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ICS 13.040

DRAFT TANZANIA STANDARD

Air Quality — Atmospheric condition for testing

Draft for public comments

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0 Foreword

The properties of materials and behavior of equipment under test are influenced by atmospheric-conditions, such as the temperature, the relative humidity and the pressure of the ambient air at the time of the test. For comparison of test results obtained by different test laboratories/testing centers, it becomes necessary to specify standard atmospheric conditions and conditioning procedures, under which the test should be carried out or at which specimen should be conditioned before the test.

The principal considerations that would justify the adoption of a set of conditions may be enumerated in short as follows: Temperature and humidity conditions specified should be suited to a majority of tests requiring standard atmospheric conditions; Equipment required to maintain the standard conditions should be economical to install and easy to maintain; and the standard conditions should be within the comfort zone for workers.

Although the necessity for having an internationally agreed set of standard atmospheric conditions for test is· realized, the wide divergence of the atmospheric conditions in the temperate and tropical or sub-tropical regions indicates that the same test conditions may not be suitable for all the zones. This aspect was examined in great detail by the several technical committees of ISO and IEC, and the Co-ordinating Committee on Atmospheric Conditions for Testing (ATCO) of ISO, in collaboration with IEC, has recommended the' following three sets of standard atmospheric conditions from which the individual· countries could choose whichever is most suitable to them

a) 20^0C with 65 percent relative humidity
b) 23^0C with 50 percent relative humidity
c) 27^0C with 65 percent relative humidity

The atmosphere (c) above is intended for tropical and sub-tropical zones and this was accepted at the international level as a result of continued efforts from sub Saharan countries. These values are based on the analysis of the weather conditions of several important parts of Tanzania. In many cases, measurements are necessary made at ambient conditions

It is realized that for many purposes the adoption of the primary international temperature, namely, 20°C would have great advantages on the grounds of international comparability, for example, measurements of basic standard of weights and measures, physical constants and precision measurements in terms of the basic standards as well as in such tests as the calibration of gauges, tools, etc. It is desirable that in such cases as well as in other cases where international comparability is of prime importance, the primary international temperature shall be adopted both for actually carrying out the test

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and for calculating the parameters when the test is carried out at the prevailing atmospheric conditions.

The standard atmospheric conditions tor testing together with the tolerances specified in this standard are intended for. use in most industrial types of tests, where a controlled atmosphere is necessary. These conditions and tolerances shall not be considered as applicable in all cases. Typical examples where exceptions shall have to be made include:

a) Conditions for drying a material free from moisture and other solvents where a temperature. of the order of the boiling point of the solvent and tolerances depending on the effect of temperature on the material shall have to be specified.
b) Certain chemical and physical constants, such as specific gravity, refractive index and vapour pressure, may need be specified at temperatures other than the temperature of 27°C, for reasons such as non-availability of data and the desirability (from the technical point of view) of using a temperature other than the standard. In cases of non-availability of data, efforts should be made as far as possible to specify the constants on the basis of these standard conditions as the data become available, exceptional conditions being adopted in the interim period.
c) Certain determinations, such as those of viscosity of liquids, plasticity of solids and density of materials, require much finer limits of tolerance than those required by this standard. In all such cases, suitable limits of tolerance shall he specified, but as far as possible the basic temperature should be retained at the standard value.
d) Certain tests of specialized character which are intended to establish suitability of goods, materials, equipment, etc., for service under severe conditions, such as climatic tests on electrical and electronic components and equipment

In preparation of this draft standard, reference was made from Indian Standard, IS 196:1998 – Atmospheric condition for testing

1 Scope

This standard specifies the atmospheric conditions for testing of materials, products, equipment, etc., and applies to such tests where atmospheric conditions need to be controlled to obtain comparable and reproducible results or to conduct measurements where test results obtained under different conditions have to be reduced to standard conditions.

This standard does not apply to the basic standards of weights and measures, to the precision measurement made in terms of these basic standards and to such tests as calibration of test gauges, precision tools, etc. This standard is not applicable to cases where testing is done under the atmospheric conditions existing at the time and place where measurements are made (for example electric motors, generators, transformers, etc.) and where no question of controlled atmosphere arise

2 References

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For the purpose of this Tanzania Standard, the following references shall apply:

TZS 836 (Part 1), Air *quality — General considerations — Vocabulary*

TZS 837 (Part 2), *Sampling of gaseous pollutants*

TZS 4, *Rounding off numerical values*

3 Terminology

For the purpose of this draft Tanzania Standard, the following definitions and those given in TZS 836 (Part 1) shall apply:

3.1 pre-conditioning

The treatment of a sample of material, product or equipment with the object of removing or partly counteracting the effect of its previous history, in respect, principally, of the temperature and humidity to which it has been exposed. This treatment usually precedes conditioning of the sample.

3.2 conditioning

The subjection of the sample to an atmosphere of a specified relative humidity, or complete immersion in water or other liquid, at a specified temperature for a specified period of time.

NOTE 1:
When the temperature and humidity for conditioning are the same as those prescribed for pre-conditioning, the pre-conditioning and conditioning may be merged and the pre-conditioning may be said to take the place of conditioning.

NOTE 2:
according to circumstances, the space used for measurement and conditioning may be a whole laboratory room in which the specified conditions are maintained within the prescribed tolerances, or a special test chamber.

3.3 standard test atmosphere

the atmosphere in which tests are conducted or to which the parameters are calculated.

3.4 ambient Atmosphere

The atmosphere surrounding the sample of material or equipment to be tested

3. STANDARD CONDITIONS

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3.1 Standard Test Atmosphere

3.1.1 The standard test atmosphere shall be:

Temperature	27 ^{0}C
Relative humidity	65 percent
Air pressure	760 mmHg

NOTE:

Wherever international comparability becomes necessary, the international accepted atmospheric conditions, for example, 20^{0}C and 65 percent relative humidity in the case of basic standards of weights and measures, electrical and electrotechnical industry; and 15^{0}C in the case of alcohol and petroleum products, may be adopted

3.1.2 This atmosphere shall be used either for actually carrying out the test or for calculating the· parameters when the tests are carried out at any other atmospheric conditions, the law of dependence of the parameter on temperature and/or humidity and/or pressure being known.

3.2 Range of Ambient Atmospheric Conditions for Testing

Wherever the parameters to be measured are not materially affected with a range of temperature and relative humidity it may not be necessary to carry out the measurements at the standard test atmosphere mentioned in 3.1.

In such cases the measurements may be carried out within the following range:

Temperature	15 to 35°C
Relative humidity	45 to 75 percent
Air pressure	645 to 795 mmHg

3.2.1 The above temperature range may however be 10 to 40°C in special cases.

4. TOLERANCES ON STANDARD TEST ATMOSPHERE

4.1 Temperature and Humidity

There. shall be two classes of tolerances; normal and close. The normal tolerance shall be ± 2 ^{0}C on temperature and ± 5 percent on relative humidity and the close tolerance shall be ± 1 ^{0}C on temperature and ± 2 percent on relative humidity at any point in the test room or chamber.

NOTE:
Depending upon the "sensitiveness of the particular test to atmospheric variations either of the two tolerances may be chosen. When the relevant specification requires a period of conditioning or pre-conditioning, it is important to distinguish between the overall limits of the temperatures within which it. may be carried out and the limits within which the temperature should be maintained in order to maintain the specified relative.

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humidity limits, for example, the close temperature tolerance of ±1 ^{0}C will not in itself ensure the close relative humidity requirement of ±2 percent.

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