Test Method for the Resistance of Unconfined CA to Freezing and Thawing
CSA A23.2-24A-14

APPARATUS / SECTION 6

1. Freezer:

   - Upright, chest or walk-in type? ..... ____
   - Maintains temperature of - 18° C ± 2.0°C? ..... ____
   - Fan for providing air circulation – maximum variation within 25 cm of top and bottom of the space does not to exceed 2.0°C? ..... ____
   - Thermometer or thermocouple to monitor freezer temperatures at 2 different points (minimum) within the freezer? ..... ____

2. Autoclavable Plastic Containers with air tight screw caps:

   - Capable of withstanding sustained temperatures of 110° C? ..... ____
   - 1 L containers for fractions coarser than 10.0 mm? ..... ____
   - 0.5 L containers for fractions P/10.0 mm – R/5.0? ..... ____

3. Sieves Conforming to the Requirements of CAN/CGSB-8.2:

   - 300 mm in Dia. / with square openings? ..... ____
   - Sizes: 40 mm, 28 mm, 20 mm, 14 mm, 10 mm and 5 mm? ..... ____

4. Thermometers:

   - Mercury or alcohol? ..... ____
   - Conforming to the requirements of ASTM E 1 with a range of -25°C to +30°C ____
   - Marked in 1° increments and readable to 0.5°C? ..... ____

5. Balance: Accurate to within 0.1 % of sample mass or 1 g. whichever is greater, over the range required for the test? ..... ____
6. Oven: Capable of maintaining a uniform temperature of 110 ± 5.0ºC ..... ____
7. Mesh Baskets (Plastic or Metal): to hold 4 - 500 mL autoclavable containers or 2 – 1 L and 1 500 mL containers? ..... ____

LABORATORY REFERENCE AGGREGATE / CLAUSE 7.2

1. Drain Brothers' Stoney Lake Quarry? ..... ____
2. Grading: As specified in Table 1 of CSA A23.2-24A? ..... ____
3. Performed in accordance with CSA A23.2-24A / Section 10?.... ..... ____

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SAMPLE / SECTION 9

1. Oven dried R/5 mm coarse aggregate? …… ____
2. Sieved into separate fraction using 40 mm, 28 mm, 20 mm, 14 mm, 10 mm and 5 mm sieves? …… ____
3. Weighed individual sieve fractions according to the following chart:

Passing - Retained	Minimum Mass
P/40 mm – R/28 mm	5000 g
P/28 mm – R/20 mm	2500 g
P/20 mm – R/14 mm	1250 g
P/14 mm – R/10 mm	1000 g
P/10 mm – R/5 mm	500 g

Note: Refer to Clause 9.2 for fractions constituting less than 5 % of the original policy.

PROCEDURE / SECTION 11

a. Placed each sample in appropriate size container? …….. ____
b. Completely immersed aggregate in containers with 3 per cent sodium chloride solution? ..... ____
c. Tighten lids on containers to prevent moisture loss and let stand for 24 h ± 2 h at room temperature? …… ____
d. Drained solution from each container by inverting over a sieve* (less than 5.0 mm) for approximately 5 s – immediately reseal? …… ____

*a lid fitted with about a 1 mm screen would be suitable for draining and washing purposes.

e. Placed containers inside basket on their side and separated with spacers to prevent contact between containers? …… ____
f. Baskets holding containers placed in freezer at -18°C ± 2.0°C for 16 h ± 2 h? …… ____
g. Baskets/containers removed from freezer and allowed to thaw at room temperature for approximately 8 h ± 1 h? …… ____
h. At the end of thawing cycle rotate each jar ¼ turn before returning to freezer? ….. ____
i. Samples to undergo 5 cycles of freezing and thawing? …… ____

Note: If any interruption to the sequence of freezing and thawing should occur, maintain samples in frozen condition until cycle can be resumed.

j. At the conclusion of the fifth cycle (thawing period), washed each container with tap water using the 1.18 mm lid fitted on each container to prevent loss of aggregate.? ____
k. Washed each container 5 times? …….. ____
l. Containers holding aggregate placed in oven and dried to a constant mass at 110° C ± 5.0° C? …… ____

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PROCEDURE / SECTION 11 (CONTINUED)

m. Each fraction placed on same sieve originally used during the preparation procedure and then shook for 3 min using the same sieve shaker? …….. ____

Note: To reduce variability of the weighted percentage loss between labs testing the same sample, the laboratory can follow a procedure referred to in Attachment A1 of A23.2-24A using the Control Sample.

n. Determine the mass retained on each sieve and record the mass? …… ____

CALCULATION / SECTION 12

1. Determine the % of mass loss on each sieve to the nearest 0.1 %? …….. ____

COMMENTS