



Performance Examination - Aggregate

Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate (ASTM C128-15) [AASHTO T 84-13]

Candidate Name: _____ NICET ID: _____

| Apparatus | Trial 1 | Trial 2 |
|--|---------|---------|
| Balance Capacity at least 1 kg, accurate to 0.1% of sample mass, sensitive to 0.1 g | | |
| Sieves Nest of two (a) 75- μ m (No. 200) Protective sieve is 1.18 mm (No. 16) | | |
| Oven Maintains uniform temperature of 110 \pm 5 $^{\circ}$ C (230 \pm 9 $^{\circ}$ F) | | |
| Conical Mold Made of metal, 0.8 mm minimum thickness, with a height of 75 \pm 3 mm Inside diameter at top 40 \pm 3 mm and inside diameter at bottom 90 \pm 3 mm | | |
| Pycnometer (for Use with Gravimetric Procedure) Flask or flask or other suitable container into can hold fine aggregate test sample and in which the volume content can be reproduced within 6 0.1 cm ³ . Volume of the container filled to mark shall be at least 50% greater than the space required to accommodate test sample. A volumetric flask of 500-cm ³ capacity or a fruit jar (Mason, Kerr, etc.) fitted with a pycnometer top is satisfactory for a 500-g test sample of most fine aggregates. | | |
| Flask (for Use with Volumetric Procedure) A Le Chatelier flask as described in C188 is satisfactory for an approximately 55-g test sample | | |
| Tamper Flat, circular tamping face 25 \pm 3 mm in diameter and tamper mass of 340 \pm 15 g | | |

| Procedures | Trial 1 | Trial 2 |
|---|---------|---------|
| Sample Preparation | | |
| 1. The sample obtained by C702, approximately 1000 g | | |
| 2. Dried to constant mass at 110 \pm 5 $^{\circ}$ C (230 \pm 9 $^{\circ}$ F) <i>Note: Oven drying not necessary if naturally moist condition is desired</i> | | |
| 3. Allowed to cool to comfortable handling temperature (approximately 50 $^{\circ}$ C) | | |
| 4. Covered with water or at least 6% moisture added | | |
| 5. Allowed to stand 20-28 hours | | |
| 6. Excess water decanted (if necessary) without loss of fines | | |
| 7. Sample spread on flat, nonabsorbent surface, and uniformly dried by a current of warm air | | |
| 8. Mold placed on flat, nonabsorbent surface and filled to overflowing | | |
| 9. Tamper allowed to fall freely under gravitational attraction, 25 times with a 5 mm drop <i>Note: See provisional tests 1-4 for materials that do not readily slump.</i> | | |
| 10. Loose sand removed from around base and mold lifted vertically | | |
| 11. A sample fails to slump on the first test | | |
| 12. If it does slump on the first test, is water added, sample covered and allowed to stand 30 minutes | | |
| 13. Drying continued and slump test repeated at frequent intervals until sample slumps slightly | | |

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| Gravimetric (Pycnometer) Procedure | Trial 1 | Trial 2 |
|---|----------------|----------------|
| 1. Pycnometer partially filled with water and 500 ± 10 g sample added and SSD sample mass recorded | | |
| 2. Pycnometer filled to 90% of total capacity and agitated to eliminate air bubbles | | |
| 3. Mechanical agitation permitted if performed in a manner that will not degrade the sample and comparison to manual agitation on the same material performed every six months, and the two results fall within the Table 1 range | | |
| 4. Temperature of contents adjusted to 23.0 ± 2.0 °C | | |
| 5. Water level adjusted to calibrated capacity and mass of pycnometer and contents determined | | |
| 6. The sample removed and dried to constant mass at 110 ± 5 °C (230 ± 9 °F) | | |
| 7. Sample cooled in air at room temperature for 1.0 ± 0.5 hour and dry specimen mass determined | | |
| 8. Empty pycnometer filled to its calibration capacity with water at 23.0 ± 2.0 °C and mass determined (pycnometer may be previously calibrated) | | |
| 9. All masses determined to nearest 0.1 g | | |
| 10. Bulk specific gravity calculated as follows [Bulk specific gravity = $A / (B + S - C)$] and reported to nearest 0.001 (or reported to nearest 0.01 for fine aggregate meeting M6 requirements) | | |
| 11. If the sample tested in a naturally moist condition, the source of the sample and the procedures used to prevent drying before testing reported | | |
| Volumetric (Le Chatelier Flask) Procedure | Trial 1 | Trial 2 |
| 1. Le Chatelier flask filled with water to point on the stem between 0- and 1- ml marks with the initial volume recorded | | |
| 2. The temperature of the flask and contents at 23.0 ± 2.0 °C | | |
| 3. Approximately 55 ± 5 g (other masses acceptable) of saturated surface dry fine aggregate added to the flask | | |
| 4. Separate 500 ± 10 -g sample of saturated surface-dry material taken for absorption determination | | |
| 5. Flask and contents check to be within 1 °C of temperature in Step 3, water level read and recorded | | |
| 6. Separate 500 g sample used to determine the absorption | | |

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| Calculations | Trial 1 | Trial 2 |
|--|---------|---------|
| Relative Density (Specific Gravity) $(OD) = A / (B + S - C)$ | | |
| Volumetric Procedure (Relative Density) $(OD) = [S_1(A/S)] / [0.9975 (R_2 - R_1)]$ | | |
| Gravimetric Procedure (Specific Gravity) $(SSD) = S / (B + S - C)$ | | |
| Volume procedure - relative density $(Sp\ Gr)\ (SSD) = S_1 / [0.9975 (R_2 - R_1)]$ | | |
| Gravity procedure – apparent relative density $(app\ Sp\ Gr) = A / (B + A - C)$ | | |
| Volume procedure – apparent relative density $(app\ Sp\ Gr) = S_1(A/S) / 0.9975 (R_2 - R_1) - [(S_1/S)(S - A)]$ | | |
| Absorption, % = $100[(S - A)/A]$ | | |

First Attempt: Pass: _____ Fail: _____ Second Attempt: Pass: _____ Fail: _____

Comments:

Examiner Name: _____ Examiner Signature: _____ Date: _____