

REGULATION

Made under section, 54(1)(ac)

THE WEIGHTS AND MEASURES (FIXED STORAGE TANK) (AS AMMENDED)

1. CITATION. Gn No.533 of 1998

These Regulations may be cited as the Weights and Measures (Fixed Storage Tank) (Amendment) Regulations, 2007 and shall be read together with the Weights and Measures (Fixed Storage Tanks) Regulations, Gn No.533 of 1998 (hereinafter referred to as "Principal Regulations").

2. INTERPRETATION

In these Regulations, unless the context requires otherwise –

"Calibration"

Means the set of operations that establish the relationship between values of quantities indicated by a measuring instrument or measuring system or values represented by a material measure or a reference material and the corresponding values realized under specified conditions by measurement standards.

"Calibration table"

Means the expression in the form of a table, of the mathematical function $V(h)$ which represent the relation between the height "h" (independent variable) and the volume V (dependent variable);

"Dead stock"

Means the volume of the liquid contained in the bottom of the tank up to the lowest dipping datum point;

"Deadwood"

Means any tank fitting(s) which affects the capacity of a tank and deadwood is referred to as < < positive deadwood > > when the capacity of the fitting adds to the effective capacity of the tank, or < < negative deadwood > > when the volume of the fitting displaces liquid and reduces the effective capacity;

"Dipping datum point (landing plate)"

Means the intersection of the vertical measurement axis, with the upper surface of the dip plate, or with the bottom surface of the tank, if the dip plate is not provided it constitutes the origin of the measurement of the liquid levels (zero reference);

"Fixed storage tank"

Means tank at atmospheric pressure or under pressure which is built for bulk storage and may be used for measurement of volumes of liquid contained;

“Gauge hatch (dip hole)”

Means the opening in the upper part of the tank to allow the liquid levels in the tank to be measured;

“Graduated zone”

Means the range of volumes between the dead stock and the nominal capacity for tanks which calibration table has been established;

“High point”

Means the highest point on the bottom of a vertical cylindrical tank having a practically horizontal bottom covered last by the liquid when the tank is being filled;

“Lowest point of accurate capacity”

Means the capacity below which the maximum permissible error does not apply taking account of the shape of the tank and the calibration method;

“Nominal capacity”

Means the rounded value of the maximum volume of liquid a tank may contain under normal conditions of use;

“Reference height (H)”

Means the distance between the dipping datum point and the upper reference point, measured along the vertical measurement axis, under reference conditions;

“Sensitivity of a tank in the vicinity of a liquid level h ”

Means the change in the level, divided by the corresponding relative change in the volume $\frac{\Delta V}{V}$, for contained volume V corresponding as the level h .

“Smallest measurable height”

Means the change in the level which corresponds to the smallest measurable volume.

“Smallest measurable volume”

Means the smallest volume the measurement of which is authorized, for delivery or reception of the liquid, at any point of the graduated zone;

“Ullage”

Means the distance between the free surface of the liquid and the upper reference point, measured along the vertical measurement axis;

“Upper reference point”

Means the point located on the vertical measurement axis, with reference to which the Ullage is measured;

“Vertical measurement axis”

Means the vertical line which passes through the middle of the steel well (guide pipe) if provided, belonging to the gauge hatch concerned, and corresponding to the position intended for automatic or manual level gauges;

3. SHAPE AND POSITION OF TANK AND MEASURING LIQUID LEVELS

- (1) Shape of a tank can be as follows
 - (a) a cylindrical with vertical or horizontal axis and with flat, conical, truncated, hemispherical, elliptical or dome-shaped bottom or ends; or
 - (b) a spherical or spheroidal; or
 - (c) a parallelepipedic
- (2) The position of the tanks with reference to the ground may be on the ground, partially underground, underground or above the ground;
- (3) The means used for measuring the levels or volumes of liquid contained may be
 - (a) a single graduation mark
 - (b) a measuring device with a graduated scale (with a viewing window or an external gauge tube);
 - (c) a graduated rule (dipstick) or a graduated tape with dip weight or sinker;
 - (d) an automatic level gauge.

4. CONSTRUCTION AND METROLOGICAL REQUIREMENTS

- (1) A tank shall be built in accordance with sound Engineering practice and shall comply with the legal requirements for storage of contained liquids in relation to the characteristics of the liquid.
- (2) A tank may be provided with devices necessary to prevent, as far as possible, the loss of liquid by evaporation.
- (3) A tank, to be accepted for verification, shall comply with the following general requirements, namely-
 - (a) the shape material, reinforcement, construction and assembly shall be such that the tank is sufficiently resistant to the atmosphere and the effects of the contained liquid and that, under the normal conditions of use, it suffers no permanent deformation which may alter its capacity other metals shall be specially approved;
 - (b) the dipping datum point and the upper reference point shall be constructed so that their positions remain practically unchanged whatever the state of filling of the tank, the temperature but for large tanks of over 100m³ the effects on the reference points as a function of filling, the temperature and density shall be indicated in the

calibration certificate so that corrections can be applied during the determination of volume;

- (c) the shape of the tank shall be such that the formation of air-pockets during filling, or of pockets of liquid after draining is prevented;
- (d) to prevent the application of the geometric method of calibration, the tank shall show no deformation, budes, etc. which could prevent correct measurement of their dimension and interpolation between measurements;
- (e) the tank shall be stable on their foundations, this may be ensured by anchoring or by an adequate period of stabilization, the tank remaining full so that its base will not vary greatly with time and for vertical cylindrical tanks, exceeding 2000m³, five gauge hatches may be provided, one of these as close as possible to the centre and the other ones evenly spaced near the side walls. The gauge hatch located in the part least exposed to the sun is the principal gauge hatch; and
- (f) the tank shall be pressure tested and leak proof, the result being recorded in the document which shall be presented before calibration starts.

5. (1) THE TANK SHALL BE PROVIDED WITH CALIBRATION INFORMATION PLATE BEARING-

- (a) the identification number of the tank;
- (b) the reference height **H** in millimetres (except for tanks with an external gauge tube);
- (c) the number of calibration certificate followed by the last two figures of the year in which calibration was carried out and preceded by the name or acronym of the institution which carried out the calibration; and
- (d) nominal capacity, rounded down to the nearest cubic meter.

(2) The calibration information plate shall be made of metal which remains practically unchanged under normal conditions of use and the plate shall be fixed on an integral part of the tank so that it is readily visible and easily legible, not subjected to deterioration and in such a manner that it cannot be removed without breaking the which carry the verification marks.

6. PERMISSIBLE CALIBRATION ERRORS

- (1) The maximum permissible calibration error applies to values between the limit of accurate capacity and nominal capacity; shown in the calibration table.

- (2) The maximum error positive or negative, shall be equal to –
- (a) 0.02% of the indicated volume for vertical cylindrical tanks calibrated by the geometrical method;
 - (b) 0.3% of the indicated volume for horizontal or tilted cylindrical tanks calibrated by volumetric method;
 - (c) 0.05% of the indicated volume for spherical or spheroidal tanks calibrated by geometrical method.
- (3) A tank shall be presented for verification when it is empty and well cleaned and it shall be degassed and prepared so that it does not present any risk to the operators.

7. VERIFICATION

- (1) A Manufacturer shall submit to the Assizer before starting construction the design drawings of the tank showing.
- (a) the general layout.
 - (b) The method of fixing the tank on the ground (or under ground);
 - (c) The position of the valves and of the inlet and outlet pipes. So that the way in which the tank can be completely emptied for the purpose of cleaning and periodic calibration can be deduced;
 - (d) the position and dimensions of deadwoods (positive and negative);
 - (e) the details concerning the floating roof or floating cover (if provided) including its mass;
 - (f) the detail of fitting liquid level measuring device in the tank; and
 - (g) the position of the calibration informations plate.
- (2) An initial verification shall be carried out in two stages, namely-
- (a) examination of the tank in situ, that is to say, the finished construction is checked, establishing its conformity with the approved drawing, taking into consideration the uniformity of construction, any possible permanent deformations, the rigidity of the structure, stability, manholes, access to the gauge hatch, the possibility of carrying out calibration, protected access ladder to the roof, handrail around the roof, internal fittings (deadwood), floating roof or floating cover, attachments for the fitting of the calibration information plate and, in particular the workmanship and the fitting of the level measuring devices.

(b) Calibration of fixed storage tanks shall be carried out when the Weights and Measures Agency is satisfied with the in-situ examination, the calibration may be carried out by one of the following methods namely –

(i) geometric; or

(ii) volumetric; or

(iii) Combination of the two.

(3) Periodic Verification shall be carried out at the end of every five years.

(4) Recalibration shall be carried out after any accident, deformation or refabrication of the tank, which could cause a change in its metrological qualities and the owner of the tank shall inform the Weights and Measures Agency of any incident of the kind.

(5) A tank which complies with all the requirements shall be accepted for verification and after calibration, the calibration certificate shall be issued and the markings on the calibration information plate are completed.

(6) The calibration certificate shall include –

(a) reference height, **H**;

(b) positions of vertical measurement axes (gauges hatches, reference points including the identification of the principal reference point);

(c) nominal capacity and lower limit of accurate capacity;

(d) the table of volumes corresponding to a vertical distance of 1mm for each ring shell for which the volume per millimetre varies (interpolation table);

(e) the reference density if appropriate;

(f) the maximum permissible error on the determinations of the values given in the calibration table;

(g) the periodic of validity of the calibration certificate;

(h) the date of issue of the calibration certificate.

8. LIASING

(1) Any person other than Weights and Measures Agency who intends to carry on the business of constructing Or Calibrating fixed storage tank shall first apply for licence to the Commissioner for Weights and Measures.

(2) An application for a licence under this regulation shall be in writing and shall specify –

(a) the name of the applicant and his proposed principal place of business and address;

(b) Qualification or experience of the applicant; and

(c) The type of licence applied:

Provided that the Commissioner may require the applicant to furnish him with such other particulars as he may deem necessary for the proper consideration of the application.

(3) A licence shall be granted only to a person who satisfies the Commissioner –

(a) that he has sufficient technical training or skill to carry out satisfactory the construction or calibration of fixed storage tank;

(b) that he has at his disposal the tools, machinery or other resources necessary to carry out satisfactorily the construction or calibration;

(c) that he has sufficient knowledge of these regulations to enable him to carry out the construction or calibration in accordance with the requirements of the Regulations.

(4) A person may apply for a licence for either construction, calibration or both as specified in Tables 1A and 1B.

(5) Every licence shall be granted for a period of one year and there shall be paid in respect of every licence or renewal of licence a fee as prescribed in the regulations.

(6) The Commissioner may at any time cancel any licence if the licensee is convicted of any offence under these Regulations or otherwise fails to comply with any obligations imposed on him by these Regulation or the terms of the licence.

(7) Any person aggrieved by the refusal of the Commissioner to grant a licence or by the cancellation of this licence may appeal to the decision of the Minister shall be final.

(8) No person shall, whether for gain or otherwise construct or calibrate any fixed storage tank except under and in accordance with a licence issued by the Commissioner for Weights and Measures.

9. Calibration

(a) Calibration of fixed storage tanks shall be carried out by Weights and Measures Agency or by any other competent person as may be authorized by Commissioner for Weights and Measures.

(b) Any person who contravenes the provisions of this regulation commits an offence and upon conviction is liable to a fine not exceeding two million shillings or in default, to an imprisonment of a term not exceeding three years.

**TABLE 1A
UNITED REPUBLIC OF TANZANIA
LICENCE TO CONSTRUCT FIXED STORAGE TANK**

The Weights and Measures (Fixed Storage Tank) Regulations.

Regulation 8(4))

This licence is granted to:

Of.....

And authorizing him to construct fixed storage tank(s) throughout the United Republic.

Valid for the period... ..

LICENCE NO......

Dar-es-salaam,

.....
Commissioner for Weights and Measures

**TABLE 1B
UNITED REPUBLIC OF TANZANIA**

AUTHORITY TO CALIBRATE FIXED STORAGE TANKS

The Weights and Measures (Fixed Storage Tanks) Regulations (regulation 9)

This authority is granted to: of

.....

and authorizing him/her to calibrate fixed storage tank(s) at.....
firm from(date) to

Granted at
Date.....

.....
Commissioner for Weights and Measures