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STANDARD

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Aggregates — Test methods —

Part 6:

**Methods for determination of shell content
in course aggregates**



Reference number

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Foreword

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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 gazetted as Rwanda Standards.

RS 96-6 was prepared by Technical Committee RSB/TC 009, *Building and Civil Engineering*. In the preparation of this standard, reference was made to the following standard :

KS 1238-7:2003 Methods of testing aggregates Part 7: Method for determination of shell content in coarse aggregates

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

This second edition cancels and replaces the first edition (RS 96-6: 2006), which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on Building Materials and Civil Engineering (RSB/TC 009) in the preparation of this standard.

Rwanda Housing Authority

National University of Rwanda/College of Science and Technology

S.I Consulting Company Ltd

IPRC Kigali

Ruliba Clays Ltd

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Standards for sustainability

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Aggregate — Test methods — Part 6: Methods for determination of shell content in course aggregate

1 Scope

This DRS 96-6 describes the method for the determination of the shell content of coarse aggregate.

2 Normative references

The following referenced documents are indispensable for the application 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 ISO 3310 Specification for test sieves.

RS 96-2, Methods of test for aggregates –Part 2: Guide to sampling and testing aggregates.

RS 96-3, Methods of test for aggregates – Part 3: Methods for sampling.

RS 96-4, Methods of test for aggregates – Part 4: Methods for determination of particle size distribution.

3 Terms and definitions

For the purposes of this part 6 of RS 96, the terms and definitions given in RS 96, part 2 and Part 3 apply.

4 Sampling

The sample used for the test (the laboratory sample) shall be taken in accordance with the procedure described in RS 96-3, Clause 6.

5 Apparatus

5.1 A Sample divider, of size appropriate to the maximum particle size to be handled or alternatively a flat shovel and clean, flat, hard horizontal surface, e.g. a metal tray for use in quartering.

NOTE A suitable divider is the riffle box illustrated in RS 96-3.

5.2 A ventilated oven, thermostatically controlled to maintain a temperature of 105 ± 5 °C

5.3 A balance, of suitable capacity accurate to 0.1 % of the mass of the test portion.

NOTE In general two balances, one of approximately 5 kg capacity accurate to 1 g and the other of approximately 500 g capacity accurate to 0.1 g, will suffice. If aggregate of larger than 28 mm nominal size is to be tested a balance of 50 kg capacity accurate to 10 g will also be required.

5.4 Test sieves, of aperture sizes as given in columns 1 and 2 of table 1, and that comply with the requirements of RS ISO 3310-1 or RS ISO 3310-2.

5.5 A mechanical sieve shaker, (optional).

5.6 Trays, of suitable size, which can be heated in the ventilated oven (see 5.2) without damage or change in mass.

5.7 A metal thickness gauge, of any suitable form, of nominal thickness 1.6 mm, and that has at least one slot for each fraction to be tested. The slots are rectangular and their dimensions conform to the relevant values given in columns 3 and 4 of table 1.

5.8 Test sieves, complying with RS ISO 3310-1 or RS ISO 3310-2 and with aperture sizes of 10.0 mm and 5.0 mm, and with the appropriate sizes of lids and receivers.

6 Preparation of test portion

Reduce the sample by the procedures described in Clause 7 of RS 96- 3 to produce a test portion that complies with Table 1 with due allowance for the later rejection of particles passing a 5.0 mm test sieve. Dry the test portion by heating a temperature of 105 ± 5 °C to achieve a dry mass is constant to within 0.1 %. Allow to cool and weigh.

Table 1— Minimum mass of test portion

Nominal size of material mm	Minimum mass of test portion after rejection of undersize particles g
75	3 500
63	20 000
53	7 500
37.5	2 500
26.5	1000

199.5	500
6.7	50
	20

7 Procedure

7.1 Separate the test sample into test fractions by sieving through 10.0 mm and 5.0 mm test sieves, ensuring that the sieves are not overloaded. Weigh the fraction retained on the 10.0 mm test sieve to the nearest gram and record as mass M_{10} . Similarly weigh the fraction retained on the 5.0 mm test sieve and record as mass M_5 . Discard any aggregate passing the 5.0 mm test sieve.

7.2 Spread each fraction, separately, on a clean, dark surface and separate out any shell fragments by hand picking under a good light. Weigh the total shell content in each fraction to the nearest gram and record as m_{10} and m_5 .

NOTE When sieve analysis in accordance with RS 96-4 has been done, the combined fraction retained on the 10.0 mm and larger test sieves and the combined fractions passing the 10.0 mm and retained on the 5.0 mm test sieves may be used for the determination of shell content.

8 Calculation and expression of results

Calculate the value of the shell content, expressed as a percentage, from the formula:

$$\text{Shell content coarser than 10 mm} = 100 \times \left(\frac{m_{10}}{M_{10}} \right)$$

and

$$\text{Shell content finer than 10 mm} = 100 \times \left(\frac{m_5}{M_5} \right)$$

Express the value of each shell content to the nearest whole number.

9 Test report

The test report shall affirm that the shell content was determined in accordance with this standard and whether or not a certificate of sampling is available. If available, a copy of the certificate of sampling shall be provided. The test report shall include the following additional information:

a) sample identification; and

b) shell content

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