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**DIVISION OF ENGINEERING SERVICES**  
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## **METHOD OF TEST FOR SURFACE ABRASION RESISTANCE OF CONCRETE SPECIMENS**

### **A. SCOPE**

This surface abrasion test method describes the procedure used to measure the ability of a concrete specimen to resist surface abrasion by impact of steel balls in the presence of water.

### **B. REFERENCES**

California Test 201 - Soil and Aggregate Sample Preparation

### **C. APPARATUS**

1. A mechanical shaker capable of agitating a mold assembly containing the test specimen, water, and steel balls, in a vertical direction at 1,200 cycles/min with a 1 in. stroke. See Figure 1.
2. One steel test mold, 4 in. dia × 5 in. high, fitted with a watertight base and cover. A  $\frac{1}{8}$  in. steel ring, triangular in cross-section, and inserted to form a lip, encircles the mold interior 2 in. above the bottom and combines with the base to hold the sample in place and protect the vulnerable edges of the specimen. See Figure 2.
3. Eight chrome steel balls,  $\frac{13}{32}$  in. dia and weighing  $4.5 \text{ g} \pm 0.3 \text{ g}$  each. Total mass of the 8 balls shall be between 32 g and 38 g.
4. One 200 mL graduated cylinder.
5. A balance or scale with a capacity of 1000 g and accuracy of  $\pm 0.1 \text{ g}$ .

### **D. SPECIMENS**

The test specimens shall be cylindrical in shape, 4 in. dia × 2 in. high, and may be either cores cut from hardened concrete or molded specimens. They shall be soaked in water for a minimum of 2 hr prior to testing.

### **E. PROCEDURE**

1. Surface dry the specimen, weigh, and record mass to the nearest gram.
2. Place specimen in the test mold with the surface to be tested facing up. Place the mold with specimen on the test mold base and add 8 steel balls and 200 mL of water. Attach the cover and clamp the assembly to the mechanical shaker.
3. Agitate the assembly at  $1,200 \text{ cycles/min} \pm 10 \text{ cycles/min}$  for  $3 \text{ min} \pm 5 \text{ s}$  and remove from the mechanical shaker.
4. Remove the specimen from the test mold. Flush off the abraded material, dry the

surface, weigh, and record the mass to the nearest gram.

**F. CALCULATIONS**

The abrasion loss in grams is calculated by subtracting the mass of the saturated surface dry specimen after the test from the mass of the surface dry specimen before test.

**G. REPORTING OF RESULTS**

Report the amount of abrasion loss in grams. The age of the concrete shall be included in the report.

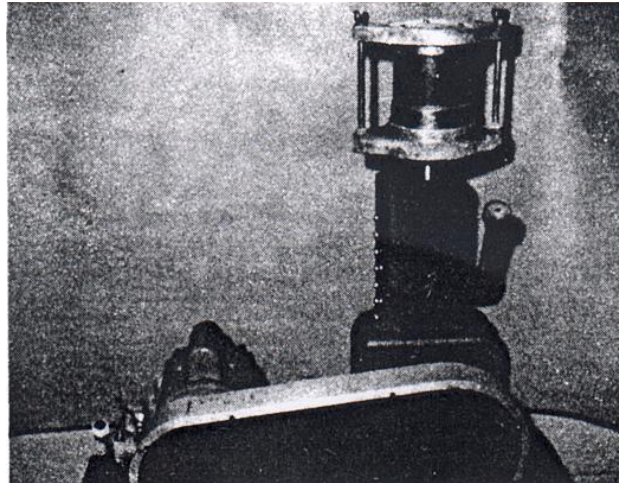
**H. HEALTH AND SAFETY**

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

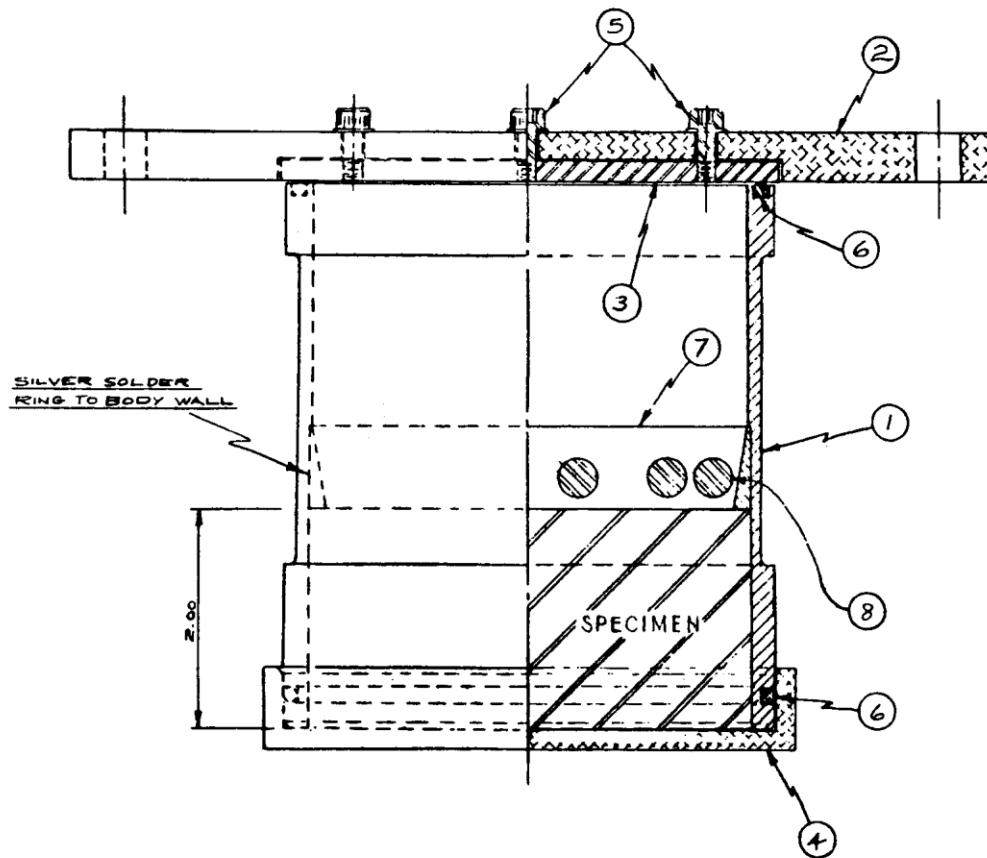
Caltrans Laboratory Safety Manual is available at:

[http://www.dot.ca.gov/hq/esc/ctms/pdf/lab\\_safety\\_manual.pdf](http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf)

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(California Test 550 contains 4 pages)**



**FIGURE 1. Mechanical Shaker**



| LIST OF MATERIAL |          |                |   |          |         |
|------------------|----------|----------------|---|----------|---------|
| 8                | 8        | Ball Bearings  | <sup>13</sup> / <sub>32</sub> inch dia., 4.5 g, Steel   |          |         |
| 1                | 7        | Retaining Ring | 4140 Steel  |          |         |
| 2                | 6        | "O" Ring       | 4 <sup>3</sup> / <sub>16</sub> in. ID x 4 <sup>5</sup> / <sub>16</sub> in. OD x <sup>1</sup> / <sub>8</sub> in. dia. Neoprene |          |         |
| 4                | 5        | Cap Screws     | 10-32NF Socket, Filister HD   |          |         |
| 1                | 4        | Base           | Alum  |          |         |
| 1                | 3        | Wear Plate     | 4140 Steel  |          |         |
| 1                | 2        | Cover          | Alum  |          |         |
| 1                | 1        | Body           | Mild Steel  |          |         |
| No. Req.         | Part No. | Description    | Stock Size  | Material | Remarks |

**FIGURE 2. Surface Abrasion Test Mold**