

## Method of Test for Abrasion of Small-Size Coarse Aggregate by use of the Los Angeles Machine

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### 1. Scope:

This standard practice describes the procedure for determining the resistance of coarse aggregate to abrasion using the Los Angeles testing machine.

### 2. Apparatus:

- 2.1 Los Angeles testing machine meeting requirements of AASHTO T 96.
- 2.2 Sieves. All sieves conforming to the requirements of ASTM E11.
- 2.3 Scale or balance having the capacity to weigh any sample which may be tested utilizing this procedure and readable to the nearest 0.1 gram.
- 2.4 Abrasive charge, steel spheres meeting the requirements of AASHTO T 96.

Depending upon the grading of the test sample as described in table 1, the abrasive charge shall be as follows:

Grading	Number of Spheres	Mass of Charge (g)
A	12	5000 ± 25
B	11	4584 ± 25
C	8	3330 ± 20
D	6	2500 ± 15

### 3. Procedure:

- 3.1 Obtain field sample in accordance with SD 201 and reduce the sample to test size by using SD 213. Oven dry the sample at  $230 \pm 9^{\circ}\text{F}$ .
- 3.2 Assemble a series of sieves that will furnish the information required by the specifications covering the material to be tested. Nest the sieves in order of decreasing size of opening from top to bottom and include a pan below the last sieve.
- 3.3 Pour the sample into the top sieve of the nest. Agitate the sieves by hand or on a mechanical shaker for a sufficient period of time.
- 3.4 Remove any dirt adhering to the + #4 material. This can be accomplished by dumping the material from each individual sieve into a flat pan and rubbing it with a soft pine or rubber covered block. After the dirt has been removed, pour the contents of the pan back onto the sieves and complete the shaking.

An alternate method of removing dirt is to place the material retained on an individual sieve in an enclosed container. Agitate the aggregate in the container by hand using a circular motion. The material is then reintroduced to the sieve and sieved by hand.

- 3.5 Separate the test specimen into individual size fractions and recombine to the grading in table 1, most nearly corresponding to the gradation of the aggregate sample.

Table 1: Grading's for test specimens

Sieve size		Mass for each grading (g)			
Passing	Retained on	A	B	C	D
1 1/2"	1"	1250 ± 25			
1"	3/4"	1250 ± 25			
3/4"	1/2"	1250 ± 10	2500 ± 10		
1/2"	3/8"	1250 ± 10	2500 ± 10		
3/8"	1/4"			2500 ± 10	
1/4"	#4			2500 ± 10	
#4	#8				5000 ± 10
Total		5000 ± 10	5000 ± 10	5000 ± 10	5000 ± 10

- 3.6 Record the mass of the sample before testing to the nearest 1 g.
- 3.7 Place the test specimen and abrasive charge in the Los Angeles testing machine and rotate the machine at a speed of 30 to 33 rpm for 500 revolutions.
- 3.8 After the testing machine has completed the required amount of revolutions, discharge the material from the machine and perform a preliminary separation of the test specimen on the #4 sieve. Sieve the finer portion on a #12 sieve.
- 3.9 Record the mass of the material retained above the #12 sieve to the nearest 1 g.

**4. Report:**

4.1 Calculate the "Percent wear" as follows:

$$\text{Percent wear} = \frac{(A - B)}{A} \times 100$$

Where:

A = Mass of original sample to the nearest 1 g.

B = Mass of final sample retained above the #12 sieve to the nearest 1 g.

4.2 Report the grading designation of the test specimen from table 1 and the percent wear to the nearest 1% by mass.

**5. References:**

AASHTO T 96  
ASTM E11  
ASTM C 131  
SD 201  
SD 202  
SD 213