1	3.5	1.4	0.09
Avg. Abs. Dev.	1.800	2.580	1.160	0.138

Grades	4.75 mm	100 – (1.800 ÷ 0.1870) = 90.37
	2.36 mm	100 – (2.580 ÷ 0.1534) = 83.18
	75 um	100 – (1.160 ÷ 0.0670) = 82.69
	AC	100 – (0.138 ÷ 0.0134) = 89.70

Mix Score for 9.5 mm Superpave Type 1

$$\frac{\{[(90.37 + 83.18 + 82.69) \times .60] + (89.70 \times .40)\}}{3} = 87.1$$

b. Example: 12.5 mm Superpave Produced Tons = 785

Average Absolute Deviation from Job Mix Formula				
Sieves	**9.5 mm**	**2.36 mm**	**75 um**	**AC**
Test 1	2.1	1.6	0.8	0.06
Test 2	1.1	1.3	0.3	0.11
Test 3	1.6	1.45	.55	0.085
Avg. Abs. Dev.	1.6	1.45	0.55	0.085

Grades	9.5 mm	100 – (1.60 ÷ 0.1870) = 91.44
	2.36 mm	100 – (1.45 ÷ 0.1534) = 90.55
	75 um	100 – (0.55 ÷ 0.0670) = 91.79
	AC	100 – (0.085 ÷ 0.0134) = 93.66

Mix Score for 12.5 mm Superpave

$$\frac{\{[(91.44 + 90.55 + 91.79) \times .60]}{3} + (93.66 \times .40)\} = 92.2$$

c. Weighted Average Rating for Day's Run

9.5 mm Superpave Type 1 ={ [1000/(1000 + 785)] x 100} = 56.02 % of day's production

12.5 mm Superpave = {[785/(1000 + 785)] x 100} = 43.98 % of day's production

Total day's production = 1785 Tons

Plant Score: (87.1 x 0.5602) + (92.2 x 0.4398) = 89.3

Note: Example is for one day's run; format would be the same for any chosen span of time.

C. Determination of Overall Plant Rating for Extended Time Periods

1. Overall Plant Rating for time periods longer than one month will be calculated based upon the average of the monthly plant ratings and adjusted for the tonnage produced per month to provide weighted plant ratings for the time period being rated.

a. Example Begin date 1/1/11 To 6/30/11

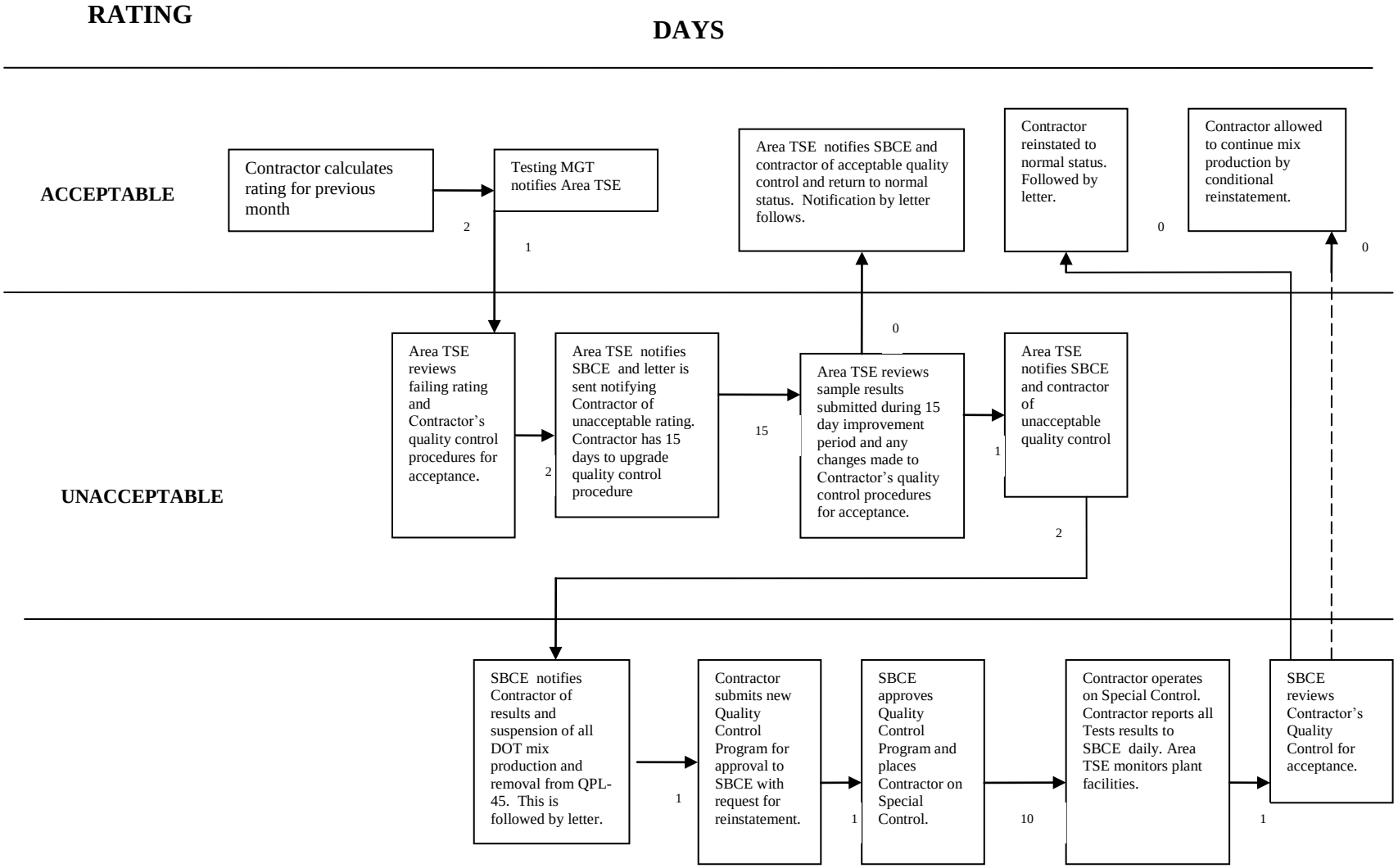
Date	Tonnage	% Tonnage	Plant Rating	Calculation	Weighted Rating
1/11	1785	21.8	89.3	(.218 x 89.3)	19.5
2/11	800	9.8	90.7	(.098 x 90.7)	8.9
3/11	1500	18.3	95.3	(.183 x 95.3)	17.4
4/11	500	6.2	86.7	(.062 x 86.7)	5.4
5/11	2000	24.4	91.7	(.244 x 91.7)	22.4
6/11	1600	19.5	94.0	(.195 x 94.0)	18.3
Totals	8185	100.0			91.9

Average Plant Rating for the time period 1/01/11 to 6/30/11 = 91.9

F. Report

1. Report test results monthly on a Quality Control Rating form; however, you may make more frequent checks to determine the effectiveness of a Contractor's quality control procedure.
2. Unless approved by the Office of Materials and Research, close all open Lots of Asphaltic Concrete on the last day of the month.
3. Make reports on the first working day after the end of each rating period. Notify the Area Bituminous Construction Engineer of the results in writing.
4. Yearly Plant Ratings will be reported annually by the Office of Materials and Research
5. Figure 107-1, below, describes the normal reporting procedure.
6. To be included in the List of Approved Hot Mix Asphaltic Concrete Plants (QPL 45), a Contractor must meet the requirements of SOP 27 which requires an acceptable rating. Figure 107-1

Figure 107-1


RATING
DAYS
ACCEPTABLE
UNACCEPTABLE
Contractor calculates rating for previous month
2
Testing MGT notifies Area TSE
1
Area TSE notifies SBCE and contractor of acceptable quality control and return to normal status. Notification by letter follows.
Contractor reinstated to normal status. Followed by letter.
0
Contractor allowed to continue mix production by conditional reinstatement.
0
Area TSE reviews failing rating and Contractor's quality control procedures for acceptance.
2
Area TSE notifies SBCE and letter is sent notifying Contractor of unacceptable rating. Contractor has 15 days to upgrade quality control procedure
15
Area TSE reviews sample results submitted during 15 day improvement period and any changes made to Contractor's quality control procedures for acceptance.
0
Area TSE notifies SBCE and contractor of unacceptable quality control
1
2
SBCE notifies Contractor of results and suspension of all DOT mix production and removal from QPL-45. This is followed by letter.
1
Contractor submits new Quality Control Program for approval to SBCE with request for reinstatement.
1
SBCE approves Quality Control Program and places Contractor on Special Control.
10
Contractor operates on Special Control. Contractor reports all Tests results to SBCE daily. Area TSE monitors plant facilities.
1
SBCE reviews Contractor's Quality Control for acceptance.