DRAFT TANZANIA STANDARD

Copper/chromium/arsenic composition for the preservation of timber – Specification

TANZANIA BUREAU OF STANDARDS

© TBS 2019

Second Edition 2019
This Tanzania Standard was published under the authority of the Board of Directors of Tanzania Bureau of Standards on ............... 

Tanzania Bureau of Standards (TBS) is the statutory national standards body for Tanzania established under the Standards Act No. 3 of 1975, repealed and replaced by the Standards Act No. 2 of 2009.

The Building and Construction Divisional Standards Committee (BCDC) under whose supervision this Tanzania Standard was prepared consists of representatives from the following organizations:

*Building Research Unit (BRU)  
*National Construction Council (NCC)  
National Housing Corporation (NHC)  
*University of Dar es Salaam (Faculty of Engineering)  
*National Estates and Designing Corporation (NEDCO)  
Institution of Engineers Tanzania (EIT)  
University College for Land and Architectural Studies (UCLAS)  
Tanzania Commission for Science and Technology (COSTECH)  
National Services of Tanzania  
Mwananchi Engineering and Contracting Company (MECCO)  
Inter-Consult Engineering Limited

The organizations marked with an asterisk (*) in the above list together with the following, were directly represented on the Technical Committee entrusted with the preparation of this Tanzania Standard.

Tanzania Wood Industry Corporation (TWICO)  
Sao Hill Timber Limited  
Sokoine University of Agriculture (Department of Wood Utilization)  
Tanzania Forestry Research Institute (TAFORI)

Tanzania Bureau of Standards  
P. O. Box 9524  
Dar es Salaam  
Telephone: 022 2450298/2450206/2450949  
Telefax: 022 2450959  
E-mail: info@tbs.tz.org

ISBN 9976  64  513 9
# Table of Contents

Table of Contents ........................................................................................................................................... iii
Introduction ......................................................................................................................................................... iv
1 Scope ............................................................................................................................................................. 2
2 References ..................................................................................................................................................... 2
3 Terminology ................................................................................................................................................... 2
4 Composition .................................................................................................................................................. 2
5 pH value of solution ....................................................................................................................................... 3
6 Insoluble matter .......................................................................................................................................... 4
7 Sampling and analysis ................................................................................................................................. 4
Annex A ............................................................................................................................................................. 5
Annex B ............................................................................................................................................................. 6
Introduction

Copper, chromium and arsenic composition is a water borne oxide liquor timber preservative for application to timber by vacuum pressure impregnation.

The preservative is a finely dispersed oxide liquor of viscosity and solubility so as to facilitate easy and rapid preparation of aqueous treating solutions so as to preserve timber against insect attack, termites and fungal decay.

This Tanzania Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this Tanzania Standard to establish appropriate safety and health practices and determine the applicability of suitable regulatory limitations prior to utilization. Such regulations shall govern the use of wood preservatives in Tanzania.
0 Foreword

The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under standards Act No. 3 of 1975, amended by Act No. 1 of 1977 and then Act No. 3 was replaced by the Act No. 2 of 2009.

This draft Tanzania Standard was prepared by BCDC 6 Sawn timber, Sawn logs and Wood based Components Technical Committee, under the supervision of the Building and Construction Divisional Committee (BCDC).

During the preparation of this draft Tanzania Standard assistance was derived from:

SANS 673 Mixture of copper-chromium-arsenic compounds for timber preservation published by South Africa Bureau of Standards.


In reporting the results of a test 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.
1 Scope
This Tanzania Standard specifies requirements OF Oxide Type C water-borne preservatives containing mixtures of compounds of copper (ii), chromium (vi) and arsenic (v).

2 References
For the purpose of this Tanzania Standard, the following references shall apply:
TZS 59; Water – Distilled quality – Specification
TZS 659; Wood preservatives and treated timber-Guide to sampling and preparation of wood preservative and treated timber for analysis.
TZS 660; Wood preservatives and treated timber – Quantitative analysis for copper/chromium/arsenic formulations.
TZS 4; Rounding off numerical values.

3 Terminology
For the purpose of this Tanzania Standard, the following definitions shall apply:
3.1 Liquid junction - Any junction between two electrolyte solutions of different composition.
3.2 Sintered glass filter - A filter produced from porous materials formed by the thermal bonding of particles.
3.3 Pore size index - A characteristic of a filter related to pore diameter.
3.4 Permeability - A characteristic of a filter related to the rate of flow through it under specified conditions.
3.5 Test solution - The solution of which the pH value is required.
3.6 pH meter - A high impedance instrument by means of which either the pH of a solution or the potential difference between a pair of electrodes immersed in a solution is indicated.
3.7 Electrode - An external system that incorporates a fitting solution and a means, such as a ceramic plug or forming the liquid junction.

4 Composition
4.1 Raw materials
4.1.1 General
The preservative shall consist essentially of a mixture of compounds of copper (ii), chromium (vi) and arsenic (v).
4.1.2 The mixture of compounds shall be selected to be consistent with this clause and 7.1.
4.1.3 The preferred mixture of compounds is;
a) Hydrated copper (ii) sulphate, hydrated sodium or potassium dichromate and hydrated diarsenic pentoxide, or

b) Copper (ii) oxide, chromium (vi) oxide and diarsenic pentoxide.

NOTE - Attention is specially drawn to the toxic nature of the formulations and their solutions that may be injurious to health if adequate precautions are not taken. Therefore, particular care and the use of appropriate protective clothing is necessary. Also special precautions are required for disposal of these solutions.

4.2 Formulation

4.1.1 The nominal composition of the preservatives together with minimum concentration of each component shall be as given in Table 1.

NOTE - Variation in composition from the nominal composition may arise because of variations in the purity of the ingredients and the lack of homogeneity of the mixture.

4.1.2 The preservatives shall be supplied as mixtures.

NOTE - The usual forms are dry ingredients, paste or concentrated solutions.

4.1.3 Containers shall carry information on the mass of preservatives equivalent to unit mass of nominal composition.

4.1.4 Preservatives as supplied may differ in composition from the nominal composition as a result of removal or addition of water. In such cases the ratio of the active ingredients shall be in the same proportions by mass as are the nominal compositions given in Table 1.

Table 1: Oxide Type C composition

<table>
<thead>
<tr>
<th>Elemental Composition</th>
<th>Oxide Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (w/w)</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>Nominal</td>
</tr>
<tr>
<td>Cu</td>
<td>8.05</td>
</tr>
<tr>
<td>Cr</td>
<td>13.70</td>
</tr>
<tr>
<td>As</td>
<td>11.60</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
</tr>
</tbody>
</table>

5 $\text{pH}$ value of solution

When tested in accordance with Annex A, the $\text{pH}$ value of a solution equivalent to 20g/L of the nominal preservative composition shall be neither lower than 1.6 nor higher than 2.8 of the solution by means of a calibrated $\text{pH}$ meter...
6 Insoluble matter
When tested in accordance with Annex B the content of insoluble matter shall not be greater than 0.1% (m/m) for paste or concentrated solutions, and shall not be greater than 0.25% (m/m) for dry powder formulations.

7 Sampling and analysis

7.1 Sampling
The preservative shall be sampled in accordance with TZS 659:2001(see clause 2).

7.2 Analysis
The copper, chromium and arsenic content shall be determined in accordance with TZS 660:2001(see clause 2) on a sample prepared in accordance with TZS 659:2001(see clause 2).
Annex A
(normative)

Determination of pH

A.1 Apparatus
Ordinary laboratory apparatus, together with the following:

A.1.1 Sintered glass filter, suitable for laboratory uses with reasonable pore size index and permeability;

A.1.2 pH meter, capable of making a measurement with tolerance ± 0.2 in a limiting accuracy class and fitted with suitable electrodes and

A.1.3 one-mark volumetric flask, 500ml capacity suitable for laboratory use.

A.2 Reagent
Water, complying with TZS 59: 1980 (see clause 2).

A.3 Preparation of test solution
Dissolve 2.0 g of the representative test sample in 100ml of deionized water and determine the pH value of the solution by means of a calibrated pH meter.

A.4 Determination
Determine the pH of the test solution prepared in accordance with A.3 at 27± 2°C using the pH meter which is intended for determining a pH value within a broad range.
Annex B
(normative)

Determination of insoluble matter

B.1 Apparatus

B.1.1 Sintered glass filter, suitable for laboratory uses with reasonable pore size index and permeability.

B.1.2 Laboratory drying oven, capable of being adjusted to 105 ± 5°C.

B.2 Preparation of test portion
Take a mass of the preservative sample equivalent to 10 ± 1.1g of the nominal composition and weigh it to the nearest 0.001g. Transfer this test portion to a beaker and dissolve it in 250ml of hot water around 40°C, stirring continuously. Cool the solution to room temperature and filter it through the pre-weighed sintered glass filter into the one mark volumetric flask. Wash the beaker and the residue on the filter five times with 10ml portions of hot water at approximately 40°C, collecting the washings in the flask. Dilute to the mark with water. Reserve the filter and residue for the determination of insoluble matter if required (see Annex B).

B.3 Determination
Transfer the sintered filter containing the residue from B.2 to the drying oven (B.1.2) previously adjusted to 105 ± 5°C. Dry initially for a period of 1h, cool in a desiccator to room temperature and re-weigh. Repeat the drying, cooling and re-weighing operations at suitable intervals until the difference between two successive weighings is not greater than 0.5mg.

B.4 Calculation
The percentage by mass of insoluble matter in the preservative $m$ is given by the following equation:

$$m = \frac{m_2 - m_1}{m_3} \times 100\%$$

where

- $m_1$ is the mass in g of the sintered glass filter
- $m_2$ is the mass in g of the sintered filter and residue after drying
- $m_3$ is the mass in g of preservative taken for the determination