PARTICLE SIZE DISTRIBUTION OF AGGREGATE IN A WET CONCRETE MIX

1 SCOPE

This method describes the procedure for the determination of the particle size distribution of aggregate in a wet, plastic concrete mix. It is usual for this test to be performed in conjunction with the normal slump test and cylinder casting (AS 1012.3.1 and AS 1012.8.1).

2 SAFETY

This method does not attempt to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this method to establish appropriate occupational health and safety practices that meet statutory regulations.

3 REFERENCED METHODS

Australian Standard

AS 1012.1  Methods of Testing Concrete: Sampling of Fresh Concrete.

AS 1012.3.1  Methods of Testing Concrete: Determination of Properties Related to the Consistency of Concrete – Slump Test.

AS 1012.8.1  Methods of Testing Concrete: Method for Making and Curing Concrete – Compression and Indirect Tensile Strength Test Specimens.

AS 1152  Specification for test sieves

Main Roads Western Australia

WA 210.1  Particle Size Distribution of Aggregate

4 APPARATUS

(a) Sampling apparatus complying with AS 1012.1.

(b) A container of suitable capacity with tight fitting lid to transport the wet concrete to the laboratory.

(c) Suitable watertight container.

(d) A scoop.

(e) Thermostatically controlled oven with good air ventilation capable of maintaining a temperature within the range of 105°C to 110°C.

(f) Sieves complying with AS 1152.

(g) A suitable tray.

5 PROCEDURE

(a) Obtain a test sample of concrete in accordance with Australian Standard AS 1012.1.

NOTE: After the slump test has been completed and the cylinders have been cast, the remainder of the composite sample as defined in AS 1012.1 may be used for this test.

(b) Transfer the sample into the container, add water to the sample and stir to delay concrete setting. Transport the sample to the laboratory as quickly as possible, in the sealed container.

NOTE: Addition of dissolved sugar-water solution or commercial retarding agent to the concrete mix helps to further delay the setting time.

(c) Pour the sample from the container into a suitable watertight container and add more water stirring vigorously.

(d) Using a scoop, place the concrete mix on a 4.75 mm test sieve and wash the fine aggregate and cement into a suitable container until the coarse aggregate is clean and free from cement and fine aggregate. Take precautions against losing any material.

NOTE: Light agitation of the sieve helps to wash the fine aggregate and cement into the container.

(e) Place the clean coarse aggregate retained on the 4.75 mm test sieve in a tray.

(f) Wash the contents of the container (the material passed through the 4.75 mm test sieve in Procedure 5 (d)) on a 0.150 mm test sieve. Take precautions against losing any material.

NOTE: Care should be taken not to overload the 0.150 mm test sieve.

(g) Repeat Procedure 5 (f) until the fine aggregate is clean and free from cement.

NOTES:

i. The presence of cement is clearly visible by its dark grey colour.

ii. If potable water is available, 5 (c) to 5 (f) can be carried out at the sample location. This is the preferred method as it prevents the concrete setting.
(h) Recombine the clean course and fine aggregate. Dry the combined mass in an oven at 105°C - 110°C to constant mass as required by Test Method WA 210.1.

(i) Using sample division obtain the minimum mass of the dried aggregate complying with Table 1 of Test Method WA 210.1.

(j) Perform the aggregate particle size distribution test in accordance with the Test Method WA 210.1.

NOTE: Only the following sieves are required for this test:

<table>
<thead>
<tr>
<th>TABLE 1 REQUIRED SIEVE SIZES.</th>
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<tbody>
<tr>
<td>Nominal maximum aggregate size</td>
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<tr>
<td>20 mm aggregate</td>
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<td>10 mm aggregate</td>
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NOTE: The amount of material retained on the 0.075 mm test sieve is considered to be insignificant for the purpose of this test.

6 CALCULATIONS
Perform necessary calculations in accordance with Test Method WA 210.1 for the determination of particle size distribution.

7 REPORTING
(a) Report the test results in accordance with Test Method WA 210.1. The results may also be included in graphical form.

8 ISSUING AUTHORITY

<table>
<thead>
<tr>
<th>Document Owner:</th>
<th>Delegated Custodian:</th>
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<tr>
<td>Manager Materials Engineering</td>
<td>Pavements Manager</td>
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9 REVISION STATUS RECORD

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<th>Page No.</th>
<th>Section</th>
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<td>All</td>
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<td>Complete Revision and Re-issue of Test Method</td>
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