

DRAFT ZANZIBAR NATIONAL STANDARD

Methods of test for Solid Waste – Part 2: Determination of Moisture Content

ZANZIBAR BUREAU OF STANDARDS

Foreword

This draft Zanzibar National standard has been developed by the Soil and Air Quality Technical Committee (TCE2). In accordance with Zanzibar Bureau of Standards general procedures, this draft standard is presented to the public in order to receive any technical comment concerns.

Technical Committee Representatives

This Draft Zanzibar National Standard was prepared by the Soil and Air Quality Technical Standard committee which consists of representatives from the following organizations:

Chief Government Chemist Agency (CGCLA)
Department of Environment (DoE)
State University of Zanzibar (SUZA)
Tanzania Meteorological Authority (TMA)
Zanzibar Environmental Management Authority (ZEMA)
Zanzibar Milling Corporation (ZMCL)
Zanzibar Urban Municipal Council (ZUMC)
Zanzibar Bureau of Standards (ZBS) – Secretariat

Zanzibar Bureau of Standards (ZBS)
P O Box 1136
Zanzibar
Tel: +255 24 2232225
Fax: +255 24 2232225
E-mail: info@zbs.go.tz
Web: www.zbs.go.tz

Introduction

Due to the rapid growth of urban areas, the problem of solid waste disposal has assumed an important position. The method of treatment or disposal of solid waste depends on its composition and characteristics. Hence, determination of the moisture content plays a vital role in conducting feasibility studies for the treatment and disposal of solid waste. For example, waste with high moisture content is generally less suitable for incineration because it has a low heating value. Such waste may be more suitable for composting or disposal in a landfill, depending on its composition.

Determination of moisture content is also significant in recycling processes because it affects the weight, volume, and overall quality of recycled materials. It is also an essential parameter in the determination of calorific value, which is important for assessing whether waste is suitable for the production of Refuse-Derived Fuel (RDF).

In reporting the result of a test or analysis, made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with ZNS 94, *Rounding off numerical values*.

Methods of test for Solid Waste – Part 2: Determination of Moisture Content

1 Scope

This standard prescribes a method for determination of moisture in solid wastes. It excludes industrial waste, un-treated bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities

This standard is not applicable to fresh compost and municipal sludge.

2 Normative references

The following referenced documents are indispensable for the application of this Zanzibar National Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IS 9234 (Part 1): 2021, *Methods of sampling and test for solid waste: Part 1: Preparation of samples for analysis*

ISO 24161, *Waste collection and transportation management—Vocabulary*

ZNS 416:2021, *Glossary of terms relating to solid wastes*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in ZNS 416:2021 and the following shall apply.

3.1

solid waste

solid or semi-solid domestic waste including sanitary waste, commercial waste, institutional waste, catering and market waste and other non - residential wastes, construction waste, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste

3.2

moisture content

percentage ratio of loss in mass to the original mass when the sample is dried to a constant mass at a temperature of 100 °C – 105 °C.

4 Preparation of sample

Crude samples are not ready for examination. The three basic operations required to prepare the sample for detailed analysis are drying, grinding or pulverizing, and mixing as per the procedure prescribed in PCD 851:2026.

5 Determination of moisture

5.1 Procedure

In order to determine the moisture content, weigh the entire sample. Spread it thinly and dry in a drying oven till its mass becomes constant. Drying may be generally done at 100-105 °C. In case of presence of combustibles, a separate set of analysis shall be carried out at 70 to 75 °C. The dried samples are somewhat hygroscopic. They shall be left to cool in a turned off drying oven and weighed immediately afterwards.

5.2 Calculation

$$c = a - b$$

$$e = d - b$$

$$w = \frac{c - e}{c} \times 100$$

$$DS = \frac{e}{c} \times 100$$

$$DS + w = 100(NS)$$

where

a= gross mass, wet;

b = mass of receptacle (tare);

c = net mass, wet;

d = gross mass, dried;

e = net mass, dried.

DS = dry substance of the sample, percent by mass;

w = moisture content of the sample, percent by mass; and

NS = non-dried substance of the sample

6 Results of analysis

The moisture content of the sample is closely linked with the place and method by which it was taken and whether it was immediately mixed and filled into containers or only after some time.

6.1 To facilitate comparison of results, the data of analysis shall be normally calculated on the basis of dry substance.

6.2 When a single sample is drawn and analyzed in order to obtain information about the quantity of a sample unaffected by a process or to determine its state, it shall be referred to as single analysis.

6.3 When samples are taken and analyzed at various intervals depending upon purpose and process, it shall be referred to as series analysis.

6.4 Single Analyses - These shall be calculated as given below.

6.4.1 Evaluation shall be done on the basis of dry substance (DS) in percentage by mass.

6.5 Series Analyses

These shall be calculated as given below.

6.5.1 Evaluation shall be done on the basis of initial dry substance (IDS) in percentage by mass.

6.5.2 The results of analysis of a series of tests carried out to follow fermentation shall be calculated on the basis of the following assumptions:

- a) It may be noted from quantitative analysis point of view that the ash content remains constant during fermentation. Whereas, the organic part decomposes and a quantitative reduction takes place.
- b) All results may be converted and compared with each other with the aid of sample's ash content as well as IDS of the sample.

NOTE: When handling refuse, the analyst should use gloves, if possible of neoprene-coated canvas. He should also wear a face mask, such as a surgical mask, when preparing samples, especially when they are in finely divided form.

Reference

IS 9234 (Part 2): 2021: *Methods of Sampling and Test for Solid Waste Part 2 Determination of Moisture Content (Excluding Industrial Solid Wastes)*

DRAFT FOR STAKEHOLDERS COMMENT