
Testing of concrete —
Part 2:
Properties of fresh concrete

Essais du béton —

Partie 2: Caractéristiques du béton frais



Reference number
ISO 1920-2:2016(E)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Determination of consistence	2
4.1 General	2
4.2 Sampling	2
4.3 Slump test	2
4.3.1 Principle	2
4.3.2 Apparatus	2
4.3.3 Procedure	3
4.3.4 Test result	4
4.3.5 Test report	5
4.4 Vebe test	5
4.4.1 Principle	5
4.4.2 Apparatus	5
4.4.3 Procedure	8
4.4.4 Test result	8
4.4.5 Test report	9
4.5 Degree of compactability test	9
4.5.1 Principle	9
4.5.2 Apparatus	9
4.5.3 Procedure	10
4.5.4 Test results	11
4.5.5 Test report	11
4.6 Flow-table test	12
4.6.1 Principle	12
4.6.2 Apparatus	12
4.6.3 Procedure	14
4.6.4 Test results	15
4.6.5 Test report	15
4.7 Slump-flow test	16
4.7.1 General	16
4.7.2 Principle	16
4.7.3 Apparatus	16
4.7.4 Procedure	17
4.7.5 Test report	18
5 Determination of fresh density	19
5.1 Principle	19
5.2 Apparatus	19
5.3 Sampling	20
5.4 Procedure	20
5.4.1 Mass of the container	20
5.4.2 Filling the container	20
5.4.3 Compacting the concrete	20
5.4.4 Surface levelling	21
5.4.5 Determining the mass and volume of the container	21
5.5 Test result	21
5.6 Test report	21
6 Determination of air content	22
6.1 General	22

6.2	Sampling.....	22
6.3	Filling the container and compacting the concrete.....	22
6.3.1	Means of compaction.....	22
6.3.2	Filling the container.....	22
6.3.3	Compacting the concrete.....	23
6.4	Pressure-gauge method.....	23
6.4.1	Principle.....	23
6.4.2	Apparatus.....	23
6.4.3	Filling the container and compacting the concrete.....	25
6.4.4	Procedure.....	25
6.5	Water-column method.....	25
6.5.1	Principle.....	25
6.5.2	Apparatus.....	25
6.5.3	Filling the container and compacting the concrete.....	27
6.5.4	Procedure.....	27
6.6	Calculations and expression of results.....	28
6.6.1	Air content of the sample tested.....	28
6.6.2	Air content of the mortar fraction.....	28
6.7	Test report.....	28
7	Test report.....	29
Annex A	(informative) Precision — Data for the density measurements.....	30
Annex B	(normative) Calibration of the container for the density test.....	31
Annex C	(informative) Additional calculations for the density test.....	32
Annex D	(informative) Precision — Water-column method.....	33
Annex E	(normative) Calibration of apparatus — Pressure-gauge method.....	34
Annex F	(normative) Calibration of apparatus — Water-column method.....	36
Annex G	(normative) Aggregate corrector factor — Pressure-gauge method.....	39
Annex H	(normative) Aggregate correction factor — Water-column method.....	41
Annex I	(informative) Examples of test reports and worksheets.....	43
Bibliography	57

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 1, *Test methods for concrete*.

This second edition cancels and replaces the first edition (ISO 1920-2:2005), which has been technically revised with the following changes:

- a) 4.3.5, list a) has been updated;
- b) 4.7.3.3, the required minimum dimensions 800 mm × 800 mm have been added;
- c) Figure 11, footnote ^a was added;
- d) 6.4.4, Note was added;
- e) Bibliography list has been updated.

A list of all parts in the ISO 1920 series can be found on the ISO website.

Introduction

International Standards are widely adopted at the regional or national level and applied by manufacturers, trade organizations, purchasers, consumers, testing laboratories, authorities and other interested parties. Since these documents generally reflect the best experience of industry, researchers, consumers and regulators worldwide and cover common needs in a variety of countries, they constitute one of the important bases for the removal of technical barriers to trade. However, full adoption may not be practicable in all cases for reasons, such as regional or national security, protection of human health or safety, or protection of the environment, or because of fundamental climatic, geographical or technological problems. As a consequence, the corresponding technical deviations to ISO standards are permitted where required by national or regional legislation or industry convention when adopting an International Standard.

Where such national deviations are required, it is important that they are clearly identified and the reasons for the deviations stated. Depending on the method of adoption of the International Standard, the deviations will be noted in the national introduction, in the preface or foreword (for small numbers) or as a national annex (for large numbers). See ISO/IEC Guide 21-1 for more information.

ISO/TC 71/SC 1 has identified those items in this document that may be the subject of national or regional deviations. The items are indicated in the text by the phrase "...except where the national annex to this document requires...".

Testing of concrete —

Part 2: Properties of fresh concrete

Caution — When cement is mixed with water, alkali is released. When sampling, prevent skin contact with wet cement or concrete by wearing suitable protective clothing (gloves, footwear, safety glasses). If wet cement or concrete enters the eye, immediately wash it out thoroughly with clean water and seek medical treatment without delay. Wash wet concrete off the skin immediately.

Caution — The use of vibrating equipment, such as vibration tables, can cause damage to joints and loss of sensation due to nerve damage. Moulds, density containers, etc. should be clamped to the table and not held in position using one's hands while they are being vibrated.

1 Scope

This document specifies procedures for testing fresh concrete. It specifies the following test methods: determination of consistence (slump test, Vebe test, degree of compactability, flow-table test for high-fluidity concrete, and the slump-flow test), determination of fresh density and determination of air content by the pressure-gauge method and by the water-column method.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 1920-1, *Testing of concrete — Part 1: Sampling of fresh concrete*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

fresh density

mass of a quantity of fully compacted fresh concrete divided by its volume

Note 1 to entry: The fresh density is expressed in kilograms per cubic metre.