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# SANS 5861-1:2006

Edition 2.1

Any reference to SABS SM 861-1 is deemed  
to be a reference to this standard  
(Government Notice No. 1373 of 8 November 2002)

## SOUTH AFRICAN NATIONAL STANDARD

### Concrete tests

### Part 1: Mixing fresh concrete in the laboratory

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**Table of changes**

<b>Change No.</b>	<b>Date</b>	<b>Scope</b>
Amdt 1	2006	Amended to change the designation of SABS standards to SANS standards, with no technical changes.

**Foreword**

This South African standard was approved by National Committee SABS SC 59A, *Construction standards – Cement, lime and concrete*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This edition is technically identical to the first revision (SABS SM 861-2:1994).

SANS 5861 consists of the following parts, under the general title, *Concrete tests*:

*Part 1: Mixing fresh concrete in the laboratory.*

*Part 2: Sampling of freshly mixed concrete.*

*Part 3: Making and curing of test specimens.*

<p><b>Reaffirmed and reprinted in March 2012. This standard will be reviewed every five years and be reaffirmed, amended, revised or withdrawn.</b></p>
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## **Concrete tests**

### **Part 1:**

## **Mixing fresh concrete in the laboratory**

### **1 Scope**

This part of SANS 5861 describes basic methods of batching prepared materials and mixing fresh concrete in the laboratory where accurate control of the quantities of materials and of test conditions is possible. The procedures are appropriate when the suitability of materials is being assessed or suitable mix proportions for concrete for general use on site are being determined.

### **2 Normative reference**

The following standard contains provisions which, through reference in this text, constitute provisions of this part of SANS 5861. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this part of SANS 5861 are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on currently valid national and international standards can be obtained from Standards South Africa.

SANS 195, *Sampling of aggregates*.

### **3 Apparatus**

**3.1 Laboratory concrete mixer**, of sufficient capacity to thoroughly mix batches that are large enough to provide samples for all the tests to be carried out.

**3.2 Shovel**, suitable for the hand-mixing of concrete.

### **4 Batching**

**4.1** Use aggregate (sampled in accordance with SANS 195) that has been oven-dried or air-dried, cement that has been thoroughly mixed (avoiding the intrusion of foreign matter) and potable water. Where possible, all materials used should be at a temperature of 22 °C to 25 °C before mixing; alternatively, record the ambient temperature and the material temperature at the time of mixing. The aggregate for each batch of concrete may be added either in separate size fractions or with an all-in grading.

**4.2** Proportion the material by mass to an accuracy of 0,5 % or better. Make allowance for an excess yield of concrete of 10 %.

**4.3** Ensure that any chemical admixtures and non-cementitious additives (such as fibres) are added to the mix at a quantity and time as specified by the manufacturer.

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### **5 Mixing**

#### **5.1 General**

Mix the concrete by hand (see 5.2) or, preferably, in a laboratory mixer (see 5.3), in such a manner as to avoid loss of water or other materials. Where possible, mix the concrete in a laboratory that has an ambient temperature in the range 22 °C to 25 °C. Alternatively, record the ambient temperature.

**NOTE** The procedures described are of a basic nature and are given as guidelines. The conditions of mixing can affect the results of tests carried out on the concrete, depending on factors such as the type of mixer used, the consistence of the mix, the type of aggregate, etc. The most important considerations during and after mixing are homogeneity of the mix and prevention of loss of materials. When preparing concrete that is to have a given property, such as workability or air content, it may be necessary to prepare and test trial mixes of varying composition to establish the required mix quantities. If tests are carried out for comparative purposes, e.g. interlaboratory experiments, care should be taken to keep constant all factors that could influence the test results. Admixtures should be used as prescribed by the manufacturers.

#### **5.2 Hand-mixing**

Mix each batch of concrete with a shovel on a clean, watertight, non-absorbent platform that has been wiped with a damp cloth prior to the mixing. Proceed as follows:

- a) Mix the dry cement and fine aggregate or all-in aggregate until the mixture is thoroughly blended and uniform in colour, and avoid any loss of fines during mixing.
- b) If the aggregate is separated into fine and coarse fractions, first mix the cement and fine aggregate and then add the coarse aggregate and mix thoroughly until the coarse aggregate is uniformly distributed in the mixture.
- c) Add the water slowly and mix the entire batch until it appears to be homogeneous and of uniform consistence.

#### **5.3 Machine-mixing**

Before using the mixer, clean and dry it and then wipe it with a damp cloth. The blades of the mixer should not be unduly worn and should be correctly adjusted. Proceed as follows:

**NOTE** If no sequence is prescribed by the manufacturer of the mixer, follow steps (a) to (c).

- a) If all-in aggregate is used, load the mixer with approximately half of the aggregate, then with cement and finally with the remainder of the aggregate in such a way as to prevent loss of material. If the fine and coarse fractions are separate, load with approximately half of the coarse aggregate, then with the cement, then with the fine aggregate, then with the rest of the coarse aggregate, and always in such a way as to prevent loss of material. Mix the dry materials for not longer than 30 s and finally add the water slowly.
- b) Continue the mixing until the concrete is uniform in appearance, but in any case for a period of not less than 2 min and not more than 3 min after all the materials were loaded in the mixer.
- c) After machine mixing, rework the concrete with a trowel to ensure that any mortar or fine material sticking to the drum is worked into the concrete mass. In the case of large quantities, empty the mixer and remove all material that sticks to the drum or pan, add it to the concrete mass and rework the whole thoroughly with a shovel.

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South African National Standards are updated by amendment or revision. Users of South African National Standards should ensure that they possess the latest amendments or editions.

The SABS continuously strives to improve the quality of its products and services and would therefore be grateful if anyone finding an inaccuracy or ambiguity while using this standard would inform the secretary of the technical committee responsible, the identity of which can be found in the foreword.

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