

Australian Standard®

AS 1012.14:2018

Methods of testing concrete

Method 14: Method for securing and testing cores from hardened concrete for compressive strength and mass per unit volume

PREFACE

This Standard was prepared by the Standards Australia Committee BD-042, Methods of Testing Concrete, to supersede AS 1012.14—1991.

The objective of this Standard is to set out a method for the securing, preparing and testing of cylindrical core specimens (cores) from hardened concrete for the determination of compressive strength and mass per unit volume.

This Standard has been revised to match the curing conditions and the tests which have been rationalised in the recent revisions to other methods within the AS 1012 series including renumbering of methods which are referred to in this method.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

METHOD

1 SCOPE

This Standard sets out a method for the securing, preparing and testing of cylindrical core specimens (cores) from hardened concrete for the determination of compressive strength and mass per unit volume.

NOTE: Interpretation of test results in order to estimate the in-service strength of a structure or part thereof and factors influencing core strength are discussed in Appendix A.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1012	Methods of testing concrete
1012.9	Method 9: Compressive strength tests—Concrete, mortar and grout specimens
1012.12.1	Method 12.1: Determination of mass per unit volume of hardened concrete—Rapid measuring method
1012.12.2	Method 12.2: Determination of mass per unit volume of hardened concrete—Water displacement method
1379	Specification and supply of concrete

AS	
2758	Aggregates and rock for engineering purposes
2758.1	Part 1: Concrete aggregates
3600	Concrete structures
5100	Bridge design (series)

3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

3.1 Authority

A body or bodies having jurisdiction over the hardened concrete or concrete structure to be cored.

3.2 Designer

The person, persons or organization responsible for the design of the structure.

3.3 Location

A region of concrete that is being assessed and that for practical purposes is assumed to be of uniform quality.

3.4 Standard temperature zones

Australia is divided into two zones, as follows:

- (a) The Standard Temperate Zone, which includes Australian Capital Territory, New South Wales, South Australia, Tasmania, Victoria and that portion of Western Australia, south of latitude 25°S.
- (b) The Standard Tropical Zone, which includes Northern Territory, Queensland and that portion of Western Australia, north of latitude 25°S.

4 PRINCIPLE

Cores shall be secured from the hardened concrete by using a core drill, then trimmed, pre-conditioned and tested for mass per unit volume in accordance with AS 1012.12.1 or AS 1012.12.2 and for compressive strength in accordance with AS 1012.9.

5 APPARATUS

The following apparatus is required:

- (a) A core drill with the facility to apply water to the cutting edge.
- (b) A masonry or diamond saw for trimming the cores.
- (c) Devices such as vernier calipers or rulers readable to 1 mm for measuring the core length and the location of any embedded reinforcement or other anomalies in the core.
- (d) Devices such as vernier calipers readable to 0.2 mm for measuring core diameter.
- (e) Facilities for conditioning in water at a temperature of $23 \pm 5^{\circ}\text{C}$ for three days in the standard temperate zone or $27 \pm 5^{\circ}\text{C}$ in the standard tropical zone, such as a water bath.
- (f) Facilities for conditioning in air at a temperature of $23 \pm 5^{\circ}\text{C}$ at a relative humidity of $50 \pm 10\%$ for seven days immediately before testing.
- (g) Facilities for capping and testing core for compressive strength and mass per unit volume.

6 PROCEDURE

6.1 General

The procedure for securing, preparing and testing the cores is as follows:

- (a) Secure the cores from the hardened concrete (see Clause 6.2).
- (b) Prepare the cores for testing by trimming and conditioning (see Clause 6.3).
- (c) Check the cores for rejection (see Clause 6.4).
- (d) Test the cores for compressive strength and mass per unit volume (see Clause 6.5).

6.2 Securing the cores

6.2.1 General

The aim is to secure representative and undamaged cores free from embedded reinforcement and/or other objects with a ratio of length/diameter after trimming of approximately 2:1 and surfaces that are smooth, cylindrical and free from steps, ridges and grooves.

The diameter of cores shall be not less than the greater of 75 mm or three times the nominal size of coarse aggregate in the concrete as detailed in AS 2758.1.

Cores shall not be secured until the concrete is sufficiently strong to permit their removal without damage to the core that would render the cores unsuitable for testing (see Clause 6.4).

Wherever possible, cores shall be drilled perpendicular to the surface of the concrete. Cores should preferably be taken at points not near to formed joints, edges of a concrete element or other areas which may reduce the representative nature of the core.

NOTE: Appendix B provides guidelines on securing cores.

6.2.2 Procedure

The procedure for securing the cores shall be as follows:

- (a) Take the cores from a location and at a time as specified by the authority or designer where possible avoiding the reinforcement. Whenever possible locate the reinforcement with a calibrated cover meter, ground penetrating radar or other suitable device and where available referencing to as-built drawings.
- (b) Secure the cores by carefully and slowly penetrating the core drill into the concrete so that the concrete will not be weakened by shock or by heating. Apply water to the cutting edge during the drilling process.
- (c) Unless otherwise specified, drill further than the desired core length to ensure an adequate core length is secured for testing.
- (d) Record the location and direction of coring for each core secured.
- (e) Label each core, after extraction, with the location, top or outer surface end and unique identification.
- (f) Handle and transport the cores carefully to avoid damage.

6.3 Preparation of cores

6.3.1 Preparation

Cores shall be accepted for testing if they have been secured in accordance with Clause 6.2 and appear to be free from defects likely to affect their strength. The cores should be examined for—

- (a) visible damage;