

SADCMEL

DOCUMENT 5

METROLOGICAL AND TECHNICAL REQUIREMENTS FOR LIQUID MEASURING DEVICES SUBJECT TO LEGAL METROLOGY CONTROL

FOREWORD

This document covers metrological and technical requirements for the regulation of Liquid measuring devices by legal metrology authorities within the SADC region. It is based on requirements contained in various regulations of SADC member countries. It was drafted to give effect to the SADCMEEL aim of harmonizing technical regulations within the region in order to eliminate technical barriers to trade.

METROLOGICAL AND TECHNICAL REQUIREMENTS FOR LIQUID MEASURING DEVICES SUBJECT TO LEGAL METROLOGY CONTROL.

1. Scope

This document specifies the metrological and technical requirements for liquid measuring devices that are subject to metrological control in terms of legal metrology legislation.

2. Definition

Liquid measuring device means an apparatus for delivering predetermined volumes of liquid into drums, barrels, bottles or other receptacles, but excludes a liquid fuel dispenser and any liquid meter system for predetermined quantities.

3. Design

A device shall be designed to determine the quantity of liquid to be delivered and to repeat such determination indefinitely, without the quantity requiring to be reset;

Provided that provision may be made for the predetermination by an operator, of various quantities to be delivered.

4. Marking of capacity and approval number

- (a) A device shall have its measuring capacity and the number of the certificate of approval of the model, marked on the body of the device or on a metal plate permanently affixed thereto;

Provided that, in the case of a device which incorporates a transparent measuring chamber or chambers, the capacity of each such chamber shall be conspicuously marked thereon or in close proximity thereto so that it is visible during use and such measuring chamber shall not bear any legend other than the said capacity marking and the number of the certificate of approval of the model if not marked elsewhere as required.

- (b) Where provision is made on a device for the predetermination of various quantities to be delivered, such predetermination shall be clearly defined on the device and the denomination of such quantities shall be clearly marked.

5. Construction

A device shall be so constructed that-

- (a) there is no leakage at any point, especially at any joints, glands and sight glasses, where the latter are provided;
- (b) the formation of air pockets is prevented;
- (c) all valves are effective for their purpose and, where gland nuts are provided, such nuts shall not require to be tightened to an extent which makes valve operation difficult;
- (d) means are provided for sealing any calibrating or volume adjusting mechanism.

6. Devices with measuring chambers

- (a) Where a device is provided with a measuring chamber which is alternately filled and emptied, adequate means shall be provided for the expulsion of air from the chamber while it is being filled and for the admission of air thereto while it is being emptied.
- (b) Where measurement by a device is effected by means of a piston moving in a measuring chamber or chambers, such piston and chamber shall not comprise the pump for drawing the liquid into the chamber.

7. Devices measuring by inference

- (a) A device which measures a quantity of liquid by inference from the pressure on the liquid flowing through an orifice and the time for which the liquid flows through such orifice shall be provided with means for maintaining such pressure and the time at levels which ensure the delivery of the correct quantity.
- (b) Where a device referred to in paragraph (a) hereof is provided with a nozzle which remains filled at the end of a delivery, such nozzle shall be of “**non-drip**” type and the outlet shall be protected so as to prevent draining of such nozzle.

8. Devices with electronic components

Where devices are fitted with electronic components that may affect their metrological integrity such components shall be designed such that they are not susceptible to environmental influences and if failure occurs, the device either stops operating or the metrological integrity including any primary or supplementary indication is not affected. The type approval authority shall

decide, in consultation with the submitter for type approval, on any additional tests of electronic components that may be required.

9. Supply of Liquid

Where the supply of liquid for a device is not visible to an operator or where such instrument is not provided with a transparent measuring chamber or chambers, means shall be provided for informing the operator when the supply of the liquid is below the minimum level required for accurate measurement.

10. Totalisers

Where a device is provided with a totaliser, the figures of such totaliser shall be clearly legible and where provision is made for resetting such totaliser, the figures shall be properly aligned when the totaliser is set to zero.

11. Use of liquid measuring devices

A device shall be installed and operated in such manner as to deliver the correct volumes.

12. Method of Testing

- (a) As far as is practicable, the liquid which is normally measured by a device shall be used for testing the device.
- (b) After the device and any delivery hose or pipe attached thereto have been thoroughly flushed, each separate measuring chamber or measuring unit shall be tested for accuracy and constancy of delivery by allowing the liquid to flow from the device directly into an appropriate calibrated verification standard.

Provided that, where the capacity of the device or some other factor precludes the method of direct comparison with a measure of volume, the net mass of the liquid delivered shall be determined by means of certified mass meter and such net mass shall be converted to measure of volume on the basis of the density of the liquid.

- (c) Where a device provides for the delivery of various predetermined quantities, each such quantity or as many such quantities as considered necessary, shall be tested.
- (d) Tests of a device shall be repeated a sufficient number of times to provide reliable data.
- (e) These tests shall be carried out at ambient conditions.

13. Allowances of error

Errors shall be allowed on liquid-measuring devices, when new, repaired or in trade use, in accordance with the following Tables:

(a) For devices other than devices for delivering quantities of potable spirits into drinking glasses in the retail trade:

TABLE

Quantity delivered	Error allowed in excess or in deficiency
Up to 10 mL	0,4 mL
Over 10 mL and up to 20 mL	4 %
Over 20 mL and up to 30 mL	0,8 mL
Over 30 mL and up to 50 mL	3 %
Over 50 mL and up to 60 mL	1,5 mL
Over 60 mL and up to 200 mL	2,5 %
Over 200 mL and up to 250 mL	5 mL
Over 250 mL and up to 500 mL	2 %
Over 500 mL and up to 700 mL	10 mL
Over 700 mL and up to 1 L	1,5 %
Over 1 L and up to 1,5 L	15 mL
Over 1,5 L and up to 2 L	1 %
Over 2 L and up to 3 L	20 mL
Over 3 L and up to 5 L	0,7 %
Over 5 L and up to 6 L	35 mL
Over 6 L and up to 10 L	0,6 %
Over 10 L and up to 12 L	60 mL
Over 12 L and up to 50 L	0,5 %
Over 50 L and up to 100 L	250 mL
Over 100 L	0,25 %

(b) For devices for delivering quantities of potable spirits into drinking glasses in the retail trade:

TABLE

Quantity delivered	Error allowed in excess only
Any quantity	5 %

14. Application of the verification mark and seals

a) The verification mark shall be applied in one of the following ways as described in type approval documentation:

- i. By means of a stamp on a lead plug inserted into a conspicuous, easily accessible and essential part of the device and, in the case of a device provided with metal displacers for altering the volume of the measuring chambers, the verification mark shall be placed upon the displacers unless they can be sealed in position.

If necessary to protect delicate devices when stamping the verification mark it is permissible to replace the lead with sealing wax and to apply the mark to the melted wax.

- ii. By means of a verification sticker applied to a conspicuous part of the device without obscuring any of the required markings or the view of the liquid in a transparent measuring chamber. Such sticker shall not be removable without destruction, or;
- iii. By means of imprinting the verification mark on a lead seal secured to the body of the device by inserting sealing wire through a hole in the body in a conspicuous position that does not interfere with the metrological integrity of the device.

The reverse of one of the seals required in b) may also be used to apply the verification mark.

(b) Seals shall be affixed to the device to prevent unauthorized adjustment or access to the working parts or measuring chambers, except as otherwise provided in terms any additional requirements that may have been set at the time of type approval.

