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DRAFT EAST AFRICAN STANDARD

School chalk — Specification

EAST AFRICAN COMMUNITY

Second Edition

Copyright notice

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards. XXXXXX.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 079, Scholastic materials

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

This second edition cancels and replaces the first edition (EAS 025:2000), which has been technically revised.

School chalk— Specification

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for solid white and coloured school chalks intended to be used on chalkboards.

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 17318, *Solid fertilisers and soil conditioners — Determination of arsenic, cadmium. Chromium, lead and mercury contents*.

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: — ISO Online browsing platform: available at http://www.iso.org/obp

3.1
lot
not more than 1 000 000 chalks of the same type in containers bearing the same batch identification, from one manufacturer, submitted at any one time for inspection and testing.

3.2
batch
material from a single mix or, in the case of a continuous production process, the material from a single day's production

4 Types

The three types of school chalks shall be as follows:

a) Soft chalks;

b) Hard chalks; and

c) Soft dust-free chalks

5 Requirements

5.1 General requirements

5.1.1 The school chalk shall be made from good quality calcium sulphate (calcined gypsum, CaSO4.½H2O), calcium carbonate (limestone, CaCO3) or a mixture of both types of materials

5.1.2 The school chalk shall not contain poisonous or toxic materials in quantities harmful or injurious to human life.

5.1.3 The school chalk shall be of homogeneous mass free from grease, grit and sandy particles liable to scratch the surface written upon

5.1.4 Chalk sticks shall be circular in cross-section, uniformly tapered or tapered at one end as per table 1.

5.1.5 The finish shall be smooth and at least 75% of the school chalk sticks shall be free from external blowholes, depressions and signs of crumbling.

5.1.6 Chalk sticks shall, freely without scratching or otherwise harming the chalkboard, produce visible and distinct marks that can be easily erased by a dry eraser such as a piece of dry cloth.

5.1.7 The white chalks shall be clear without showing any traces of other colours.

5.1.8 The coloured chalks shall be of the declared colour, preferably chosen from the following standard colours: blue, brown, green, red and yellow.

5.2 Specific requirements

The school chalk shall comply with the requirements given in Table 1 when tested in accordance with the methods prescribed therein.

Table 1 – Specific requirements for school chalks

S/N	Parameters			Requirements			Test methods
				Soft	Hard	Soft dust free	
1	Dimensions, mm	Length		81.0 ± 2.0	76.0 ± 2.0	78.0 ± 2.0	Annex A
		Diameter	At the base	11.0 ± 1.0	9.5 ± 1.0	9.5 ± 1.0	
			At the tip	9.5 ± 1.0	9.5 ± 1.0	9.5 ± 1.0	
2	Average weight per chalk stick, g, min			5			Annex A
3	Transverse breaking strength, kg, min			1.200	1.800	1.200	Annex B
4	Resistance to abrasion, cm^3			0.13 ─ 0.26	0.10 ─ 0.16	0.08 ─ 0.16	Annex C
5	Free moisture content, % by mass, max			12	12	12	Annex D
6	Freedom from poisonous and toxic materials, mg/Kg, max		Lead, Pb	10			ISO 17318
			Arsenic as As_2O_3	2			
			Cadmium	7			
			Chromium	10			
			Mercury	2			
7	Quality of raw materials1, % by		Calcium Sulphate/ Calcined Gypsum (as $CaSO_4.1/2H_2O$)	90			Annex E

	mass, min.[a]	Calcium carbonate (as $CaCO_3$)	90	Annex F
[a] In case both calcium carbonate and calcium sulphate are used, the total content of the raw material should not be less than 90% and the portion should be defined by the manufacturer.				

6 Packaging

The product shall be packaged in suitable containers, which offer adequate protection of the content during transportation, handling and storage.

7 Labelling

Each package shall be legibly and indelibly labelled in English and/or any other official language (French, Kiswahili, etc.) used in the importing East African Partner State with the following information:

a) Name of product as “School chalk”

b) Colour

c) Name of the material of the chalk;

d) Type of chalk;

e) Number of chalk sticks in the box;

f) Manufacturer’s name and address

g) Registered Trademark if any

h) Manufacturing date

i) The batch number

8 Sampling

Sampling shall be done in accordance with Annex G.

Annex A
(normative)

Measurement of length, diameter and weight

A.1 Procedure

Measure the length and diameter at two ends of only full-length chalk by means of callipers and a foot-rule calibrated in millimetres or with sliding calliper gauge.

A.2 Determination of weight

Weigh 10 % of the chalk sticks, drawn from the same box at a time and compute the average mass per chalk stick. The average mass computed per chalk stick shall be obtained from triplicate, and shall not differ by more than two percent.

Annex B
(normative)

Determination of transverse breaking strength

B.1 Apparatus

Metal apparatus, of such construction that a chalk can be supported on two parallel edges while a load is applied through an anvil positioned midway between and parallel to the two supports (figure B1), and capable of applying a steadily increasing load of 0 kg to 2 kg to the chalk under test, and of indicating the applied load

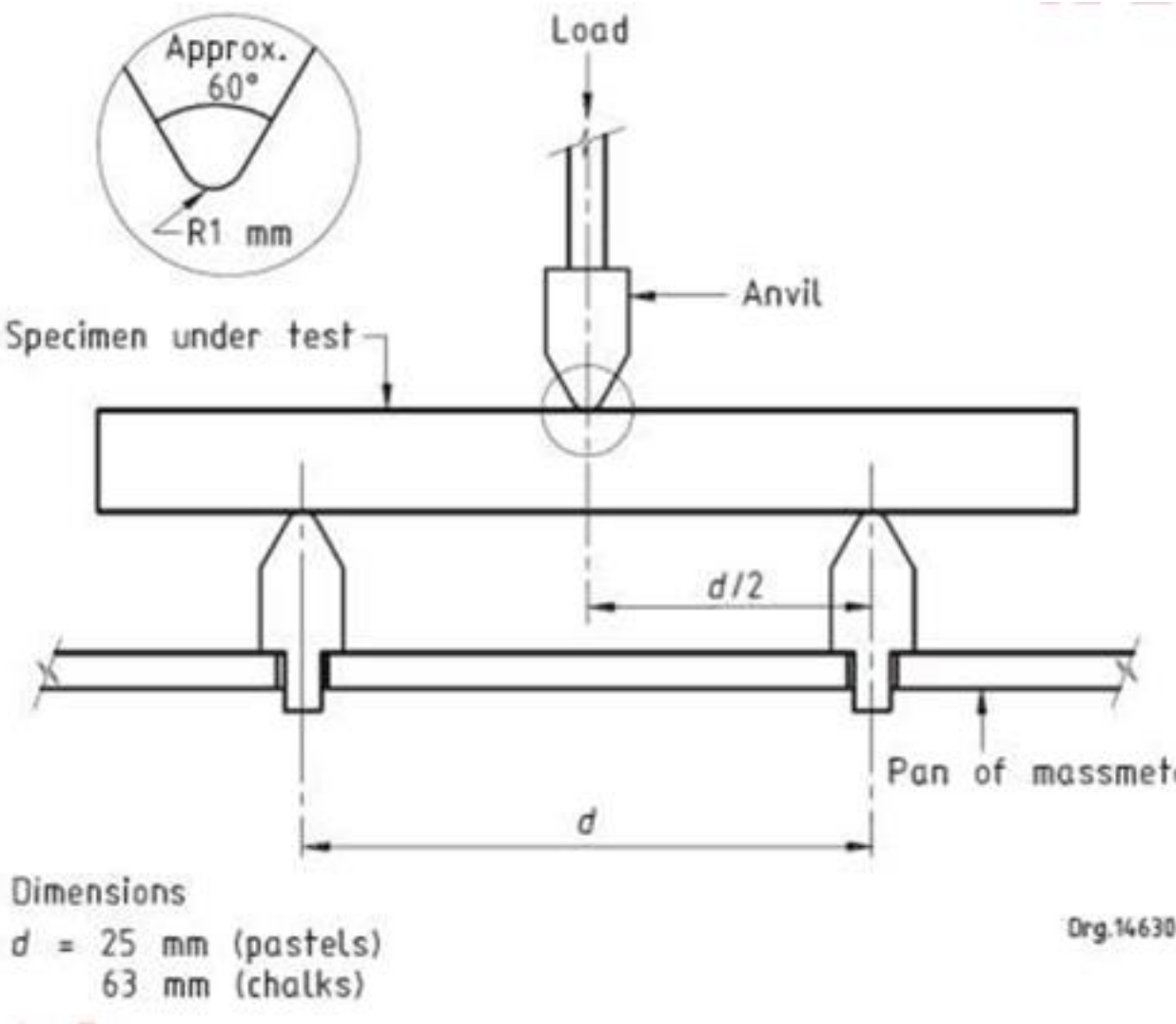


Figure B1 – Determination of transverse breaking strength

B.2 Procedure

B.2.1 Test, in turn, each chalk reserved in terms of determination of transverse breaking strength.

B.2.2 So secure the supporting edges that the distance between them is appropriate to the product being tested.

B.2.3 Centre a chalk on the two supporting edges, and lower the loading anvil until it touches the specimen under test

B.2.4 Increase the load steadily at a rate of 50 g to 100 g per second and record the load at which the specimen breaks.

B.2.5 Determine whether the lot complies with the requirements of this specification

Annex C
(normative)

Determination of resistance to abrasion

C.1 Apparatus

C.1.1 Sliding platform A, of width 190 mm, of length 330 mm, fitted with clamps 250 mm apart and suitable for clamping down the standard abrasive paper (see C.1.5), and with a stroke of 230 mm.

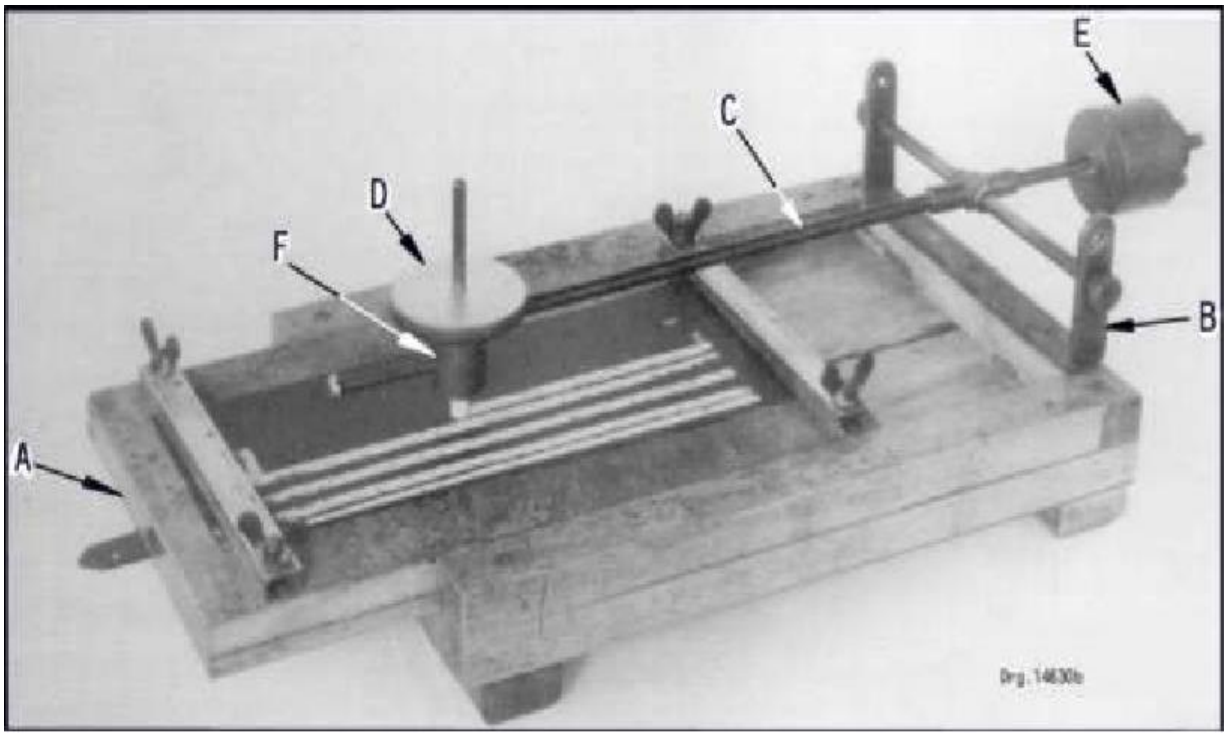
C.1.2 Bracket B, of length 180 mm, fitted to the base on which the platform slides, and with two holes in each upright so that the spindle of the balance arm C can be supported either 38 mm or 57 mm above the top of the sliding platform.

C.1.3 Balance arm C, fitted with platform D and an adjustable counter-mass E, and that is capable of sliding on its spindle along the length of the bracket B.

C.1.4 Holder F, secured to the centre of the lower surface of platform D, and in which a chalk can be securely clamped, the clamp being so constructed that it will not damage the test specimen.

C1.5 Abrasive paper, standard waterproof silicon carbide, of grade No. 400.

C.1.6 Graduated measuring cylinder, of capacity 100 cm^3.



Key

A Sliding platform

B Bracket

C Balance arm

D. Platform

E Adjustable counter-mass

F Holder

Figure C1 — Apparatus or determining resistance to abrasion

C.2 Procedure

C.2.1 Cut the appropriate specimens to a length of 57 mm of chalks. Abrade both ends of each specimen on a piece of abrasive paper until the ends are flat and square, then determine the mass of each specimen to the nearest milligram.

C.2.2 Clamp the abrasive paper to the sliding platform. With the balance arm installed at the appropriate height given in table C1, secure the test specimen vertically in holder F (in case of tapered chalks, clamp the thick end), and set the balance arm in equipoise by adjusting the position of the counter-mass. So adjust the specimen that the entire tip is in contact with the abrasive paper. If this is not possible, repeat C.2.1.

C.2.3 Move the balance arm to one extreme of its travel on its spindle, load the platform D with the appropriate mass given in table C1 and draw the sliding platform out to its limit at a uniform rate and in such a way that the stroke is completed in 4 s to 5 s. so move the balance arm on its spindle that the end of the chalk rests on a clean part of the abrasive paper and next to the line formed by the previous stroke. Push the sliding platform in at a uniform rate and in such a way that the stroke is completed in 4 s to 5 s. Repeat this procedure until 10 strokes have been made

Table C1 – Resistance to abrasion

Product	**Height of balance arm (above sliding platform)**	Mass to be placed on platform
Chalks (soft, hard and soft dust-free)	57	113

C.2.4 Remove the test specimen from the holder, determine the loss in mass by again determining the mass to the nearest milligram and set it aside for the determination of apparent density.

C.2.5 Repeat the test on each specimen in the lot.

C.2.6 Determine, to the nearest tenth of a gram, the combined mass of the abraded specimens and set them aside in terms of C.2.4 and C.2.5. Determine the volume of each specimen as follows:

a) Soft and hard chalks: immerse four specimens in water for 1 h. Wipe off the excess water with a filter paper. Pour sufficient water into a 100 cm^3 measuring cylinder to ensure that the specimens will be fully immersed. Record the volume of water, then immerse the specimens, ensuring that no air Bubbles are present and determine the volume (in cubic centimetres) of water displaced by the specimens

b) Dust-free chalks: using callipers, measure the length and diameter or cross-section of each specimen and calculate its volume, in cubic centimetres.

C.2.7 In the case of chalks, calculate the apparent density of the specimens by dividing their total mass by their total volume. Using the figure for the mass of chalk abraded from each test specimen (see C.2.4), calculate the average mass of chalk abraded from each specimen and divide this by the apparent density to obtain the average volume, in cubic centimetres, abraded from each specimen.

Annex D
(normative)

Determination of free moisture content

D.1 Procedure

Grind in a mortar about four chalks so as to pass through 1.00 mm sieve. Weigh accurately about 10 g of the ground sample and spread it in a thin layer in a Petri dish. Place it in an oven maintained at 100 ± 2 ºC till constant mass is obtained.

D.2 Calculation

$$\text{Free moisture, \% by mass} = \frac{100(m - m_1)}{m}$$

Where:

m = mass in g of the material taken for the test, and

m_1 = mass in g of the material after drying.

Annex E
(normative)

Determination of calcium sulphate content

E.1 Reagents

E.1.1 Quality of reagents

Pure chemicals and distilled water shall be used in the test.

NOTE Pure chemicals shall mean chemicals that do not contain impurities, which affect the result of analysis.

E.1.2 Ammonium acetate solution

Dissolve 454 g of ammonium acetate in two litres of water. Add aqueous ammonia solution to make the solution distinctly ammoniacal.

E.1.3 Diatomaceous silica

Wash kieselguhr free from soluble matter and dry to constant mass at 105 ºC to 110 ºC.

E.1.4 Ammonium hydroxide,

20 % by mass

E.1.5 Ammonium wash solution

Dilute 100 ml of aqueous ammonia solution to one litre with water.

E.2 Procedure

Grind the sample in a mortar so as to pass through a 250 micro sieve. Place about 4 g of the sample, accurately weighed, in a 600 ml beaker. Add 350 ml of ammonium acetate solution stirring the mixture thoroughly so as to loosen the matter from the bottom of the beaker. Add about 0.2 g of diatomaceous silica, accurately weighed, to the mixture and heat at 70 ºC on a steam bath for 30 minutes with frequent stirring. Keep the solvent distinctly ammoniacal during this period by adding aqueous ammonia solution, if necessary. Filter the mixture through a weighed Gooch crucible applying suction, if necessary. Stir frequently to keep the diatomaceous earth suspended in the liquid. Wash the residue with five 10 ml portions of hot ammonium acetate solution, draining thoroughly on each washing. Repeat washing with eight 10 ml portions of ammonia wash solution. Dry the crucible in an oven at 70 ºC to constant mass.

E.3 Calculation

$$\text{Calcium Sulphate, percent by mass} = \frac{m - (m_1 - m_2) - m_3}{m} \times 100$$

Where:

m mass in g of the material taken for the test

m_1 final mass in g of the crucible and the contents after drying

m_2 = initial mass in g of the crucible plus mass in g of diatomaceous silica used as filter aid, and

m_3 = mass in g of moisture present in the sample

Annex F
(normative)

Determination of calcium carbonate content

F.1 General

F.1.1 The approach is known as a back titration. A measured mass of chalk from the cliff is weighed out and then dissolved completely in an excess of hydrochloric acid. The resultant solution is made up to the mark in a 250 ml volumetric flask.

F.1.2 A titration is then carried to determine the concentration of the excess hydrochloric acid in the flask. Knowing the excess and the original amount of acid, it can work back (hence back titration) to find the amount of acid reacting with the calcium carbonate in the chalk.

F.2 Procedure

F.2.1 Weigh out accurately 1.30 g of a sample of naturally occurring chalk;

F.2.2 Dissolve this mass of chalk in 50 ml of 1M hydrochloric acid solution in a 250 ml beaker;

F.2.3 Transfer the contents of the beaker and all washings to a 250 ml volumetric flask and make up to the mark with distilled water;

F.2.4 By pipette extracts 25 ml of the acid solution from the volumetric flask and transfers it to a 250 ml conical flask;

F.2.5 Titrate this aliquot of the acid solution with 0.1 M sodium hydroxide solution using phenolphthalein indicator: the end point occurs with the first faint pink tinge to the solution in the flask;

F.2.6 Repeat the titration until you have concordant results, i.e. titres to within 0.1 ml of each other

Annex G
(normative)

Sampling Criteria

G.1 General precautions

G.1.1 Samples shall be drawn from originally unopened and undamaged boxes.

G.1.2 Samples shall be protected from abnormal exposure to heat, and shall not be exposed to any liquid.

G.1.3 Samples shall be handled as little as possible, and contact with wet or sweated hands shall be avoided

G.2 Scale of sampling

6.2.1 In any consignment, all boxes of school chalks drawn from a single batch of manufacture shall constitute a lot. If the consignment is declared or known to consist of different batches of manufacture, the boxes belonging to the same batch shall be grouped together and each such group shall constitute a separate lot.

G.2.2 For ascertaining the conformity of the lot to the requirements of the specification, tests shall be carried out for each lot separately. The number of boxes to be selected from lots of different sizes shall be in accordance with table 2. From each selected box, 10 chalks shall be picked up at random.

G.2.3 To ensure randomness of selection, the following procedure is recommended for use.

G.2.4 Count the boxes in a systematic manner as 1,2,3… up to r and so on, where r is the integral part of N/n (N and n being the number of boxes in the lot and number of boxes to be selected respectively). Every n^{th} box thus counted shall be selected until the requisite number of boxes is obtained.

G.2.5 From each of the boxes thus selected, 10 chalks shall be picked up blind from different places.

Table G1 – Scale of sampling and permissible number of defectives

Number of boxes in the lot (N)	Number of boxes to be selected (n)	Total number of chalks to be selected(n)	Permissible number of defective chalks
Up to 5	1	10	0
6 to 50	3	30	1
51 to 100	5	50	2
101 to 500	10	100	4
More than 500	15	150	6

G.3 Number of test and criteria for conformity

G.3.1 All the chalk selected according to clause G.2 shall be examined for the requirements in clause 3, If the number of defectives found are equal to or less than the corresponding number given in col. 4 of Table G1 the lot shall be declared as conforming to the specification requirements in Clauses 4.1.

G.3.2 All the chalks selected according to G.2. shall then be examined for length of the stick and diameter at the two ends. Any chalk failing to meet the requirements of either length or diameter shall be considered as defective.

G.3.3 If the number of defective chalks found is less than or equal to the corresponding number given in Column 4 of Table G1, the lot shall satisfy the requirements of length and diameter as prescribed in Table 1

G.3.4 Calcium sulphate content, Calcium Carbonate content and free moisture content shall be determined on a suitable number of chalks after crushing them to the required fineness.

G.3.5 Five chalks shall be selected from those got according to G.2.2 and subjected to transverse breaking strength test separately.

G.3.6 A lot shall be declared as conforming to the requirements of calcium sulphate, Calcium Carbonate moisture content and transverse breaking strength if all the test results obtained are found satisfactory.

G.3.7 A lot shall be declared satisfactory to the requirements of this specification if the stipulations laid down in clause 5, 6 and 7 have been met

Bibliography

[1] DRS 409: 2019, *School chalk — Specification*

[2] EAS 25:2000, *School chalk — Specification*

[3] TZS 68: 201*, Writing chalks —Specification*