

# DRAFT UGANDA STANDARD

Second Edition  
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## Limestone for Industrial use — Specification

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## Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to coordinate the elaboration of standards and is

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 301, Chemistry.

This second edition cancels and replaces the first edition (US 289:2001), which has been technically revised.

## **Introduction**

Limestone is an important basic raw material for the chemical industry.

The chemical industry uses relatively small quantities of limestone as compared to quicklime and hydrated lime, although many industries can use both

Physical requirements, such as specific gravity, porosity, compressive strength and size of stone are not included in this standard, as these requirements will depend on, amongst others, the types of kilns used for burning limestone.

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# Limestone for Industrial use — Specification

## 1 Scope

This Draft Uganda standard specifies the requirements, test methods and sampling of limestone for industrial use.

This standard does not cover limestone for building, agricultural, metallurgical, glass and ceramic industries.

## 2 Normative references

The following referenced documents 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.

US EAS 73, Building limes (quicklime and hydrated lime) — Specification

## 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

#### **limestone**

sedimentary rock composed principally of calcium carbonate (calcite) or the double carbonate of calcium and magnesium (dolomite). It is commonly composed of tiny fossils, shell fragments and other fossilized debris

## 4 Requirements

### 4.1 General requirements

**4.1.1** Limestone for industrial use shall be in the form of fine or granular powder, free from dirt and other foreign matter.

**4.1.2** Limestone for industrial use shall be white in colour

### 4.2 Specific requirements

Limestone shall comply with the requirements given in Table 1 when tested according to the test methods prescribed in therein.

**Table 1. Specific requirements for limestone for industrial use**

<b>Characteristic</b>	<b>Requirements</b>	<b>Test method</b>
Loss on ignition, % by mass, max	46.0	US EAS 73: 2000
Iron as (Fe <sub>2</sub> O <sub>3</sub> ), % by mass, max	0.12	Annex B
Calcium (as CaO), % by mass, min	32	US EAS 73: 2000
Magnesia as (MgO), % by mass, max	18.4	US EAS 73: 2000
Manganese (as Mn <sub>2</sub> O <sub>3</sub> ), % by mass, max	0.01	Annex C
Phosphorus (as P), % by mass, max	0.001	Annex D
Silica (as SiO <sub>2</sub> ) Alumina (as Al <sub>2</sub> O <sub>3</sub> ) and Ferric oxide (as Fe <sub>2</sub> O <sub>3</sub> )	3	Annex E

## **5 Packaging**

Limestone shall be packaged in airtight or moisture proof containers/packages that will protect the product's integrity during transportation, storage and handling.

## **6 Labelling**

**6.1** When supplied in packages, each package shall be marked indelibly with the following information:

- a) Name of product as limestone
- b) Name and physical address of manufacturer & trade mark if any;
- c) Net weight in grams
- d) batch number; and
- e) Date of manufacture.
- f) Best before date

**6.2** When supplied in bulk, a metallic or cardboard label of appropriate size bearing the above information printed with suitable paint or ink shall be conspicuously displayed on the carrier and also placed inside.

## **7 Sampling**

Sampling shall be done in accordance with annex F



## Annex A (normative)

### Preparation of main solution

#### A.1 Reagents

**A.1.1 Dilute Hydrochloric Acid, 1 percent, 40 percent (v/v).**

**A.1.2 Fusion Mixture**

Mix carbonates of sodium and potassium in equal proportion.

**A.1.3 Dilute Sulphuric Acid, 1:4 and 1:1 (v/v)**

**A.1.4 Hydrofluoric Acid, 40 percent (v/v).**

#### A.2 Procedure

##### A.2.1 For Other than Magnesite Refractory Materials

**A.2.1.1** Weigh accurately 2.5 g of the test sample into a beaker or a porcelain dish and add to it 40 to 50 ml of dilute hydrochloric acid, covering the beaker by means of a suitable cover glass immediately after addition of the acid. As soon as effervescence stops, wash the lower surface of the cover glass into the beaker and set the contents for drying and baking at 110°C to 115°C.

**A.2.1.2** After baking for about 20 to 25 minutes, cool to room temperature, add 25 to 30 ml dilute hydrochloric acid (40 percent) boil and filter.

**A.2.1.3** Transfer thoroughly the residue in the beaker as well as that adhering to the sides of the beaker to the filter, by hot water. Wash with hot dilute hydrochloric acid (1 percent) and then with hot water.

**A.2.1.4** Wash the filter free from chlorides by means of hot water. Collect the filtrate and washings in the same beaker and preserve it (A).

**A.2.1.5** Transfer the filter paper with its residue into a previously heated platinum crucible and char at low temperature. Finally ignite at 900°C to 950°C and cool.

**A.2.1.6** Fuse the residue in the platinum crucible with about 3 g of fusion mixture. Cool and extract the melt in about 50 ml of dilute hydrochloric acid (40 percent).

**A.2.1.7** Mix with the filtrate from A.2.1.1 and repeat the process of drying and baking.

**A.2.1.8** Extract the baked mass with about 30 to 40 ml of dilute hydrochloric acid and filter. Transfer all the silica in the beaker to the filter thoroughly by means of hot water.

**A.2.1.9** Wash silica on the filter free from chlorides by means of hot water. Collect the filtrate and washings in the same beaker and preserve the filtrate (B).

**A.2.1.10** Transfer the filter with its residue into a previously weighed platinum crucible and char the filter paper at a low heat without burning the paper. Finally ignite at 900°C to 950°C to a constant mass. Moisten

the residue with few millilitres of dilute sulphuric acid (1:1) and add to it about 10 ml of hydrofluoric acid. Evaporate to dryness. Ignite and cool.

**A.2.1.11** Fuse thoroughly the residue A.2.1.10 left over in the platinum crucible, after volatilization of silica with 1 to 2 g of fusion mixture and add the extract in dilute hydrochloric acid to the filtrate reserved under A.2.1.9.

**A.2.1.12** Mix these combined filtrates with that reserved under **A.2.1.4**. Transfer the final filtrate to 250 ml volumetric flask and make up to the main solution volume. (If filtrate is bulky, it should be concentrated to 250 ml by boiling). Suitable aliquots are taken for determination of ferric oxide, alumina, calcium oxide and magnesia.

## **A.2.2 For Magnesite Refractory Materials**

**A.2.2.1** Weigh one gram of the sample in a Platinum crucible and fuse it with 6 to 8 g of pure anhydrous sodium carbonate. Extract the melt carefully with 40 to 50 ml of dilute hydrochloric acid in a 500 ml beaker and when dissolution is complete, wash the crucible thoroughly with hot water. Evaporate the solution to dryness on hot plate and bake for about 20 minutes.

**A.2.2.2** Cool the beaker; add 25 to 30 ml of dilute hydrochloric acid, boil and filter. Transfer thoroughly all the residue in the beaker to the filter by a jet of hot water and wash it free from acid by means of hot water. Collect the filtrate and washings in the same beaker and preserve it. Further, complete the estimation as described under **A.2.1.5** to **A.2.1.12**

## Annex B (normative)

### Determination of Iron by the spectrophotometric method

#### B.1 Outline of the Method

Iron (III) in the aliquot from the main solution is reduced to iron (II) with hydroxylamine hydrochloride and treated with 0-phenanthroline. The coloured complex produced is measured at 510 nm. The amount of iron (as  $\text{Fe}_2\text{O}_3$ ) is evaluated from the calibration curve obtained under similar conditions.

#### B.2 Reagent

- B.2.1** Para-nitrophenol Indicator Solution, 1percent.
- B.2.2** Tartaric Acid Solution, 10 percent (m/v).
- B.2.3** Dilute Ammonia Solution, 1:3 (v/v).
- B.2.4** Dilute Hydrochloric Acid, 1:1 (v/v).
- B.2.5** Hydroxylamine Hydrochloric, 10 percent (m/v).
- B.2.6** Standard Iron Solution (1 ml = 0.0001 g of  $\text{Fe}_2\text{O}_3$ ).

Dissolve 0.7024 g of ferrous ammonium sulphate in water, add 5 ml of concentrated  $\text{H}_2\text{SO}_4$  and oxidize with bromine water. Boil to expel excess bromine. Cool and make up to 1litre.

#### B.3 Procedure

- B.3.1** Take 100 ml of sample into 250-ml volumetric flask.
- B.3.2** Add few drops of paranitrophenol indicator and 25 ml of tartaric acid solution.
- B.3.3** Neutralize the solution with ammonia solution.
- B.3.4** Acidify the solution with dilute hydrochloric acid to pH 4.0 to 4.5.
- B.3.5** Add 20 ml of hydroxylamine hydrochloride and 25 ml of 0-phenthroline and make up.
- B.3.6** Allow to stand for 1h and measure the absorbance at 510 nm against reagent blank prepared by using same quantity of reagents as used for sample.

#### B.4 Calibration

Draw a dalibration curve by taking 0, 10, 20, 30, 40 and 50 ml of standard iron solution into six 250 ml volumetric flasks and proceed in accordance with **B.3** and measure the absorbance at 510 nm against reagent blank. Plot the absorbance values against mg of  $\text{Fe}_2\text{O}_3$  per 250 ml of the solution.

## B.5 Calculation

Convert the spectrophotometric readings of sample to mg of Fe<sub>2</sub>O<sub>3</sub> by means of calibration curve and calculate Fe<sub>2</sub>O<sub>3</sub> as follows:

Fe<sub>2</sub>O<sub>3</sub>, percent by mass =

$$\frac{A}{B} \times \frac{1}{10}$$

where

A Is mass in mg, of Fe<sub>2</sub>O<sub>3</sub> found in aliquot of the sample solution, and

B Is mass in g, of sample represented by the aliquot taken.

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## Annex C (normative)

### Determination of Manganese

#### C.1 Outline of the Method

Manganese is determined colorimetrically by visual comparison.

#### C.2 Apparatus

C.2.1 Platinum Crucible

C.2.2 Kessler Cylinders - 100 ml capacity

#### C.3 Reagents

C.3.1 Dilute Nitric Acid - 1:1 (v/v).

C.3.2 Sodium Carbonate

C.3.3 Dilute Phosphoric Acid - 1:1 (v/v).

C.3.4 Potassium Periodate - solid.

#### C.3.5 Standard Manganese Solution

Dissolve 0.1 g of pure electrolytic grade of manganese in dilute nitric acid, boil off nitrous fumes and make up the volume to 1000 ml mark in a volumetric flask. One millilitre of this solution is equivalent to 0.1 mg of manganese (as Mn).

#### C.4 Procedure

C.4.1 Weigh accurately about 1 g of the material and dissolve in about 25 ml of dilute nitric acid.

C.4.2 Filter and wash the residue with hot water.

C.4.3 Ignite the residue in a platinum crucible, fuse with a little sodium carbonate, dissolve in dilute nitric acid and add to the main filtrate.

C.4.4 To the solution (if necessary, filtered) add 20 ml of dilute phosphoric acid and 0.6 to 0.8 g of potassium periodate.

C.4.5 Heat the solution to boiling and keep at boiling point for about 10 minutes (one hour for very small amounts). Cool the solution to room temperature. Transfer the solution completely to a Nessler cylinder and make up the volume to 100 ml mark.

C.4.6 Simultaneously take 20 ml of dilute phosphoric acid and 0.6 to 0.8 g of potassium periodate in another beaker and add 4.2 ml of standard manganese solution.

**C.4.7** Heat the solution and boil as above.

**C.4.8** Cool and transfer to another Nessler cylinder and make up the volume to 100 ml.

**C.4.9** The material shall be deemed to have passed the requirement of the test if the colour produced in the test with the material is equal to or less than that produced in the control test.

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## Annex D (normative)

### Determination of phosphorus

#### D.1 Procedure

**D.1.1** Dissolve 2g of the material in 20 ml of dilute hydrochloric acid 1:1 (v/v) with a few drops of concentrated nitric acid.

**D.1.2** Filter and transfer the filtrate to a 250-ml measuring flask and make up to the mark.

**D.1.3** Take aliquot equivalent to 0.05 to 0.10 g of the sample in a 500 ml conical flask. Neutralize with 10 percent sodium hydroxide solution and add 2 to 3 ml excess of concentrated hydrochloric acid. Make the volume to about 120 ml by adding water. Add 1 g of citric acid; heat to boiling and add from a burette in thin stream, 20 ml of quinoline hydrochloride solution. Put a rubber stopper and shake vigorously for about 5 minutes. Allow the precipitate to settle down and the solution to cool.

**D.1.4** Filter under suction through a thick pad of filter pulp prepared on a perforated disc in a funnel. Wash the precipitate and the flask with water till free from acid (about 10 ml of the washing and 4 drops of the indicator should show colour change from violet to yellow with 1 drop of 0.1 N sodium hydroxide solution). Transfer the pad of filter paper back with the precipitate to the original flask. Add 50 to 60 ml of water and then add 0.1 N sodium hydroxide solution with stirring in multiples of 25 ml from a pipette till the precipitate dissolves completely. Add 5 to 6 drops of the indicator solution and titrate the excess of alkali with standard hydrochloric acid until violet colour changes to yellow. The end point is sharp.

**D.1.5** Run a blank determination with the same quantity of sodium hydroxide solution which was added in the test and titrate with standard hydrochloric acid using 5 to 6 drops of indicator solution.

**D.1.6** Calculation

Phosphorus (as P), percent by mass =

$$\frac{(V1 - V2)N \times 0.2732}{M}$$

Where,

V1 volume in ml of standard hydrochloric acid required for the blank test,

V2 volume in ml of standard hydrochloric acid required for the sample

N normality of standard hydrochloric acid, and

M mass in g of the material taken for the test.

## Annex E (normative)

### Determination of Silica (as SiO<sub>2</sub>) Alumina (as Al<sub>2</sub>O<sub>3</sub>) and Ferric oxide (as Fe<sub>2</sub>O<sub>3</sub>)

#### E.1 Determination of alumina By EDTA method

##### E.1.1 Outline of the Method

A suitable aliquot of the main solution (Annex A) is taken in a beaker and 0.05 M EDTA is added in excess. pH is adjusted at 5.8 when EDTA will form complex with mixed oxides i.e. R<sub>2</sub>O<sub>3</sub> (Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>) present in the solution. In the first titration, excess EDTA is titrated against standard zinc acetate solution using xylenol orange as indicator. Same solution is boiled with sodium fluoride when EDTA complexed with alumina is released and titrated against standard zinc acetate solution. Alumina can be determined from the second titration. If titanium is present in the sample, equivalent amount of EDTA corresponding to titanium is deducted from the second titration and the remaining quantity of EDTA will correspond to alumina.

##### E.1.2 Reagents

###### E.1.2.1 Xylenol Orange (0.5 percent)

Dissolve 0.5 g of xylenol orange in 100 ml water. Add 2 drops of dilute hydrochloric acid (1:1).

###### E.1.2.2 Methyl Orange

Dissolve 0.05 g of indicator in 100 ml water.

###### E.1.2.3 EDTA (0.05M) .

Dissolve 18.613 g of disodium dihydrogen ethylenediammetetra acetate in one litre of water.

###### E.1.2.4 Zinc Acetate Solution

Dissolve 27.4 g of zinc acetate in 200 ml of water, add 1.3 ml of glacial acetic acid and 73 ml of sodium acetate buffer and make the volume to 2.5 litres.

###### E.1.2.4.1 Standardization of zinc acetate solution

Transfer, 20 ml of standard EDTA solution (E.2.3) in 250 ml beaker and add 15 ml buffer.

Titrate against zinc acetate solution using xylenol as indicator until the color changes from yellow to red.

Calculate the normality of zinc acetate as follows:

$$N = \frac{20 \times 0.05}{V}$$

Where



V is the volume of zinc acetate in ml.

#### E.1.2.5 Ammonia Solution. 1 : 1 (v/v)

#### E.1.2.6 Bugler Solution pH ( 5.8 )

Dissolve 43 g of sodium acetate in 500 ml of distilled water, and 2 ml of glacial acetic acid and make the volume to one litre.

#### E.1.2.7 Sodium Fluoride - Solid

### E.2 Procedure

#### E.2.1 First Titration

Take suitable aliquot say 25 or 50 ml of the main solution in 250 ml beaker and add 20 ml of EDTA (0.05 hf.). Stir well. Add 1 to 2 drops of methyl orange indicator. Add ammonia solution (1:1) until just alkaline. Add 15 ml of buffer solution and boil for about 5 to 10 minutes. Cool, add about 3 to 4 drops of xylenol orange indicator and titrate with standard zinc-acetate solution till colour changes from yellow to red.

#### E.2.2 Second Titration

Add about 2 g of sodium fluoride in the above solution (G.3.1) and boil for 5 to 10 minutes, cool and add 15 ml of buffer solution. Add about 2-3 drops of xylenol orange indicator and titrate against standard zinc acetate solution, till colour changes from yellow to red.

Note the volume (v) of zinc acetate used.

### E.3 calculation

Aluminium oxide ( $\text{Al}_2\text{O}_3$ ), percent by mass =

$$\frac{V}{m} \times \frac{N \times 50.98 \times 100}{1000}$$

where

V volume of zinc acetate in ml, required to titrate liberated EDTA, calculated from second titration (G.3.2);  
and

m mass in g, of the sample taken.

NOTE - In case titanium is present, calculate the  $\text{Al}_2\text{O}_3$  content as follows:

Aluminium oxide ( $\text{Al}_2\text{O}_3$ ), percent by mass =

$$\frac{v - v_1}{m} \times \frac{N \times 50.98 \times 100}{1000}$$

where

$v_1$  volume in ml, of EDTA equivalent to the percent by mass of titanium dioxide ( $\text{TiO}_2$ ) in the sample.

## E.4 Determination of silica by gravimetric method

### E.4.1 Reagents

E.4.1.1 Dilute Hydrochloric Acid. 40 percent (v/v).

E.4.1.2 Fusion Mixture

Mix carbonates of sodium and potassium in equal proportion.

E.4.1.3 Dilute Sulphuric Acid, 1: 4 and 1:1 (v/v)

E.4.1.4 Hydrofluoric Acid, 40 percent (v/v)

### E.4.2 Procedure

E.4.2.1 Weigh accurately 1.0 g of the test sample into a beaker or a porcelain dish and add to it 40 to 50 ml of dilute hydrochloric acid.

E.4.2.2 Cover the beaker by means of a suitable cover glass immediately after the addition of the acid. As soon as effervescence stops, wash the lower surface of the cover glass into the beaker and set contents for drying and baking at 110° to 115°C.

E.4.2.3 After baking for about 20 to 25 minutes, cool to room temperature, add 25 to 30 ml of dilute hydrochloric acid, boil and filter.

E.4.2.4 Thoroughly transfer all the residue as well as that adhering to the sides of the beaker, to the filter by hot water. Wash the residue free from chlorides by means of hot water. Collect the filtrate and washings in the same beaker and preserve it.

E.4.2.5 Transfer the filter with its residue into a previously heated platinum crucible and char at low temperature. Finally ignite at 900° to 950°C and cool

E.4.2.6 Fuse the residue in the platinum crucible with about 3 g of fusion mixture. Cool and extract the melt in about 50 ml of dilute hydrochloric acid.

E.4.2.7 Mix with the filtrate preserved under B.2.1 and repeat the process of drying and baking. Extract the baked mass with about 30 to 40 ml of dilute hydrochloric acid and filter.

E.4.2.8 Transfer all the silica in the beaker to the filter thoroughly by means of hot water. Wash silica on the filter free from chloride by means of hot water. Collect the filtrate and washings in the same beaker and preserve the filtrate.

E.4.2.9 Transfer the filter with its residue into a platinum crucible and smoke off the filter paper at a low heat without burning the paper. Finally ignite at 900°C to 950°C to a constant mass. Moisten the residue with few millilitres of dilute sulphuric acid (1:1) and add to it about 10 ml of hydrofluoric acid. Evaporate to dryness, ignite, cool and weigh.

E.4.2.10 Carry out a blank determination following the procedure specified in A.2.1 to A.2.9 using the same amount of reagents but without the sample.

#### E.4.2.11 Calculation

Silica, expressed in percent by mass, shall be calculated using the formula below

$$\frac{[(A - B) - C]}{D} \times 100$$

where

- A is the mass in grams of platinum crucible with residue of silica before hydrofluorization;
- B is the mass in grams of platinum crucible with residue obtained after repeated hydrofluorization;
- C is the mass in grams of silica obtained in blank determination, and
- D is the mass in grams of the sample taken.

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## Annex F (normative)

### Sampling

Limestone shall be first crushed in a jaw crusher, roll crusher or manually using a hammer or pounder and a suitable steel plate, until the material in gross sample is of 10 mm size.

The material shall be mixed well and reduced to 20 kg, which shall then be further processed in stages as detailed in Fig. 2.

For reduction at various stages, one of the methods detailed in H.1 to H.3 shall be followed. The mass of the each laboratory sample shall be at least 200 g.

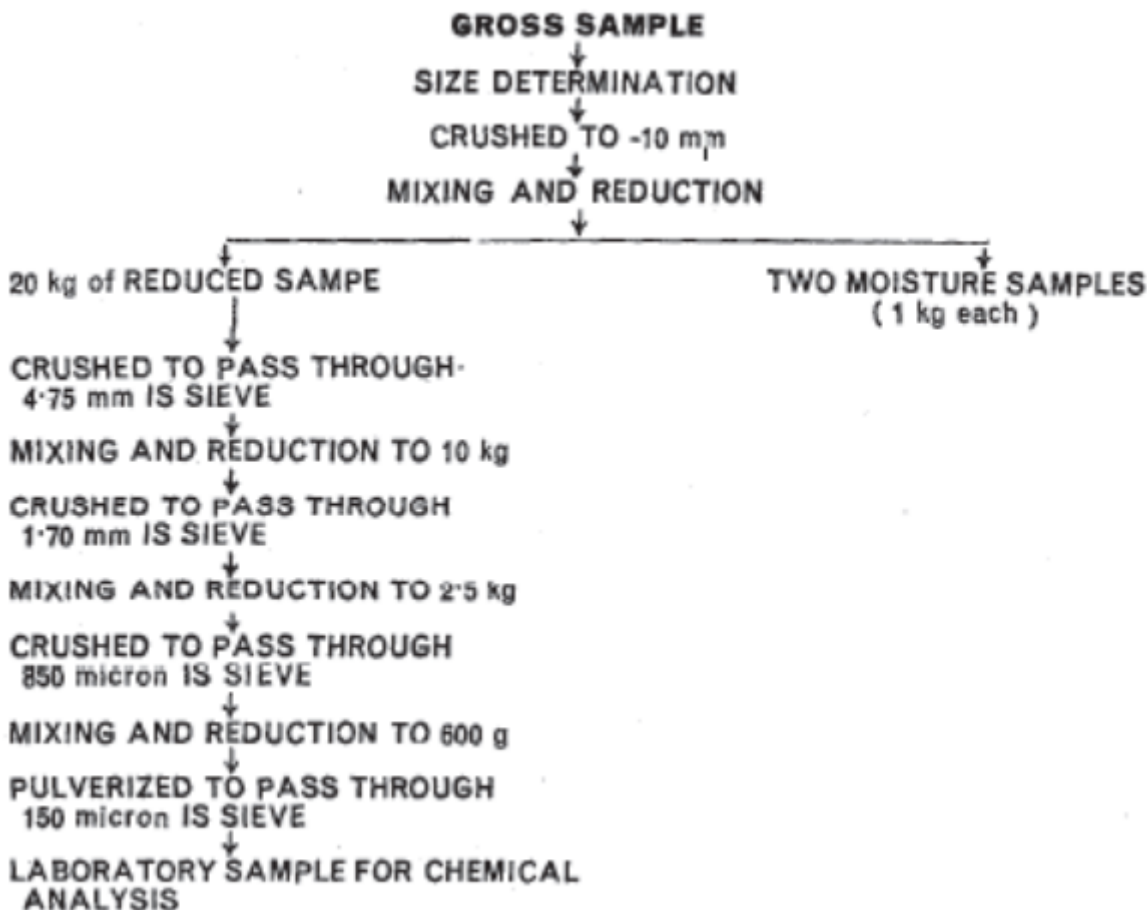


FIG. 2 STAGES OF REDUCING A GROSS SAMPLE

### F.1 Reduction by Riffle Divider

After each crushing, the material shall be well mixed and poured into the riffle. This process shall be repeated using riffles of different sizes according to the size of the crushed material.

### F.2 Coning and Quartering Method

In this method, the crushed sample shall be well mixed and then scooped into a cone-shaped pile. Care shall be taken to drop each scoopful over the same spot to ensure even distribution of lumps and fines on all sides of the cone.

After the cone is formed, it shall be flattened by pressing the top of the cone with the smooth surface of the scoop. Then, it is cut into quarters by two lines which intersect at right angle at the Centre of the base of the cone. The bulk of the sample is reduced to half by rejecting any two diagonally opposite quarters.

### F.3 Increment Reduction Method

The division of the gross sample (after being crushed to) 10 mm) by the manual increment division method (see Fig. 3) shall be carried out according to the following procedure. It is advisable to have at least 20 increments under this method. The size of the increment shall be as specified in Table 2.

- a) Spread the crushed sample on a smooth, flat and non-moisture absorbing plate, into a uniform flat rectangle of dimensions  $a \times b$  mm.
- b) Divide the rectangle into five equal parts lengthwise and four equal parts breadthwise (for 20 increments) as given in Fig. 3.

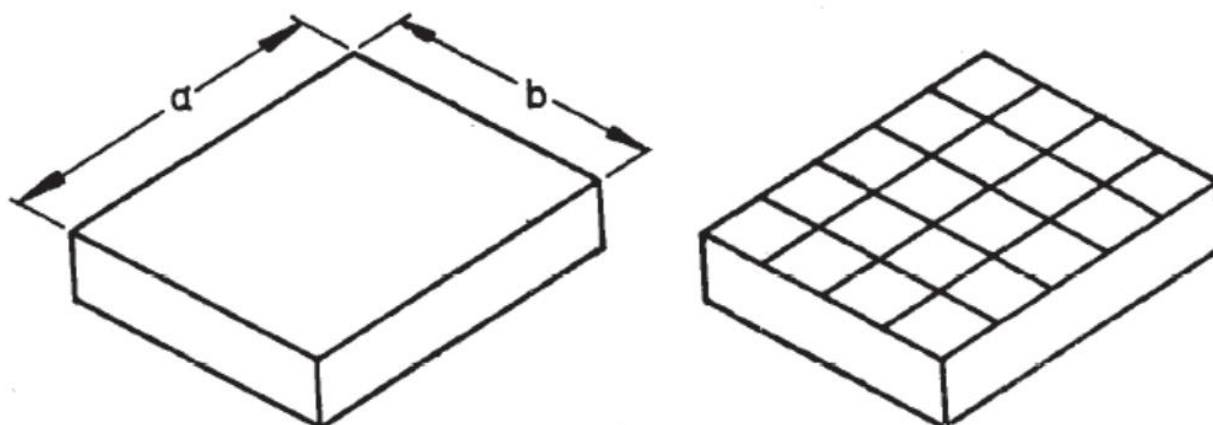


FIG. 3 MANUAL INCREMENT DIVISION METHOD

- c) From each of the 20 parts so obtained, equal quantities, not less than that specified in Table 3, shall be collected with the help of a suitable scoop and combined together to form the reduced sample. In the above procedure, the scoop shall be inserted to the bottom of the sample layer and if necessary, a bumper plate may be inserted in front of the scoop to facilitate the operation.

**Table 2 — Size of increments in manual increment division method**

<b>Size of limestone, mm</b>	<b>Thickness of layer, mm</b>	<b>Quantity to be obtained at one time from each part, g</b>
10	30 – 40	250
4.75	25 – 35	150
1.70	15 – 25	40
0.85	10 – 20	25
0.15	5 – 10	5

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- [4] IS 2109:1962, Methods of sampling dolomite, limestone and other allied materials

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## Certification marking

Products that conform to Uganda standards may be marked with Uganda National Bureau of Standards (UNBS) Certification Mark shown in the figure below.

The use of the UNBS Certification Mark is governed by the Standards Act, and the Regulations made thereunder. This mark can be used only by those licensed under the certification mark scheme operated by the Uganda National Bureau of Standards and in conjunction with the relevant Uganda Standard. The presence of this mark on a product or in relation to a product is an assurance that the goods comply with the requirements of that standard under a system of supervision, control and testing in accordance with the certification mark scheme of the Uganda National Bureau of Standards. UNBS marked products are continually checked by UNBS for conformity to that standard.

Further particulars of the terms and conditions of licensing may be obtained from the Director, Uganda National Bureau of Standards.



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