AS 3974—1991

Australian Standard®

Evaluation of uniformity of cement strength from a single source

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Association of Consulting Engineers, Australia
AUSTROADS
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Cement and Concrete Association of Australia
Confederation of Australian Industry
Department of Administrative Services—Australian Construction Services
National Association of Testing Authorities, Australia
National Ready Mixed Concrete Association
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PREFACE

This Standard was prepared by the Standards Australia Committee on Cement.

This test method is designed to provide a 'standard' approach to the determination of the uniformity of cement strength from a single source over a period of time and hence to facilitate the provision and or exchange of this information between purchasers and suppliers.

It can be applied to hydraulic cement covered in AS 3972 but it does not necessarily purport to cover all aspects of this subject which may be required in contract documents.

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STANDARDS AUSTRALIA

Australian Standard

Evaluation of uniformity of cement strength from a single source

1 SCOPE This Standard sets down guidelines for sampling, testing, presentation of results, and evaluation in instances where the purchaser desires information on the uniformity of strength of a cement, produced at a single source, as determined by AS 2350.11.

This test method can be applied to hydraulic cement covered in AS 3972.

NOTE: It is intended that this method be used for the predominant cement manufactured at a cement plant, a grinding plant or a blending plant.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

2349 Method of sampling portland and blended cements

2350 Methods of testing portland and blended cements

2350.11 Method 11: Compressive strength of portland and blended cements

3972 Portland and blended cements

3 SAMPLING Sampling shall be in accordance with AS 2349 and carried out as follows:

(a) All sampling shall be performed under the technical control of quality control personnel.

(b) For shipments of up to 25 000 t per month, frequency of sampling shall be at least one test per 2 500 t. Samples shall be taken at a rate of at least 10 per month for shipments greater than 25 000 t per month.

(c) An individual sample as defined in AS 2349 shall be taken and a test sample of not less than 10 kg in mass prepared from this individual sample.

(d) When sampled at the place of manufacture, random samples shall be taken from the loading points of the bulk storage. Samples shall be identified in accordance with AS 2349.

Frequency of sampling from different loading points shall be related to the approximate volume of cement passing through those loading points. Statistical procedures shall be used to randomize sampling from particular loading points to ensure that the samples are selected by a random procedure.

(e) When sampled elsewhere, as from a delivery unit or silo, sampling shall be planned to provide representative portions drawn at statistically random intervals as appropriate.

4 TEST PROCEDURE For the cement being tested, the test procedure shall be as follows:

(a) Test all samples for strength in accordance with AS 2350.11. All tests used in a single evaluation shall be made in a single laboratory.

(b) A within-laboratory testing standard deviation shall be established over the full review period.

NOTE: Tests on a control cement sample are required to separate the effect of testing variations from the variations in the cement.

(c) The control sample is a sample of the cement type being tested. It shall consist of a sufficient quantity of cement which is carefully homogenized, apportioned and stored to avoid deterioration and to provide sufficient for testing over the proposed review period.

(d) Tests for the strength shall be carried out on the control sample. The number of tests on the control sample shall not be less than 10 spread evenly over the review period. Use the results from the control sample to estimate the laboratory testing variation for the cement tested in that laboratory during the same period of time.

(e) When it is necessary to introduce a new control sample, a new review period shall commence.

5 CALCULATION Results known to be in error due to error in the testing procedure or failure of equipment may be excluded from the calculations for average strength and standard deviations but shall be reported with reasons.

Calculations shall include the following:

(a) Average strength –

$$\bar{X} = \frac{X_1 + X_2 + \ldots + X_n}{n} \qquad \ldots 5(1)$$

where

$\bar{X}$ = average strength

$X_1, X_2 \ldots, X_n$ = values of strength on test samples

n = number of test samples