## Australian Standard®

### Methods of testing concrete

# Method 2: Preparing concrete mixes in the laboratory

1

#### 1 SCOPE

This Standard sets out a method for the preparation of concrete mixes in the laboratory.

#### **2 REFERENCED DOCUMENTS**

The following documents are referred to in this Standard:

AS		
1012	Methods of t	esting concrete
1012.1	Method 1:	Method for sampling fresh concrete
1012.3.1	Method 3.1:	Methods for the determination of properties related to the
		consistency of concrete—Slump test
1012.3.2	Method 3.2:	Methods for the determination of properties related to the
		consistency of concrete—Compacting factor test
1012.3.3	Method 3.3:	Methods for the determination of properties related to the
		consistency of concrete—Vebe test
1012.3.4	Method 3.4:	Methods for the determination of properties related to the
		consistency of concrete—Compactibility index
1012.4.1	Method 4.1:	Determination of air content of freshly mixed concrete—
		Measuring reduction in concrete volume with increased air pressure
1012.4.2	Method 4.2:	Determination of air content of freshly mixed concrete—
1010 4 0		Measuring reduction in air pressure in chamber above concrete
1012.4.3	Method 4.3:	Determination of air content of freshly mixed concrete—
1010 5		Measuring air volume when concrete dispersed in water
1012.5	Method 5:	Method for determination of mass per unit volume of freshly mixed
1012 (	Matha 1 C	concrete
1012.0	Method 6:	Method for the determination of bleeding of concrete
1012.8.1	Method 8.1:	tensile test specimens
1012.8.2	Method 8.2:	Method for making and curing concrete—Flexure test specimens
1012.13	Method 13:	Determination of the drying shrinkage of concrete for samples
		prepared in the field or in the laboratory
1012.16	Method 16:	Method for the determination of creep of concrete cylinders in
		compression (metric units)
1012.17	Method 17:	Methods for the determination of the static chord modulus of
		elasticity and Poisson's ratio of concrete specimens
1012.18	Method 18:	Method for the determination of setting time of fresh concrete,
		mortar and grout by penetration resistance (metric units)
1141	Methods for	sampling and testing aggregates
1141.3.1	Method 3.1:	Sampling of aggregates



AS			
1141.5	Method 5: Particle density and water absorption of fine aggregate		
1141.6.1	Method 6.1: Particle density and water absorption of coarse aggregate – Weighing-in-water method		
1141.6.2	Method 6.2: Particle density and water absorption of coarse aggregate— Pycnometer method		
1478	Chemical admixtures for concrete		
2758 2758.1	Aggregates and rock for engineering purposes Part 1: Concrete aggregates		
3582 3582.1 3582.2 3582.3	<ul> <li>Supplementary cementitious materials for use with portland cement</li> <li>Part 1: Fly ash</li> <li>Part 2: Slag—Ground granulated iron blast-furnace</li> <li>Part 3: Silica fume</li> </ul>		
3972	Portland and blended cements		

#### **3 DEFINITIONS**

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

#### 3.1 Absorption

As follows:

- (a) *Fine aggregates*—in accordance with the requirements for particle density and water absorption of fine aggregate of AS 1141.5.
- (b) *Coarse aggregates*—in accordance with the requirements for particle density and water absorption of coarse aggregate of AS 1141.6.1 or AS 1141.6.2.

#### 3.2 Cement

A hydraulic binder composed of portland or blended cement used alone or combined with one or more supplementary cementitious materials.

#### 3.3 Supplementary cementitious material (SCM)

Material as defined in the relevant Part of the AS 3582 series.

#### 3.4 Self compacting concrete (SCC)

Self compacting concrete (SCC) is concrete that is able to flow and consolidate under its own weight, completely fill the formwork or bore hole even in the presence of dense reinforcement, whilst maintaining homogeneity and without the need for additional compaction. SCC is also known as 'self-consolidating concrete' or 'super-workable concrete'.

#### 4 APPARATUS

A motor-driven mixer shall be used which complies with the requirements for mixing efficiency as specified in Appendix A. The maximum and minimum size of the batch for a specific mixer shall be established by this test. The size of all subsequent test mixes shall fall within this range.

A mixer uniformity test shall be carried out on the mixer in accordance with Appendix A and—

- (a) when the mixer is installed;
- (b) after every 750 mixes or after 5 years elapses whichever occurs first;
- (c) whenever the mixing mechanism is repaired; and

(d) whenever there is an apparent lack of mixing identified.

NOTE: A mixer efficiency test using an intense coloured pigment followed by a 'streak test' as with paint mixing could indicate inadequate mixing.

#### 5 BATCH MASSES

The concrete mix shall be based upon a set of predetermined batch masses calculated for saturated surface dry (SSD) aggregates. The aggregate may be used in the mix in any moisture condition, provided that the batch masses are adjusted accordingly.

NOTE: The preferred condition is SSD or slightly above, but not free draining. Aggregate which is too dry may cause loss of slump.

#### 6 STORAGE OF SAMPLES

On arrival at the laboratory, samples of aggregate shall be stored in such a manner that their properties, such as gradation and volume stability, remain unchanged. Samples of cement shall be stored in a dry place in airtight containers.

Each container shall be as full as possible. Admixtures shall be stored in accordance with the manufacturer's recommendations and in any case for not longer than 12 months.

#### 7 REPRESENTATIVE SAMPLES

#### 7.1 General

Where the volume of the sample is substantially greater than that required for the mix, representative subsamples of that material need to be obtained. These subsamples shall be either prepared prior to delivery to the laboratory, or obtained in the laboratory from samples which have been provided for this purpose.

#### 7.2 Aggregates

Representative subsamples shall be obtained from each aggregate required for the mix except that, if separate size fractions are required for special purposes (e.g. if unusual gradings are being studied), relevant aggregates shall be separated into appropriate different size fractions which shall be then treated as separate materials. If the samples of coarse aggregate are graded, every care shall be taken to avoid segregation of different sizes, and to obtain a truly representative subsample for the concrete batch.

The representative subsample of fine aggregate shall be obtained so as to avoid segregation or loss of different size fractions, e.g. fines.

NOTE: Guidance on obtaining representative subsamples of aggregate may be obtained from AS 1141.3.1.

#### 7.3 Cement and supplementary cementitious material

A representative subsample of the cement (see Clause 3.2) and when required of supplementary cementitious material (see Clause 3.3) needed for the mix shall be obtained.

#### 7.4 Water

Where the quality of mixing water proposed for use is to be assessed, a representative sample shall be obtained and used as the mixing water, and, where applicable, for any pre-wetting of the aggregates, otherwise potable water shall be used.

#### 7.5 Admixtures

Where applicable, admixtures shall be representative of current production.

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