

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 1012.16—1996

Methods of testing concrete

Method 16: Determination of creep of concrete cylinders in compression

RECONFIRMATION NOTICE

Technical Committee BD-042 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 9 September 2014.

The following are represented on Technical Committee BD-042:

AUSTROADS

Australian Chamber of Commerce and Industry

Cement Concrete and Aggregates—Concrete

Concrete Institute of Australia

National Association of Testing Authorities Australia

The University of New South Wales

University of Technology Sydney

Victorian Construction Materials Laboratory

NOTES

Australian Standard®

Methods of testing concrete

Method 16: Determination of creep of concrete cylinders in compression

PREFACE

This Standard was prepared by the Standards Australia Committee BD/42 on Methods of Testing Concrete to supersede AS 1012.16—1974. This method is one of a series in metric units for testing of concrete applying to the sampling and testing of concrete. The objective of the revision is to extend the series and bring it into line with current practice.

METHOD

1 SCOPE This Standard describes the procedure for determining the creep of standard concrete test cylinders subjected to a sustained longitudinal compressive load. This method does not provide means for calculating time-dependent deflection of reinforced or prestressed concrete members.

NOTE: The conditions for curing and storage (see Clause 6) can be varied to suit different requirements, e.g. early pre-stress. The time of loading (see Clause 7) can also be varied to give an indication of other properties. These variations, however, will not comply with the requirements for a creep test as specified in this Standard.

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

AS

- | | |
|---------|---|
| 1012 | Methods of testing concrete |
| 1012.8 | Part 8: Method for making and curing concrete compression, indirect tensile and flexure test specimens, in the laboratory or in the field |
| 1012.9 | Part 9: Method for the determination of the compressive strength of concrete specimens |
| 1012.13 | Part 13: Determination of the drying shrinkage of concrete for samples prepared in the field or in the laboratory |

ASTM

- | | |
|-------|---|
| E 177 | Practice for Use of the Terms Precision and Bias in ASTM Test Methods |
|-------|---|

3 PRINCIPLE The creep of the concrete is obtained by determining the total combined creep and drying shrinkage of the loaded specimens and subtracting from this value the drying shrinkage of the unloaded specimens, all specimens being stored in the same environmental conditions. This Standard details the fixed environmental conditions to carry out the test, which allows a comparison of creep from one concrete to another, thus minimizing the effect of variable conditions on the results of concrete tests.

4 APPARATUS

4.1 Loading frame The loading frame shall be capable of applying and maintaining the required load on the specimen or group of specimens for the duration of the test. The means of maintaining the load may be either a spring or system of springs or alternatively, a hydraulic ram or capsule.

NOTES:

- 1 A schematic diagram of a loading frame operated by a hydraulic arrangement is given in Figure 1. A similar arrangement can also be used for a spring-loaded system in which the system of loading only will be different.
- 2 The arrangement shown in Figure 1 employs the vertical loading of specimens. Horizontal loading of specimens also is frequently employed.

Where the load maintaining system comprises a spring or a system of springs, initial compression shall be applied by means of a portable jack or testing machine. Where a system of springs is used for load maintenance, care should be taken in the selection of springs, which should be long and suitably matched for the purpose.

Means shall be provided for measuring the load to the nearest 2 percent of the total applied load. Suitable means of measuring the load is by—

- (a) a permanently installed hydraulic load cell with calibrated pressure gauge;
- (b) a calibrated hydraulic jack with pressure gauge; or
- (c) a calibrated load cell inserted in the frame at the time of loading or when the load is adjusted.

All end plates of the loading frame shall be sufficiently rigid to ensure uniform loading of the cylinders, and at one end of the specimen or group of specimens a suitable spherical seating device shall be provided between the specimens and the end plates. Bearing surfaces of any plates in contact with the loaded specimens shall not depart from a plane by more than 0.05 mm.

In any loading frame, a group of specimens may be stacked for simultaneous loading. In every case, whether one specimen or several specimens are to be tested, dummy blocks of concrete of the same cross-section as the specimens under test and having a height of not less than 25 percent of the height of the specimen shall be placed at each end between the specimen and the end plates.

4.2 Strain-measuring device The requirements for the strain-measuring device are as follows:

- (a) Suitable apparatus shall be provided for the measurement of longitudinal strain in each specimen to the nearest 10 microstrain. The apparatus may be attached or portable. In all cases reference gauge points shall be positively attached to the specimen. Gauges relying on friction contact shall not be used.
- (b) Deformations shall be measured on gauge lines spaced uniformly around the periphery of the specimen. The gauge reference points shall be evenly spaced at about the mid-height of the specimen. The number of gauge lines shall be not less than two for control specimens and not less than three for loaded specimens.
- (c) The effective gauge length shall be not less than three times the maximum aggregate size nor greater than—
 - (i) 260 mm for large specimens without end plates, and 160 mm for small specimens without end plates; and
 - (ii) 150 mm for large specimens having attached end plates, and 100 mm for small specimens having attached end plates.