CDC 7 (14) DTZS

DRAFT TANZANIA STANDARD

Bleaching powder (Calcium Hypochlorite) – Specification

TANZANIA BUREAU OF STANDARDS

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Introduction

Bleaching powder (chemical formula = $CaOCl_2$) with its chemical name as Calcium hypochlorite is synthesized by the action of chlorine gas (produced from the chlor-alkali process) on dry slaked lime. It is a carrier of chlorine the ingredient most widely used for bleaching, whitening, sterilization, disinfection and environmental hygiene. Bleaching powder is a pale yellowish powder existing with a strong smell of chlorine.

Among the uses of the bleaching powder is for bleaching dirty clothes in the laundry, as a bleaching agent for cotton and linen in the textile industry. Also, it is a strong oxidizing agent, hence used as an oxidizer in many industries.

Foreword

This Draft Tanzania Standard is being developed by the Industrial and Laboratory Chemicals Technical Committee under supervision of the Chemical Division Standards Committee and it is in accordance with the procedures of the Bureau.

In the preparation of this Tanzania Standard assistance has been drawn from:

> IS 1065-1: 2019 *Stable bleaching powder - Specification*, *Part 1: Household and Industrial use*, published by the Bureau of Indian Standards

Acknowledgement is hereby made for the assistance derived from this source.

In reporting the result of a test or analysis made in accordance with this Tanzania Standard, if the final value, observed or calculated is to be rounded off, it shall be done in accordance with TZS 4 *rounding off numerical values.*

Bleaching powder (Calcium Hypochlorite) – Specification

1 Scope

This Draft Tanzania Standard prescribes the requirements, sampling and test methods for bleaching powder intended for household and industrial use.

2 Normative references

The following referenced documents are indispensable for the application of this document. The latest edition of the referenced document (including any amendments) applies;

TZS 59 *Water for analytical laboratory use – Specification and test method*

3. Terms and definitions

For the purpose of this standard, the following definitions shall apply.

3.1
Available chlorine
chlorine equivalent of the hypochlorite chlorine present in bleaching powder

3.2
Stability
difference in the chlorine equivalent of the hypochlorite chlorine present in the sample before and after heating it for 2 hrs at 100 ± 2 °C.

4. Requirements

4.1 General requirements

4.1.1 The bleaching powder shall be white to slightly yellowish-white in appearance and shall be free from hard lumps and any visible impurities.

4.1.2 The bleaching powder shall be dry and free-flowing.

4.2 Specific requirements

The material, when tested according to the methods prescribed in Annex, shall comply with the specific requirements given in Table 1.

Table 1 Specific requirements for bleaching powder.

S/N	Characteristic	Requirement	Method of test reference to annex
1.	Available chlorine, percent by mass, min	32.0	A
2.	Stability, loss of chlorine on the basis of initial available chlorine, max	1/11	B
3.	Moisture, percent by mass, max	0.5	C
4.	Particle size (passing through 1.70 mm sieve), percent by mass, min	99.0	D

5 Packing and Marking

5.1 Packing

The material shall be supplied in clean, dry and tight containers, without faults, made of material which do not affect the contents.

5.2 Marking

Each package shall be securely closed and marked with the following information in English and/or Kiswahili:

a) Name of material
b) Manufacturer's name and address
c) Recognized trade-mark, if any
d) Net content
e) Lot or batch number
f) Dates of manufacture and best before
g) Safety precautions including relevant warning signs
h) Instruction for storage and use

6 Sampling

Representative samples of the material shall be drawn and their conformity to this standard shall be determined in accordance with the method prescribed in Annex E.

Annex A

(Normative)

Determination of available chlorine

A-1 Reagents

A-1.1 Potassium Dichromate Solution - 0.1 N.
carefully pulverize a quantity of potassium dichromate ($K_2Cr_2O_7$) and dry at 110 ± 5 °C to constant mass. Dissolve 4.904 g of the dried reagent in water to make exactly 1 L and mix thoroughly.

A-1.2 Standard Sodium Thiosulfate Solution - 0.1 N
Standardization of Sodium Thiosulfate Solution — In a 250 mL glass-stoppered flask, take 2 g of potassium iodide and about 25 mL water to dissolve it. Then add approximately 2 g of sodium bicarbonate and 5 ml of hydrochloric acid. Just before the effervescence ceases, add 25 mL of 0.1 N potassium dichromate solution and stopper the flask. When the effervescence ceases, allow the flask to stand for 10 min in a cool dry place. Dilute with 50 mL of water and titrate against standard sodium thiosulfate solution till the liquid in the flask has assumed a yellowish green colour. Then add starch solution and continue with the addition of sodium thiosulfate solution until the blue colour is just discharge.

A-1.3 Starch indicator—Triturate 1 g of starch with 10 mL of cold water and pour, with constant stirring, in to 200 mL boiling water. Allow to settle and use the clear supernatant liquid.

A-1.4 Potassium Iodide, solid

A-1.5 Glacial Acetic Acid

A-2 Procedure

Weigh about 2.5 g of the sample, add small amount of water and grind in a mortar till a smooth paste is formed. Add 15 to 25 mL of water and decant off the fine part into a 250 mL flask. Again, grind the material left behind and repeat the process of decanting off till no gritty material is left. Wash the pestle and mortar in the same flask. Make up the solution to 250 mL. Take 25 mL of this solution, add 2 g of potassium iodide and 100 mL of water followed by 2 mL of glacial acetic acid. Titrate it against the standard sodium thiosulfate solution till the pale-yellow colour disappears. At this stage add starch indicator and continue the addition of standard sodium thiosulfate solution till the blue colour discharges.

A-3 Calculation

Available chlorine, percent by mass = $\frac{A \times N \times 35.46}{M}$

Where,

A = volume in ml of standard thiosulfate solution used,
N = normality of standard sodium thiosulfate solution, and
M = mass in g of sample taken for the test.

Annex B

(Normative)

Determination of Stability

B-1 Outline of the method
Crush the sample in a mortar and sieve. Heat it at 100 ± 2°C for 2 h and determine the available chlorine. The difference in available chlorine content before and after heating is indicative of the stability of the bleaching powder.

B-2 Apparatus
B-2.1 Test Tube - About 150 mm long and 25 mm in diameter.
B-2.2 Air Condenser - glass tube, about 375 mm long and 5 mm in diameter.
B-2.3 Rubber stoppers
B-2.4 Bath - Capable of maintaining at 100 ± 2°C.

B-3 Procedure
Crush the material to powder. This operation shall be carried out with the minimum delay. Fill a test tube to a depth of 125 mm with the sieved material and tap lightly three times. Close the mouth of the test-tube with the rubber stopper carrying the air condenser so that about 12 mm of this tube projects below the base of the stopper into the test-tube. Place the test-tube in a bath maintained at 100 ± 2°C for 2 h. At the end of this period, remove the test–tube from the bath. Remove the stopper carrying the air condenser and close the test-tube with a solid stopper. After standing for 15 min, transfer the material to a glass bottle. Shake thoroughly and store.

B-4 Determine the available chlorine on the stored material (*see* **A-3.2)** in manner as given in **A-2.**

B-5 Calculation

Stability = $\frac{M_1 - M_2}{M_1}$

Where,

*M*1 = percent by mass of available chlorine, as determined under **A-2**; and
*M*2 = percent by mass of available chlorine after heating, as determined under **A-3.2.1**.

Annex C

(Normative)

Determination of moisture

C-1 Procedure

Weigh accurately 15 to 20 g of the sample in an open dry weighing glass, and place it for 24 hours in a vacuum desiccator over fused anhydrous calcium chloride under an absolute pressure of 30 to 40 mm of mercury. Weigh the weighing glass again. The decrease in mass corresponds to the moisture content of the sample.

C-2 Calculation

Moisture content, percent by mass = $\frac{M_1 - M_2}{M_1}$

where
*M*1 = mass of material taken before drying, and
*M*2 = mass of material after drying.

Annex D

(Normative)

Determination of Particle size

D-1 Procedure

Weigh accurately 50 g of the sample and place it over 1.70 mm sieve. Shake it for 15 min. The mass of material passing through the sieve gives the particle size of the sample expressed as percentage by mass.

D-2 Calculation

Material passing through 1.70 mm sieve, percent by mass = $\frac{M_1 - M_2}{M_1} \times 100$

Where,

M1= mass of material taken for sieving, and
M2= mass of material retained over the sieve.

Annex E

(Normative)

Sampling of bleaching powder

E-1 General requirements of Sampling

E-1.1 In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

E-1.2 Samples shall not be exposed to atmosphere for a longer time than necessary, and sampling shall be done as rapidly and as thoroughly as possible.

E-1.3 Samples shall be placed in a cool and dry place.

E-1.4 The sampling instrument shall be clean and dry when used.

E-1.5 To draw a representative sample, the contents of each containers selected for sampling shall be mixed as thoroughly as possible by rolling, shaking or stirring by suitable means.

E-1.6 The samples shall be placed in clean, dry and air-tight glass or other suitable containers on which the material has no action.

E-1.7 The sample containers shall be of such a size that they are nearly filled by the samples.

E-1.8 Each sample container so filled shall be sealed air-tight after filling, and marked with full details of sampling, the date of sampling, the month and year of manufacture of the material and its grade.

E-1.9 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination. Care should be taken to avoid direct contact of bleaching powder with skin. Face should be kept at a safe distance from the container when it is opened.

E-1.10 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal shade temperature.

E-2 Scale of sampling

E-2.1 Lot

All the containers in a single consignment of same grade of the material drawn from a single batch of manufacture shall constitute the lot. If a consignment is declared to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

E-2.2 The number of containers (*n*) to be selected from the lot shall depend upon the size of the lot (*N*) and shall be in accordance with Table 2.

Table 2 Number of Containers to be Selected

(*Clause* E-2.2)

Lot Size	Sample Size
(*N*)	(*n*)
(1)	(2)
2 to 8	2
9 to 27	3
28 to 64	4
65 to 125	5
126 to 216	6
217 to 343	7
344 to 512	8
513 to 729	9
730 to 1000	10
1001 and above	11

E-3.2 The material drawn from all the selected containers according to **E-3.1** shall be thoroughly mixed together. The total material so obtained shall be divided into three approximately equal parts each of which shall be called a composite sample to represent the lot.

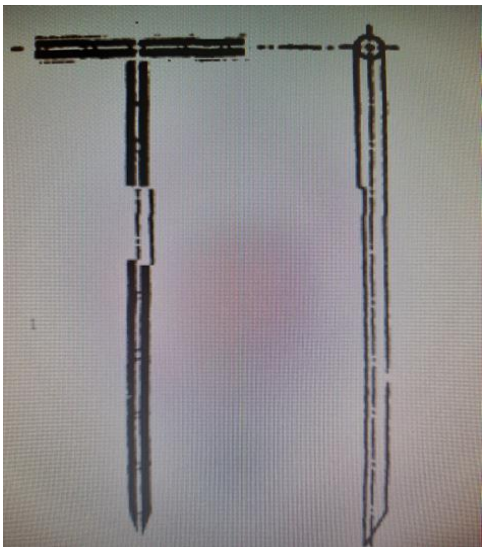

FIG. 1 Galvanized Iron or plastic sampling Instrument

E-3.3 Each of three composite samples obtained in **E-3.2** shall be immediately transferred to appropriate galvanized iron containers which shall be sealed airtight immediately after filling and marked with necessary details for identification.
E-3.4 One of the three composite samples shall be marked for the purchaser, another for the supplier, and the third kept as a referee sample.
E-3.5 The reference sample shall be kept at a place and under conditions agreed to between the purchaser and the supplier. The referee sample shall be used in case of a dispute.

E-4 Number of tests and criterion for Conformity

E-4.1 Examination and Tests
The purchaser may examine and test separately each of the reduced samples constituting a test sample for compliance with the individual requirements or may prepare for the purpose of such examination and at every stage of the progress of the examination, a composite sample representative of the whole lot by mixing all the reduced samples constituting the test sample.

E-4.2 Criterion for Conformity
When the individual reduced samples in a test sample are separately examined and the results vary from one reduced sample to another so as to show that one or more results are outside the limits prescribed in the specification. The criteria for conformity for the quality of the lot for the purpose of acceptance on the basis of the results obtained shall be at the discretion of the purchaser, unless otherwise agreed to between the purchaser and the supplier.

