Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
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APPARATUS / SECTION 6

1. Balance / Clause 6.1

    a. One kg capacity, sensitive to 0.1 g or less, and accurate to within 0.1% of test load at any point within the range of use ……………………………………… _____

    b. Difference between readings shall be accurate within 0.1 g…………………….. _____

2. **Volumetric Flask** or Fruit Jar / Clause 6.2

    a. **Volumetric flask** of 500-cm³ capacity …………………………………………… _____

    b. Fruit jar fitted with a pycnometer top (for 500-g test sample) …………………… _____

    Note: Determine mass of Flask filled to its calibrated capacity with water at $23.0 \pm 2.0°C$.

3. Mold / Clause 6.4

    a. Metal in the form of a frustum of a cone…………………………………………… _____

    - 40 ± 3 mm - inside diameter at top …………………………………………….. _____
    - 90 ± 3 mm - inside diameter at bottom …………………………………….. _____
    - 75 ± 3 mm – in height ……………………………………………………………… _____

4. Tamper / Clause 6.4

    a. Metal tamper …………………………………………………………….. ___

    - 340 ± 15 g ……………………………………………………………………… _____
    - Flat circular tamping face / 25 ± 3 mm in diameter ………………………….. _____

5. Oven / Clause 6.5

    a. Capable of maintaining a uniform temperature of $110 \pm 5.0°C$ ($230 \pm 9.0°F$) …. _____

SAMPLING / CLAUSE 7.1

    a. Sample obtained in accordance with Practice D 75? …………………………….. __

SAMPLE PREPARATION / SECTIONS 7 & 8

    a. Thoroughly mix sample and reduce it in accordance with ASTM C702 to approx. 1 kg (Section 7)………………………………………………………………….. _____

    b. Sample placed into a suitable pan and oven dried at temperature of $110 \pm 5.0°C$? ……………………………………………………………………….. _____

    c. Allow sample to cool then cover with water for 24 ± 4 h or alternatively add 6% moisture to the fine aggregate and let stand for 24 ± 4 h? ………………… _____

    Note: Seal or protect material to prevent evaporation during the 24 ± 4 h waiting period after adding 6% moisture.

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SAMPLE PREPARATION / SECTION 8.0 (CONTINUED)

Note: Determinations based on relative density of material with the P/75µm particles having been removed (ASTM C117) prior to testing, more accurately reflects the relative density of the material. Refer to C128 / Appendixes X1.1. for further details.

d. Decant water carefully to avoid loss of fines? …………………………………….. _____
e. Spread material on a flat nonabsorbent surface? ……………………………… _____
f. Material exposed to a current of warm air and stirred frequently to maintain homogeneous drying?
…………………………………………………………………………………….. _____
g. SSD condition also achieved by tumbling or stirring with the use of mechanical aids or by the use of a suitable stainless steel pan having a large surface area and high walls to prevent loss of material? …………………………………………... _____
h. Continue operation until material approaches a free-flowing condition? ……….. _____
i. Hold mold firmly on a smooth nonabsorbent surface (upright like a pyramid)? _____
J. With the other hand, fill the mould with the partially dried FA to overflowing? … _____
k. Lightly drop the tamper from approximately 5 mm above the top surface of the mold onto the fine aggregate 25 times? ……………………………………. _____
l. Starting height adjusted to the new surface elevation after each drop – distribute the drops evenly over the surface? ……………………………………………… _____
m. Remove material from the base and vertically lift the mold? ……………………. _____
n. Test complete if slight slumping occurs (SSD condition) – if not, continued the mixing procedure followed by the tamping procedure until SSD is achieved? ……………………….._____
o. Material dried past SSD – followed procedure indicated in clause 8.2? ……….. _____
p. For materials that do not readily slump followed procedure indicated in clause 8.3 and Note 2 (ASTM C128)? ……………………………………………………..………….. _____

PROCEDURE / SECTION 9

Gravimetric (Pycnometer) Procedure / Clause 9.2

a. Partially filled pycnometer (500-cm³ flask) with water at approx. 23.0 ±2.0°C? _____
b. Introduce 500 ± 10 g of SSD material followed by additional water at approx. 90% of capacity? …………………………………………………………………... _____
c. Agitate flask manually or mechanically to eliminate visible air bubbles? ………. _____

Note 3:

- Avoid degradation of material when agitating mechanically.
- Mechanical to be compared with manual for each six-month period of use – Refer to clause 9.2.1.2 for details.

d. Air bubbles eliminated, temperature of flask and contents adjusted to 23.0 ± 2.0°C by partial immersion in water, if necessary? ………………………………………………. _____
e. Water level brought to calibration capacity in flask? …………………………….. _____
f. Dry flask with absorbent cloth or paper towel, then determine total mass of flask, specimen and water? ……………………………………………………………………………._____
g. Empty sample from flask, dry in oven at 110 ± 5.0°C (230 ± 9.0°F)? ………….. _____
h. Remove from oven and cool in air at room temp. for 1 ± ½ h, and determine mass? …………………………………………………………………………….. _____

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CALCULATIONS / SECTION 10

    a. Calculate Relative density (specific gravity) (OD) of oven dried sample? ……… ____

        Example: Relative Density (specific gravity) (OD) = $A/(B + S - C)$ Where:

       A = Mass of oven-dry test sample in air, g.
       B = Mass of pycnometer (flask) filled with water, to calibration mark, g
       C = Mass of pycnometer filled with specimen and water to calibration mark, g
       S = Mass of saturated-surface-dry sample, g

    b. Calculate Relative density (specific gravity) (SSD) – Saturated Surface Dry? … ____

        Example: Relative Density (specific gravity) (SSD) = $S/(B + S - C)$

    c. Calculate Apparent Relative Density (apparent specific gravity)? ……………. ____

        Example: Apparent Relative Density (apparent specific gravity) = $A/(B + A - C)$

    d. Calculate % of Absorption

        Example: Absorption, % = $100\,[(S - A)/A]$

REPORTING / SECTION 11

    a. Report Relative Density to the nearest 0.01? …………………………………… ____
    b. Report Absorption to the nearest 0.1%? …………………………………… ____

COMMENTS

_____

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