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Mortar for masonry — Test methods —

**Part 2: Bulk sampling of mortars and
preparation of test mortars**

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Reference number

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 211-2 was prepared by Technical Committee RSB/TC 009, *Civil engineering and building materials*.

In the preparation of this standard, reference was made to the following standards:

- 1) BS EN 998-1, *Specification for mortar for masonry – Part 1: Rendering and plastering mortar with inorganic binding agents*
- 2) BS EN 998-2, *Specification for mortar for masonry – Part 2: Masonry mortar*
- 3) BS EN 1015-2, *Methods of test for mortar for masonry – Part 2: Bulk sampling of mortars and preparation of test mortars*

The assistance derived from the above source is hereby acknowledged with thanks.

DRS 211 consists of the following parts, under the general title *Mortar for masonry — Test methods*:

- *Part 1: Determination of particle size distribution (by sieve analysis)*
- *Part 2: Bulk sampling of mortars and preparation of test mortars*
- *Part 3: Determination of consistence of fresh mortar (by flow table)*
- *Part 4: Determination of consistence of fresh mortar (by plunger penetration)*
- *Part 5: Determination of flexural and compressive strength of hardened mortar*
- *Part 6: Determination of adhesive strength of hardened rendering and plastering mortars on substrates*
- *Part 7: Determination of water absorption coefficient due to capillary action of hardened mortar*

Committee membership

The following organizations were represented on the Technical Committee on *Civil engineering and building materials* (RSB/TC 009) in the preparation of this standard.

CIMERWA

Enabel

EGC Ltd

GECO Africa

Mass Design Group

Rwanda Housing Authority (RHA)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

Standard Geotechnical Engineering and Construction Ltd (STAGECO Ltd)

SJEC Ltd

University of Rwanda/College of Science and Technology (UR-CST)

Rwanda Standards Board (RSB) – Secretariat

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Mortar for masonry — Test methods — Part 2: Bulk sampling of mortars and preparation of test mortars

1 Scope

This Draft Rwanda Standard provides methods for taking a bulk sample of fresh mortar, and the preparation of a bulk test sample from this.

It also provides a procedure for producing test mortars from dry constituents and water.

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.

RS EAS 148-1, *Cement – Test methods – Part 1: Determination of strength*

RS 211-3, *Mortar for masonry – Methods of test – Part 4: Determination of consistence of fresh mortar (by flow table)*

3 Terms and definitions

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

3.1

lot

quantity of mortar produced under conditions presumed uniform. After specified tests this quantity is regarded as a whole “conforming” or “not conforming” to the specifications

3.2

increment

quantity of mortar taken in a single operation of the sampling equipment used

3.3

bulk sample

aggregation of sample increments meant to represent the lot sampled

3.4

bulk test sample

reduced sample taken from the bulk sample which is used for the testing purposes of this standard

4 Minimum bulk test sample size

The minimum bulk test sample size shall be 10 kg.

5 Preparation of the bulk test sample and individual test samples

5.1 Apparatus

5.1.1 Metal or rigid plastics receptacle or scoop of not less than 1 L capacity.

5.1.2 Clean, dry containers with close-fitting lids.

5.1.3 Trowel or palette knife.

5.1.4 Flat shovel.

5.2 Procedure

5.2.1 Procedure

5.2.1.1 Obtain the bulk sample by taking uniformly distributed increments (preferably from material in motion, provided this can be carried out in safety), and mix thoroughly.

5.2.1.2 Reduce the bulk sample in accordance with 5.3 to obtain the bulk test sample.

5.2.2 Sampling from batch mixers

Sample the mortar at the discharge point of a batch from the mixer. Take not less than three increments spaced evenly through the batch at the discharge point of the mixer. Take increments by passing the receptacle across the stream of mortar in such a manner as to collect a representative sample of mortar.

5.2.3 Sampling from conveyors or pipelines

5.2.3.1 Sample the mortar at the discharge point of the conveyor or pipeline. Pass the receptacle across the stream of mortar, if possible, so as to cross the whole of the stream until it is filled. If it is not possible to catch the whole stream at once, pass the receptacle through the stream at a uniform rate so that consecutive increments are taken from different parts of the stream. Where it is not possible to sample at the discharge point of the conveyor, stop the conveyor and use the scoop (see 5.1.1) to take increments from the full width and thickness of the stream of mortar on the conveyor.

5.2.3.2 Take not less than three increments at regularly spaced time intervals during the passage of the whole of the quantity of the mortar that is being sampled.

5.2.4 Sampling from large hoppers, beans, or heaps being moved

Sample the mortar when hoppers or bins, are being filled or emptied or when heaps are being moved, in accordance with 5.2.3.

5.2.5 Sampling from small hoppers, bins, static heaps, or bags

Sample the mortar by means of the scoop. Take increments from material not less than 100 mm below the surface in at least three different places, distributed in a regular manner throughout the mass, so as to ensure, when mixed, a thoroughly representative combined sample.

5.2.6 Bulk transport vehicles

Sample the contents of bulk transport containers either during filling or emptying in accordance with 5.2.3 or, when this is not practical, by taking increments in accordance with 5.2.5.

5.3 Reduction of the bulk sample

Immediately after collecting, using a flat shovel (see 5.1.4) combine and thoroughly mix the increments, taken in accordance with any of the methods described, on a flat, impervious rigid surface. Care should be taken when lightweight or fibrous components are present in order to avoid segregation. Complete the mixing within 5 min of placing the increments upon the surface. Reduce the bulk sample to produce a bulk test sample of not less than 10 kg by taking sufficient scoops from random positions throughout the mixed material. Place the bulk test sample in one or more containers (see 5.1.2) with close-fitting lids. The sampling operation shall not take longer than 3 min.

5.4 Packing and certificate of sampling

5.4.1 Each bulk test sample to be dispatched to a laboratory in the containers shall be suitably labelled so that its origin can be identified at the laboratory. The bulk test sample shall be accompanied by a certificate from the person responsible for taking the samples stating that sampling was carried out in accordance with the requirements of this Rwanda Standard.

5.4.2 This certificate shall include the following information:

- a) the name and address of the body responsible for sampling;
- b) the name and address of the customers;
- c) the place, date and time and method of producing the bulk test sample;
- d) identification of the mortar sample, including type, origin and designation by reference to the relevant Standard.
- e) the quantity of the lot, or the period of production represented by the bulk sample;
- f) the number of increments and the mass of the original bulk sample;

- g) age of mortar when sampled;
- h) identification mark on sample container; and
- i) remarks.

5.4.3 In addition it is recommended that the following be added, if known: mixing procedure, i.e. mixer type and length of mixing period.

5.5 Laboratory examination of bulk test samples

5.5.1 Each bulk test sample received at the laboratory for test shall be examined visually to ascertain whether setting, leakage, or evaporation has occurred. If so, the bulk test sample shall be rejected for further tests, other than sieve analysis (assuming the sample has not hardened). If none of the above factors is apparent, the whole of the sample, with any liquid that has separated, or has condensed on the inside of the container, shall be removed completely and mixed without loss of water to render it homogeneous.

5.5.2 Where practicable, the temperature of the bulk test sample shall be adjusted to $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, without loss of water. In all cases the temperature of the sample at the time of test shall be recorded.

5.6 Time of testing

5.6.1 Bulk test samples dispatched to a laboratory for testing shall be tested immediately after arrival at the laboratory, and within the specified workable life of the mortar.

5.6.2 Test ready to use mortars (plant -made wet mortars which are retarded), and pre-batched airlime/sand wet mortars when not gauged with hydraulic binders, within their specified workable life.

6 Preparation of test mortars from dry constituents and water or pre-batched mixes and binders

6.1 Amount of mortar for test samples

The solid content of a prepared mortar mix, or the volume of the fresh mortar mix, shall be within the range given in Table 1.

Table 1 – Solid content and volume of the mortar mix

Fresh mortar mix	Mixer according to RS EAS 148-1	Pan mixer
Solid content (kg)	1.8 - 3.0	30 - 50
Volume (dm ³)	0.5 - 2.5	25 - 75

6.2 Mixing the mortar

6.2.1 General

6.2.1.1 Fresh mortar used for the purpose of testing and preparing specimens for tests shall, as far as possible, have the consistence appropriate for its use. Unless otherwise specified, bring the fresh mortar sample to a defined flow value as specified in Table 2, and determined in accordance with RS 211-3 the water determined by the use of trial mixes.

Table 2 – Defined flow value for various types of mortar related to the bulk density of fresh mortar

Bulk density of fresh mortar kg/m ³	Flow value mm
> 1200	175 + 10
> 600 - < 1200	160 + 10
> 300 - < 600	140 + 10
< 300	120 + 10

6.2.1.2 Carry out mixing according to the mortar manufacturer's instructions. If such instructions are not manufacturer's instructions or if they are not available, follow the mixing procedure described in 6.2.2 or 6.2.3. Mix with the amount of water expected to give a mortar with the intended consistence.

6.2.1.3 Measure the length of the mixing period from the moment all consistence.

6.2.1.4 Measure the length of the mixing period from the moment all constituents are introduced into the mixer.

6.2.1.5 Record any deviation from the mixing procedure prescribed.

6.2.2 Mixer

6.2.2.1 After the predetermined amount of water has been introduced into the mixer, add the solid content of the dry mortar mix, as given in Table 1, over a period of 30 s with the mixer running at low speed.

6.2.2.2 For lightweight mortars correspondingly reduce the amount and take from a vessel as an average sample. Then complete mixing at the same speed for a further 60 s unless otherwise specified by the manufacturer.

NOTE Some admixtures may not be activated within the specified time and particular attention should be paid to the manufacturer's instructions.

6.2.2.3 Follow the same procedure also for plant-made mortars to which only water is to be added.

6.2.2.4 For pre-batched mortars to which binders are also to be added, mix the additional proportion of binder into the water over a period of 15 s before adding the pre-batched constituents and with the mixer running at low speed. Then follow the same procedure as described above to complete mixing.

6.2.3 Pan mixer

Carry out the mixing process in the same way as described in 6.2.2, the solid content of the dry mortar mix, as given in Table 1, being added over a period of 15 s with the mixer running. Then complete the process by mixing for a further 120 s - 180 s, the latter preferred for lightweight mortars and for high lime-based mortars.

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