

The Republic of Kiribati



Metrology Act 2021

Weighing and Measuring Instruments Regulations 2026

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Part I - Preliminary

1. Title and commencement

- (1) These regulations may be cited as the Metrology (Weighing and Measuring Instruments) Regulations 2026.
- (2) The Weights and Measures Regulations 1997 are hereby revoked.
- (3) Notwithstanding paragraph (2), weights and measuring equipment verified under the 1997 regulations may continue in use if –
 - a. The verification mark has not been obliterated
 - b. it meets the in-service maximum permitted error prescribed under these regulations for the equivalent equipment and
 - c. after repair or adjustment, it meets the verification maximum permissible error.

2. Interpretation

- (1) In these regulations unless the context otherwise requires –

‘Act’ means the Metrology Act 2021

‘calibration’ means the operation that, under specified conditions, –

- a) in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties, and
- b) in a second step, uses this information to establish a relation for obtaining a measurement result from an indication

‘Director’ means the Director appointed under section 5(2) of the Act

‘non-automatic weighing instrument’ is an instrument that requires the intervention of an operator during the weighing process to decide that the result is acceptable.

‘inspector’ means the person defined in section 7(1) of the Metrology Act 2021

‘measurement uncertainty’ means parameter characterizing the dispersion of the values being attributed to a measurand, based on the information used, with a coverage factor $k=2$

‘regulated instrument’ means an instrument defined in regulation 3(1)

‘Secretary’ means the Secretary responsible for commerce

‘technical documentation’ shall make it possible to assess the instrument's conformity with the applicable requirements of these Regulations and shall include an adequate analysis and assessment of the risk(s). The technical documentation shall specify the applicable requirements and cover, as far as relevant for the assessment, the design, manufacture and operation of the instrument. The technical documentation shall contain, wherever applicable, at least the following elements—

- a. a general description of the instrument;
- b. conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits, etc.;
- c. descriptions and explanations necessary for the understanding of those drawings and schemes and the operation of the instrument;
- d. a list of the designated standards applied in full or in part, and, where those designated standards have not been applied, descriptions of the solutions adopted to meet the essential requirements of these Regulations, including a list of other relevant technical specifications applied. In the event of partly applied

designated standards, the technical documentation shall specify the parts which have been applied;

- e. results of design calculations made, examinations carried out, etc.;
- f. test reports;

'type approval' means the conformity assessment procedure which results in the issuing of a certificate.

- (2) Unless the context otherwise requires, a reference to a numbered regulation or schedule is a reference to the regulation or schedule so numbered in these regulations.

Part II – General

3. Regulated instruments

- (1) All weighing and measuring instruments of the type referred to in (2) below and used for the purposes referred to in (3) below, shall be referred to as 'regulated instruments'
- (2) The types of weighing and measuring instruments referred to in (1) above are –
 - a. weights
 - b. length measures
 - c. capacity measures
 - d. non-automatic weighing instruments
 - e. automatic catchweighing instruments
 - f. automatic gravimetric weighing instruments
 - g. dynamic metering systems for liquids fuels
 - h. water meters for drinking (potable) water
 - i. electricity meters.
- (3) The uses referred to in (1) above and included in sections 4 and 23(2) of the Act are –
 - a. use for trade
 - b. in the field of public health for the purposes of –
 - i. weighing patients for the purposes of monitoring, diagnosis, and medical treatment
 - ii. making up medicines on prescription in a pharmacy
 - iii. mass in analyses carried out in medical and pharmaceutical laboratories
 - iv. ensuring the safety of loads
 - c. postal and courier services for determining the tariff
 - d. petroleum sector for the measurement of fuel and lubricant
 - e. making up prepackages and prepacked product
 - f. applying laws or regulations and for an expert opinion given in court proceedings.
- (4) All regulated instruments shall be subject to type approval except as exempted by these regulations. Only regulated instruments may be verified.
- (5) All regulated instruments shall be submitted for verification complete and in a clean condition.
- (6) During any regulated use both the buyer and the seller shall be able to see the measurement being made and the result where displayed.

4. Trade in weighing and measuring instruments

- (1) As required by section 28 of the Act, no person shall sell, manufacture, repair or adjust any regulated instrument except under the authority of a license issued by the Secretary.

- (2) The prescribed form of the license shall specify –
- a. name and address of person licensed
 - b. where the instruments are required to have a type approval certificate, the type approval certificate number and technical documentation file number for each instrument type.
 - c. the conditions of that license shall include that –
 - i. the licensee shall have an undertaking from the manufacturer that the latter shall provide support to enable any repair or adjustment to maintain conformity to the type approval certificate'
 - ii. type approval certificate and technical documentation shall be retained and maintained up to date
 - iii. the person shall issue with the instrument in English a declaration of conformity to type identifying the instrument, instructions for use and their contact name and address in Kiribati
 - iv. the person shall inform the Secretary by the end of the following working day of each date of instruments that have been imported, sold, repaired and adjusted
 - v. records of each transaction shall be retained
 - vi. any other requirement specified by the Secretary.

5. Controls on regulated instruments

- (1) Regulated instruments shall be subject to the following controls unless otherwise exempt by these regulations.
- (2) Initial verification prior to its first use, shall consist of:
- a. a visual inspection to ensure the instrument is in conformity with the type approval certificate
 - b. confirming the presence of the declaration of conformity with the approved type and instructions from the manufacturer
 - c. performing the tests to verify the conformity of the instrument to the requirements of these regulations
 - d. placing of verification marks on the instrument or issue a certificate of verification as required by section 25 of the Act.
- (3) In-service verification to check seals remain intact and the instrument operates within the in-service prescribed limits of error.
- (4) Verification after repair or adjustment affecting the instrument's accuracy shall be performed in the manner prescribed by (2) above.
- (5) Periodic verification shall be performed as required by the Director.
- (6) The verification mark shall be specified by the Director as shall include a mark identifying the verifier and the last two digits of the year in which the instrument was verified.
- (7) The rejection mark shall be specified by the Director. Any regulated instrument that is found not to comply with the requirements of these regulations shall have a rejection mark affixed, this shall be over any verification or rejection mark already on the instrument.
- (8) Verifications shall be performed by inspectors or an authorised accredited facility that has been assigned this function under section 6(2) of the Act. This includes a

manufacturer's internationally recognised accredited test facilities for verifying electricity meters, water meters, capacity measures and material measures of length.

Part III – Weights

6. General requirements

- (1) Regulated instruments consisting of weights do not require type approval and shall have a permitted nominal values and maximum permitted errors as specified in schedule 1 to these regulations.
- (2) The material of every weight shall, save for any treatment to inhibit corrosion and the lead in an adjusting hole, be -
 - a. If less than 1 g, made of material that is sufficiently resistant to corrosion and oxidisation
 - b. If less than 100 g, made of brass or a material whose hardness and resistance to corrosion is similar or better than that of brass
 - c. Other weights, made of grey cast iron or another material whose brittleness and resistance to corrosion is at least equal to that of grey cast iron.
- (3) The shape of each weight shall be -
 - a. If less than 1 g be flat polygonal or wire shaped with the number of edges or segments appropriate to the nominal value. Duplicate weights shall be differentiated by a dot or bent segment
 - b. If 1 g or greater, except as in c. below, be of hexagonal or cylindrical
 - c. If 5 kg or greater may be rectangular with handle and shall have no sharp edges or corners.
- (4) The construction of weight shall be -
 - a. for weights up to 10 g solid, for larger weights an adjustment hole is optional
 - b. no part of a weight may be removed without breaking a seal, ring or handle.
- (5) Weights of 1 g or more shall be marked on the top surface with the nominal weight in legible figure and letters. Weights may bear a mark identifying the manufacturer, that mark being no larger than the nominal value mark.

7. Testing

- (1) Each weight shall be tested against a standard of a higher accuracy class using equipment such that the measurement uncertainty does not exceed one-third of the maximum permissible error permitted on the weight under test.

Part IV – Material measures of length

8. General requirements

- (1) Regulated instruments consisting of a material measure of length shall be -
 - a. of carbon steel, brass, aluminium alloy, wood or any other material of adequate stability
 - b. the material shall be such that -
 - i. the expansion due to a temperature change of 8 °C from the temperature indicated on the measure, or if not stated 20 °C, plus the error from nominal length shall not exceed the maximum permissible error, and
 - ii. for measures which have to be used under a specified tension, a variation of 10 % of the tension does not produce a variation in length exceeding the maximum permissible error.

- c. every measure shall be sufficiently strong and resistant to abrasion to withstand ordinary wear and tear
 - d. if made of wood, each end shall have securely fixed onto it a brass or other hard material tip
 - e. every rigid measure of length, including folding measures, shall be practically straight and free from flaws.
- (2) Every flexible measure of length shall be constructed such that when stretched out on a flat surface its edges are practically straight and parallel. Any winding device shall not cause any permanent deformation of the measure.
- (3) Any measure of length having any novel feature, such as digital display, shall require type approval. Otherwise, no type approval is required.

9. Markings

- (1) Every measure of length which is graduated shall be graduated clearly indelibly and regularly to enable unambiguous readings to be made.
- (2) When the scale marks are lines, these shall be straight, perpendicular to the axis of the measure, and shall all have the same width, which shall be constant throughout their length. The length of the lines shall be related to the corresponding unit of measurement. The lines shall be such that they form a distinct and clear scale and that their width does not cause any measurement uncertainty.
- (3) Every measure of length shall be conspicuously, legibly and durably marked with –
- a. the nominal length in m, cm or mm
 - b. the name or trade mark of the manufacturer
 - c. if a flexible measure exceeding five metres, its tractive force
- for flexible measures these markings shall be near the beginning of the measure.
- (4) Every measure which is not graduated shall be marked conspicuously, legibly and durably with the words 'Not subdivided'.

10. Testing

- (1) Each measure of length shall be tested against of measure of higher accuracy class. The Inspector shall test the nominal length, and in the case of a graduated measure, such other graduations as the Inspector thinks fit.
- (2) The permitted nominal lengths, maximum permissible errors for verification and in-service are specified in schedule 2.

Part V – Capacity measures

11. General requirements

- (1) Regulated instruments consisting of material measure of capacity shall be –
- a. sufficiently robust to withstand normal usage without distortion, except that single use measures shall remain accurate during nominal filling, transportation and discharge functions
 - b. constructed such that –
 - i. a variation in the contents equal to the maximum permissible error shall cause a change in the liquid level of at least 2 mm
 - ii. the base is wide enough to allow a vertical, stable position when resting on a flat horizontal surface

- iii. no air is trapped on filling and all the content is emptied when tilted to an angle of 135 °.
- (2) Any measure having a novel feature, such as a spout, shall require type approval, otherwise no type approval is required.
- (3) The permitted nominal values of capacity and the maximum permitted errors are specified in schedule 3 to these regulations.

12. Markings

- (1) All measures shall be marked with the nominal capacity and a mark identifying the person responsible for compliance with the metrological specifications.
- (2) Where the nominal capacity is defined by a line the line shall be at least 10 mm from the brim and at least 10 mm long in the horizontal plane, except where the measure is used for foam building liquids when the line shall be at least 20 mm from the brim.
- (4) Any sub-divisions shall be distinct and be marked so the quantity can be clearly and unambiguously determined.
- (5) All markings shall be clearly visible and permanently marked.

13. Manner of use

- (1) A brim measure shall not be used where the liquid being measured produces a foam.

14. Testing

- (1) Where a group of capacity measures of the same nominal capacity -
 - a. have been produced in the same identifiable production run by the same manufacturer
 - b. consists at least 500 measures
 - c. are accompanied by the records of the production process which are adequate to show that the measures in the group are likely to fall within the maximum permissible errors
 then the group may be tested by sampling as specified by the Director.
- (2) Other than in (1) above, each measure shall be tested either gravimetrically or volumetrically to determine the capacity at 20 °C unless another temperature is specified on the measure.
- (3) The equipment used to verify the measure shall be such that the measurement uncertainty does not exceed one-third the maximum permissible error of the measure being testing.

Part VI – Non automatic weighing instruments

15. General requirements

- (1) In this part –
 - ‘auxiliary indicating device’ is a device which enables the sub-dividing of the verification scale interval
 - ‘graduated instrument’ means an instrument allowing the direct reading of the complete or partial weighing result
 - ‘non-graduated instrument’ means an instrument not fitted with a scale numbered in units of mass
 - ‘scale division’ is the smallest value between two consecutive scale marks referred to as ‘d’
 - ‘self-indicating instrument’ means an instrument in which the position of equilibrium

is obtained without the intervention of an operator
'semi-self-indicating instrument' means an instrument with a self-indicating range weighing range, in which the operator intervenes to alter the limits of this range
'non-self-indicating instrument' means an instrument in which the position of equilibrium is obtained entirely by the operator
'verification scale interval' is the scale interval used for the classification and verification of the instrument and referred to as 'e'.

- (2) Regulated instruments consisting of the following shall not require type approval –
- a. simple equal arm beam
 - b. simple 1/10 ratio beam
 - c. simple sliding poise instruments (steelyards)
 - d. Roberval and Beranger instruments
 - e. instruments with ratio platforms
 - f. instruments with a load-measuring device having accessible sliding poises (of the steelyard type).
- (3) All other regulated instruments that are non-automatic weighing instruments shall require type approval prior to verification. An instrument may consist of approved modules that are shown to be compatible.
- (4) Instruments submitted for verification shall be –
- a. suitable for its intended use, including the environment in which it is used. No instrument shall be used for weighing below 'Min' except for postal and carriage tariff determination.
 - b. solidly and carefully constructed to ensure it maintains its metrological qualities during use
 - c. constructed and located to enable the tests required to be safely performed and have no characteristics likely to facilitate fraud
 - d. complete and in clean condition
 - e. constructed so that accidental breakdown or a maladjustment of control elements likely to disturb its correct functioning cannot take place without its effect being evident
 - f. except for class I instruments, provided with a means for securing components and pre-set control to which access or adjustment is prohibited.

16. Accuracy classes

- (1) The accuracy class of an instrument shall be determined as indicated in schedule 4

17. Marking requirements

- (1) All regulated instruments shall be marked permanently, legibly in a place that is clearly visible to allow easy reading with –
- a. manufacturer's mark or name in full
 - b. metrological markings –
 - i. accuracy class
 - ii. maximum capacity in the form Max ...
 - iii. minimum capacity in the form Min ...
 - iv. verification scale interval in the form $e = \dots$
 - v. name or mark of manufacturer's agent for an imported instrument
 - vi. serial number

- vii. an identification mark on each unit of an instruments made up of separate but associated units
- viii. type approval certificate number,
- c. Additional markings as appropriate -
 - i. any supplementary metrological characteristics, for example software identification
 - ii. any special limits, for example temperature range
 - iii. any additional markings, such as 'not to be used for direct sales'.

18. Manner of use

- (1) Regulated instruments used for determining the mass of precious metals, precious stones and pearls shall be at least class II instruments.
- (2) Regulated instruments of class III may only be used for weighing waste, sand and ballast and other low value goods

19. Testing

- (1) The tests to apply on verification and in service and the maximum permissible errors (mpe) are specified in schedule 4 as specified by the Director.
- (2) The standard weights used to test the instrument shall not have an error greater than one-third of the maximum permissible error of the instrument for the applied load.
- (3) For loads over 0.5 Max a substitution load may be used, and If the repeatability of 3 loadings at the substitution load does not exceed --
 - a. 0.3 e, then the portion of standard weights can be reduced to one-third Max
 - b. 0.2 e, then the portion of standard weights can be reduced to one-fifth Max
- (4) The rounding error included in any digital indication shall be eliminated if the actual scale interval, d , is greater than 0.2 e.

Part VII - Liquid fuel measuring systems

20. General requirements

- (1) All regulated instruments that consist of a dynamic measuring system shall require type approval.
- (2) The instrument shall be legibly and durably marked with --
 - a. the manufacturer, or their representative,
 - b. type approval certificate number
 - c. inscriptions necessary for correct operations, and
 - d. fuel being dispensed.
- (3) Every indicator of measurement, and where present, price shall be marked with the unit of measurement and, unless it is self-evident, the value of its scale interval.
- (4) Every measuring system shall be readily set to zero and so arranged that the indicator cannot be readily advanced other than by the correct operation of the instrument.
- (5) The expanded measurement uncertainty ($k = 2$) on the errors of indication shall be less than one-third the maximum permissible error applicable for that test.

21. Fixed measuring systems

- (1) Every fixed instrument shall be --
 - a. adequately secured to a solid base
 - b. have protecting panels or covers that permit easy access to the instrument for inspection and stamping

- c. without any leaks from joints, valves, etc.
 - d. fitted with a non-resettable quantity totaliser
 - e. marked conspicuously, legibly and durably with the –
 - i. type of fuel or lubricant dispensed
 - ii. minimum delivery of the instrument
 - iii. the unit of volume in which the product is measured
 - iv. the method of operation
 - v. where the quantity displayed is that at a specific temperature, the temperature to which the volume (and price) has been corrected
- (2) Where the instrument has an electronic point of sale system, that shall be as permitted by the approved type.

22. Testing

- (1) Instruments shall be tested at the place of installation when it is complete with all the parts described in the approved type certificate, completely erected and ready for use, including any repeat indicating device or control device.
- (2) The submitter of the instrument shall provide appropriate calibrated volume measures for the inspector use.
- (3) The tests shall be performed using the liquid it is intended to measure and fuel dispensed shall be disposed of safely as requested by the submitter of the instrument. The person submitting the instrument shall provide the necessary assistance to provide and dispose of safely the liquids needed to perform the tests.
- (4) If requested by the submitter, the Inspector shall provide a signed and dated record of the quantity and types of fuel dispensed and where it was disposed.
- (5) The tests to apply on verification and the maximum permissible errors are specified in schedule 5.

23. Measuring systems on vehicles

- (1) Each system shall be used to deliver at least 100 litres of fuel and shall require type approval
- (2) It shall be erected and installed to facilitate testing and the method of test, and the maximum permissible errors are specified in schedule 5
- (3) It shall be marked clearly and indelibly with –
 - a. manufacturer's mark or name
 - b. information in respect of its accuracy
 - c. minimum quantity to be delivered
 - d. identity mark
 - e. identity of the approved type.
- (4) The system shall be accompanied by the necessary information on its operation, which shall be easily understandable and shall include where necessary –
 - a. rated operating conditions, in particular –
 - i. The flow rate range
 - ii. The properties of the fuel to be measured by the system
 - iii. The electricity supply voltage
 - b. upper and lower temperature limits
 - c. instruction for installation, maintenance, repairs, permissible adjustments
 - d. instructions for correct operations an any special conditions of use

- e. conditions for compatibility with interfaces or other measuring instruments.
- (5) The indication of results shall be by means of a display or legible and indelible hard copy.
- (6) Instruments for direct sale to the consumer shall be designed to present the results to both parties. If one party to the transaction is absent the system shall record durably the measurement result and information to identify the transaction.
- (7) Where fitted with a hose, the dilation shall not cause the instrument to exceed the maximum permissible error.
- (8) If the instrument operates with the hose full at all times, it shall have an anti-drain valve fitted in the delivery nozzle.

24. Testing

- (1) The tests shall be performed using the liquid it is intended to measure and fuel dispensed shall be disposed of safely as requested by the submitter of the instrument. The person submitting the instrument shall provide the necessary assistance to provide and dispose of safely the liquids needed to perform the tests.
- (2) If requested by the submitter, the Inspector shall provide a signed and dated record of the quantity and types of fuel dispensed and where it was disposed.
- (3) The tests to apply on verification and the maximum permissible errors are specified in schedule 5.

Part VIII – Water meters

25. General requirements

- (1) Regulated instruments shall require type approval
- (2) It shall be marked with –
 - a. manufacturer's name or mark
 - b. information in respect of its accuracy.
- (3) And where applicable with –
 - a. information in respect of the conditions of use
 - b. measuring capacity
 - c. measuring range
 - d. identity mark
 - e. identity of the approved type.
- (4) Meters shall be accompanied by information on its operation which shall be easily understandable and include where relevant –
 - a. rated operating conditions
 - b. mechanical and electromagnetic environment class
 - c. upper and lower temperature limits
 - d. instructions for installation, maintenance, repairs, permissible adjustments
 - e. instructions for correct operation and any special conditions of use
 - f. conditions for compatibility with interfaces or other measuring instruments.
- (5) The indication of the results shall be by means of a display or hard copy.
- (6) The indication of any results shall be clear and unambiguous and accompanied by such marks and inscriptions necessary to inform the user of the significance of the result.
- (7) In the case of a hard copy the print or record shall also be easily legible and indelible.

- (8) Whether or not an instrument can be remotely read, it shall be fitted with a metrologically controlled display accessible without tools to the consumer. The reading of this display serves as a basis for the price to pay.

26. Manner of use

- (1) Where the meter is marked with –
- a. a temperature range, it shall not be used in temperatures outside this range
 - b. a flowrate range, it shall not be used at a flowrate outside that range.
- (2) A meter shall not be used in circumstances –
- a. in which it may be prevented from operating consistently or accurately, or
 - b. which are likely prematurely to degrade its metrological characteristics.
- (3) A meter shall not be used unless, when adjusted it is set as close to zero as practicable, there shall be no exploitation of the tolerances.

27. Testing

- (1) The tests to apply and maximum permissible errors are specified in schedule 5.

Part IX – Electricity meters

28. General requirements

- (1) 'Electricity meter' means a device which measures the active electrical energy consumed in a circuit.
- (2) Regulated instruments that consist of electricity meters shall conform to an approve type.
- (3) Meters shall bear indelible and distinct markings, legible from outside the meter, of –
- a. manufacturer or representative in Kiribati and address
 - b. serial and model number
 - c. year of manufacture
 - d. accuracy class
 - e. nominal voltage,
 - f. minimum, transitional and maximum current
 - g. temperature range.
- (4) The method of test and maximum permissible error (MPE) for the various load points is specified in schedule 7.
- (5) For supplies to domestic premises the MPE for class 2 shall be met, and the display shall be visible to the consumer.

Part X – Automatic weighing instruments

29. General requirements

- (1) The following definitions shall apply to this part –
- 'automatic weighing instrument': Instrument that weighs and follows a pre-determined programme of automatic processes characteristic of the instrument
- 'automatic catchweighing instrument' (catchweigher): Automatic weighing instrument that weighs pre-assembled discrete loads or single loads of loose material
- 'automatic gravimetric filling instrument': Instrument which fills containers with predetermined and virtually constant mass of product from bulk by automatic weighing, and which comprises essentially automatic feeding device(s) associated with weighing unit(s) and the appropriate control and discharge devices

'checkweigher': Catchweigher that sub-divides prepackages of different mass into two or more sub-groups according to the value of the difference between their mass and the nominal set point

'weigh labeller': Catchweigher that labels individual pre-assembled discrete loads (e.g. prepackages) with the weight value

'weigh-price labeller': Catchweigher that calculates the price to pay on the basis of the indicated mass and the unit price and labels individual pre-assembled discrete loads (e.g. prepackages with the weight value, unit price and price to pay).

- (2) All regulated instruments that are automatic weighing instruments shall require type approval.
- (3) The verification tests to apply and maximum permissible errors are specified in schedule 8.

30. Markings

- (1) Regulated automatic weighing instruments shall be marked in full, at each location having a mass indicating and/or printing device, with –
 - a. name or identification mark of the manufacturer and importer in Kiribati
 - b. serial number and type designation of the instrument
 - c. maximum rate of operation in the form loads/min or units/min
 - d. maximum speed of load transport system, if applicable
 - e. electrical supply voltage and frequency
 - f. pneumatic/hydraulic pressure, if applicable
 - g. temperature range when not -10°C to $+40^{\circ}\text{C}$
 - h. software identification, if applicable.
- (2) Also, the following marks in code –
 - a. type approval certificate number
 - b. indication of accuracy class
 - c. verification scale interval in the form $e = \dots$
 - d. actual scale interval in the form $d = \dots$
 - e. maximum capacity in the form Max ...
 - f. minimum capacity in the form Min ...
 - g. maximum additive tare in the form $T = +\dots$
 - h. maximum subtractive tare in the form $T = -\dots$
- (3) Additional marking shall be marked where necessary, for example to specify the product, packing rate etc.
- (4) Descriptive marking shall be indelible and of a size, shape and clarity that permit legibility under normal conditions of use. They shall be grouped together and permanently fixed to the instrument.

Part XI – Other regulated instruments

31. General requirements

- (1) Other instruments within the scope of section 23 of the Act shall have calibration certificates issued by a calibration laboratory meeting the requirements of ISO/IEC 17025:2017 – General requirements for the competence of testing and calibration laboratories, that demonstrate that the instrument remains within the acceptance criteria between calibrations.

(2) The user of the instrument shall specify the acceptance criteria considering any standards to be met and the risk of making incorrect measurements.

Schedule 1 – Weight nominal values and maximum permissible errors

1. The following table specifies the nominal value of weights permitted and the maximum permissible error for each nominal value at time of verification and while in-service.
2. The weight meets the requirement if the actual deviation from the nominal value (error) plus the measurement uncertainty is less than the maximum permissible error.

Permissible nominal value	Maximum permissible error on verification (mg)	Maximum permissible error in relation to obliteration of verification mark (mg)
50 kg	+ 8 000	± 8 000
20 kg	+ 3 000	± 3 000
10 kg	+ 1 600	± 1 600
5 kg	+ 800	± 800
2 kg	+ 300	± 300
1 kg	+ 160	± 160
500 g	+ 80	± 80
200 g	+ 30	± 30
100 g	+ 16	± 16
50 g	+ 10	± 10
20 g	+ 8.0	± 8.0
10 g	+ 6.0	± 6.0
5 g	+ 5.0	± 5.0
2 g	+ 4.0	± 4.0
1 g	+ 3.0	± 3.0
500 mg	+ 2.5	± 2.5
200 mg	+ 2.0	± 2.0
100 mg	+ 1.6	± 1.6

3. The troy ounce may only be used for the determination of mass of precious metals

Permissible nominal value (oz tr)	Maximum permissible error on verification (mg)	Maximum permissible error in relation to obliteration of verification mark (mg)
Multiples of 10 oz tr up to 100 oz tr	± 15 per 10 oz tr	± 30 per 10 oz tr
10	± 15	± 30
5	± 8	± 16
3	± 5	± 10
2	± 3.5	± 7
1	± 2.7	± 5.4
0.5	± 2.3	± 4.6
0.3	± 1.9	± 3.8
0.2	± 1.6	± 3.2
0.1	± 1.3	± 2.6
0.05	± 1.1	± 2.2
0.04	± 1.0	± 2.0
0.03	± 0.9	± 2.0
0.02	± 1.0	± 2.0

0.01	± 0.6	± 1.4
0.005	± 0.5	± 1.2
0.002	+ 2.5	± 2,5

Schedule 2 – Length nominal values and maximum permissible errors

1. The following table specifies the nominal value of measures of length permitted and the maximum permissible error for each nominal value at time of verification and in relation to the obliteration of the verification mark.
2. A line measure is where the nominal value is defined by two lines on the measure.
3. An end measure is where the nominal length is defined by the two ends of the measure.
4. A composite measure is where the nominal length is defined by one end and one line.
5. The maximum permissible error in-service is twice the verification maximum permissible error.
6. The measure meets the requirement if the actual deviation from the nominal value (error) is less than the maximum permissible error. The measurement uncertainty should not be added to the error when determining compliance with the maximum permissible error.

Permissible nominal value (m)	Maximum permissible error on verification for line measures (mm)	Maximum permissible error for verification of end or composite measures (mm)
0.5	± 1.0	± 1.3
1.0	± 1.0	± 1.3
1.5	± 1.4	± 1.7
2	± 1.4	± 1.7
3	± 1.8	± 2.1
4	± 2.2	± 2.5
5	± 2.6	± 2.9
10	± 4.6	± 4.9
15	± 6.6	± 6.9
20	± 8.6	± 8.9
25	± 10.6	± 10.9
30	± 12.6	± 12.9
50	± 20.6	± 20.9
60	± 24.6	± 24.9
100	± 40.6	± 40.9

Schedule 3 – Capacity nominal values and maximum permissible errors

1. The two types of capacity measures are –
 - a. 'transfer measures' used solely for decanting specific volumes of liquids, and
 - b. 'drinking measures' used for the consumption of specific volumes of beverages.
2. The following table specifies the nominal capacities of measures permitted and the maximum permissible error for each nominal value at time of verification for brim and the capacity defined by a line.
3. For delivery measure the capacity is determined after prior wetting of the measure and draining for 30 seconds.
4. The Inspector shall test the nominal value and other graduations as he thinks fit.
5. For brim measures, there is no permissible negative error.
6. The measure meets the requirement if the actual deviation from the nominal value (error) is less than the maximum permissible error. The measurement uncertainty should not be added to the error when determining compliance with the maximum permissible error.

Permissible nominal value	Maximum permissible error for verification of transfer measures (ml)		Maximum permissible error for verification of drinking measures (ml)	
	Line	Brim	Line	Brim
20 ml	± 2	+ 4	± 1	+ 2
25 ml	± 2	+ 4	± 1.25	+ 2.5
50 ml	± 2	+ 4	± 2.5	+ 5
100 ml	± 3	+ 6	± 5	+ 10
150 ml	± 4.5	+ 9	± 7.5	+ 15
200 ml	± 6	+ 12	± 10	+ 20
250 ml	± 7.5	+ 15	± 11.25	+ 22.5
300 ml	± 9	+ 18	± 12.5	+ 25
500 ml	± 15	+ 30	± 17.5	+ 35
1 litres	± 30	+ 60	± 30	+ 60
2 litres	± 60	+ 120	-	-
5 litres	± 150	+ 300	-	-
10 litres	± 300	+ 600	-	-

Schedule 4 – Non-automatic weighing instrument classification, tests and maximum permissible errors

32. Classification

1. The accuracy class of an instrument depends on the type of instrument and the verification scale interval 'e' as follows –
 - a. For graduated instruments without an auxiliary indicating device, the verification scale interval is equal to the scale divisions, $e = d$
 - b. For graduated instruments with auxiliary indicating device, the verification scale interval is greater than the scale interval but less than ten times this, $d < e \leq 10 d$
 - c. For non-graduated instruments the verification scale interval is chosen by the manufacturer.
2. The verification scale interval, number of verification scale intervals and minimum capacity, in relation to the accuracy class of an instrument, are given in the following table

Accuracy class	Verification scale interval	Number of verification scale intervals, $n = \text{Max} / e$		Minimum capacity, Min (lower limit)
		minimum	maximum	
Special I	$0.001 \text{ g} \leq e$	50 000		$100 e$
High II	$0.001 \leq e \leq 0.05 \text{ g}$	100	100 000	$20 e$
	$0.1 \text{ g} \leq e$	5 000	100 000	$50 e$
Medium III	$0.1 \text{ g} \leq e \leq 2 \text{ g}$	100	10 000	$20 e$
	$5 \text{ g} \leq e$	500	10 000	$20 e$
Ordinary IIII	$5 \text{ g} \leq e$	100	1 000	$10 e$

33. Location of test

3. The instrument shall be tested at the time of installation and at the location it is to be used. Notwithstanding this verification may be performed at another location if –
 - a. Transport to the location of use does not require dismantling the instrument, and
 - b. The installation will not affect the instrument's performance, and
 - c. The gravity value at the location of use is taken into account.

34. Verification tests.

4. A visual inspection of the instrument shall be performed to determine compliance with the type approval certificate stated in the declaration of conformity, from the manufacturer, or his representative. The inspection shall include –
 - a. metrological characteristics, i.e. accuracy class, Min, Max, e , d
 - b. identification of software if applicable
 - c. identification of modules if applicable
 - d. prescribed inscriptions
 - e. positions for verification and control marks.
5. The tests to be performed for initial verification and verification after repair or adjustment shall include –
 - a. accuracy of zero setting and tare devices
 - b. errors of indication, with ascending and descending loads of 5 loads including -

- i. Min and Max and values where the maximum permissible errors change
 - c. repeatability shall be performed at about 0.5 Max and max with 5 weighings for class I and class II instruments and 3 weighings for class III and class IIII instruments. Zero shall be re-set as necessary between each weighing.
 - d. eccentric loading using a load of one-third Max for a load receptor with up to $n = 4$ supports, and a load of $\text{Max}/(n-1)$ where there are more than 4 supports and n is the number of support. The load shall be placed centrally in each of the n equal segments of the load receptor. This test may be varied for instruments with special load receptors (e.g. tanks) or used for weighing rolling loads (e.g. a vehicle)
 - e. discrimination, not applicable for instruments with digital indications. This shall be performed at Min, 0.5 max and Max loads.
 - f. tilt, in the case of mobile instruments
 - g. sensitivity of non-self-indicating instruments shall be performed at two different loads, e.g. Min and Max.
 - h. tests required by the type approval certificate
 - i. any other tests the Inspector thinks necessary.
6. The tests to perform on periodic verification or in-service inspections shall be determined by the Inspector.
7. The maximum permissible errors permitted are as follows -

35. Maximum permissible errors (mpe) on initial verification & after repair or adjustment

mpe	For loads, m , expressed in verification scale intervals, e			
	Class I	Class II	Class III	Class IIII
$\pm 0.5 e$	$0 \leq m \leq 50\ 000$	$0 \leq m \leq 5\ 000$	$0 \leq m \leq 500$	$0 \leq m \leq 50$
$\pm 1.0 e$	$50\ 000 < m \leq 200\ 000$	$5\ 000 < m \leq 20\ 000$	$500 < m \leq 2\ 000$	$50 < m \leq 200$
$\pm 1.5 e$	$200\ 000 \leq m$	$20\ 000 < m \leq 100\ 000$	$2\ 000 < m \leq 10\ 000$	$200 < m \leq 1\ 000$

- 8. After zero setting the effect of zero deviation on the result of weighing shall be not more than $\pm 0.25 e$.
- 9. The maximum permissible errors in service shall be twice the maximum permissible errors on initial verification.

Schedule 5 – Liquid fuel measuring systems tests and maximum permissible errors

36. General

- 1. The initial verification of the measuring system shall include:
 - a. an examination for conformity of the measuring system and its constituents with the respective types
 - b. a check that the data plate and other relevant locations are correctly marked.

37. For fixed installations

- 2. The tests to be performed on verification shall be –

- a. visual examination to check conformity to approved type and inscriptions and sealing provisions are appropriate
 - b. accuracy test at a slow speed and fast speed of deliveries of 2 l, 5 l, 10 l and 20 litres, and
 - c. where a price is indicated, the price indicated at each indication (e.g. at kiosk for self-service) and computed shall not differ by more than the price equivalent of the maximum permissible error for that delivery.
3. After repair where only the gearbox seal has been broken, the tests to perform shall be –
 - a. accuracy tests at fast speed of 5 l, 10 l and 20 litres, and
 - b. check computed price to pay at instrument and kiosk (for self-service).
 4. After repair where only the price computing mechanism seal has been broken, the tests to perform shall be –
 - a. accuracy tests at fast deliveries of 10 l and 20 l, and
 - b. check computed price to pay at instrument and kiosk (for self-service).
 5. After repair where only the meter seal has been broken, perform the accuracy tests at slow and fast delivery speeds of 2 l, 5 l and 20 litres.
 6. If new circuitry is introduced or enabled in electronic computer, the tests to perform shall be –
 - a. accuracy tests at fast deliveries of 5l, 10 l and 20 l, and
 - b. check computed price to pay at instrument and kiosk (for self-service).
 7. The maximum permissible errors on verification and in service are:
 - a. + 1% to - 0.5% of the purported quantity delivered, but twice this shall be permitted for the minimum delivery
 - b. The instrument shall be set to as near as zero error as practicable.
 8. Where the quantity purported to be delivered is that at a specified temperature, then the errors shall be corrected for the temperature difference using a thermometer (with maximum error 0.2 °C) and the appropriate density of the fuel.

38. For measuring instruments on vehicles

9. The tests to be performed on the system for verification are –
 - a. accuracy of delivered quantity by the system on at least 2 liquids of different viscosity (usually gas oil and kerosene)
 - b. three test runs at a flowrate near the maximum flowrate with the least viscous product
 - c. three test runs at a flowrate near the minimum flowrate with the more viscous product.
 - d. check that the printed ticket corresponds to the meter and the delivery number is consecutive
 - e. hose dilation test
 - f. gas elimination device test
 - g. blow down test, only for dry line systems
 - h. for temperature compensating systems, check the correction is appropriately
 - i. test interlocks for –
 - i. delivery time out
 - ii. manifold foot valve
 - iii. manifold/bottom loading

- iv. product return/printer
- v. hose selection.

Schedule 6 – Water meter tests and maximum permissible errors

39. General

1. The initial verification of the measuring system shall include –
 - a. a visual examination to confirm conformity to the approved type and the required inscriptions are marked
 - b. any special requirements for testing specified in the approved type certificate
 - c. a test to show that the meter is capable of withstanding the test pressure of 1.6 times the maximum admissible pressure applied for one minute
 - d. the errors of indication shall be determined at nominal flow rates of Q_1 , Q_2 and Q_3 which shall not exceed the maximum permissible errors in the table -

Flowrate range	Maximum permissible error (MPE) as a percentage of quantity delivered
Q_1 to $< Q_2$	$\pm 6\%$
Q_2 to and including Q_4	$\pm 2.5\%$

Where

Q_1 means the minimum flowrate
 Q_2 means the transitional flow rate, where the maximum permissible error changes
 Q_3 means the permanent flow rate
 Q_4 means the overload flowrate, the highest rate used for a short period of time which will not deteriorate the instrument.

2. If all the errors of indication have the same sign, at least one of the errors shall not exceed one half the MPE.
3. The maximum permissible errors (MPE) in service shall be twice the verification MPE.

Schedule 7 – Electricity meter tests and maximum permissible errors

40. General

- (1) Check that the meter conforms to an approved type.
- (2) perform the minimum program of –
 - a. No load check
 - b. Starting current check
 - c. Current dependence, and
 - d. Accuracy of the register.
- (3) The maximum permissible error (MPE) for the various load points are –

Single phase and whole current polyphase electricity meters with balanced loads:

Load point	MPE for meters of Class A	MPE for meters of Class B	MPE for meters of Class C
1 amp @ Unity Power Factor	$\pm 2.5\%$	$\pm 1.5\%$	$\pm 1.0\%$
20 amps @ Unity Power Factor	$\pm 2.0\%$	$\pm 1.0\%$	$\pm 0.5\%$
I_{max} @ Unity Power Factor	$\pm 2.0\%$	$\pm 1.0\%$	$\pm 0.5\%$

Imax @ 0.5 Inductive Power Factor $\pm 2.0\%$ $\pm 1.0\%$ $\pm 0.5\%$
(Polyphase Meters Only)

Whole current polyphase electricity meters carrying a single-phase load:

Load point	MPE for meters of Class A	MPE for meters of Class B	MPE for meters of Class C
20 Amps @ Unity Power Factor	$\pm 3.0\%$	$\pm 2.0\%$	$\pm 1.0\%$
Imax @ Unity Power Factor	$\pm 3.0\%$	$\pm 2.0\%$	$\pm 1.0\%$

The reference conditions and their tolerances for initial and subsequent verifications shall be –

Quantity	Reference conditions	Tolerance
Voltage(s)	U_{nom}	$\pm 2\%$
Ambient temperature	23 °C	$\pm 5\text{ °C}$
Frequency	f_{nom}	$\pm 0.5\%$
Wave-form	Sinusoidal	$d \leq 2\%$
Magnetic induction of external origin at reference frequency	0 T	$B \leq 0.1\text{ mT}$
Electromagnetic RF fields 30 kHz – 6 GHz	0 V/m	$< 2\text{ V/m}$
Operating position for instruments sensitive to position	Mounting as stated by manufacturer	$\pm 3.0^\circ$
Phase sequence for poly-phase meters	L1, L2, L3	-
Load balance	Equal current in all current circuits	$\pm 5\%$ and $\pm 5^\circ$

The load conditions and their tolerances in tests for initial and subsequent verifications shall be -

Current(s)	Current range of device under test	Class A, B: $\pm 10\%$ Class C, D: $\pm 10\%$
Power factor	Power factor range of device under test	current to voltage phase difference $\pm 5^\circ$

Schedule 8 – Automatic weighing instrument test and maximum permissible errors

41. General

1. Instruments shall only be verified in the place where they are used.
2. The following shall be performed on initial verification –
 - a. visual examination to check conformity with approved type
 - b. check that the markings are correct
 - c. performance tests under the rated conditions marked on the instrument.
3. A control non-automatic weighing instruments shall be used to determine the mass discharged or weighed by the instrument. This shall determine the mass of the load of

fills with an error not exceeding one-third of the maximum permissible error (MPE) of the instrument at that load.

42. Automatic catchweighing instruments (Category Y)

4. The initial verification of the instrument, and verification after repair, shall use test loads of the articles, which are intended to be used, close to –
 - a. Min and Max
 - b. $500 e$ and $2\,000 e$, where e = verification scale interval.
5. There shall be at least 10 test weighings at each load.
6. For each load the difference between the conventional true value of mass determined on the control instrument and the indicted or printed weight value observed and recorded shall not exceed the following MPE.
7. For initial verification where $d \leq 0.2 e$
 - a. MPE = $1 e$ in the range 0 to $500 e$
 - b. MPE = $1.5 e$ in the range $501 e$ to $2\,000 e$
 - c. MPE = $2 e$ in the range exceeding $2\,000 e$.
8. For in service verification the MPE are –
 - a. MPE = $1.5 e$ in the range 0 to $500 e$
 - b. MPE = $2.5 e$ in the range $501 e$ to $2\,000 e$
 - c. MPE = $3.5 e$ in the range exceeding $2\,000 e$.
9. Where $d > 0.2 e$, the above MPE are increased by $0.5 e$.

43. Checkweigher (Category X)

10. The initial verification of the instrument, and verification after repair, shall use test loads of the articles, which are intended to be used, close to –
 - a. Min and Max
 - b. $500 e$ and $2\,000 e$, where e = verification scale interval.
11. The actual true conventional mass is determined on the control instrument.
12. Each test load is individually passed over the instrument the following number of consecutive weighings –

Load (m)	Number of test weighings
$m \leq 1\text{ kg}$	60
$1\text{ kg} < m \leq 10\text{ kg}$	30
$10\text{ kg} < m \leq 20\text{ kg}$	20
$20\text{ kg} < m$	10

13. The mean and standard deviation is calculated for each load.
14. The difference between the actual true conventional mass and the mean weight calculated by the instrument is acceptable if it does not exceed the following MPE –
 - c. MPE = $0.5 e$ in the range 0 to $500 e$
 - d. MPE = $1.0 e$ in the range $501 e$ to $2\,000 e$
 - e. MPE = $1.5 e$ in the range exceeding $2\,000 e$.
15. The in service MPE shall be twice the above.

16. The standard deviation of the weighings shall not exceed the following –

Value of the net load, m (g)	Maximum permissible standard deviation (as a % of m or in grams)	
	Initial verification	In-service inspection
$m \leq 50$	0.48 %	0.6 %
$50 < m \leq 100$	0.24 g	0.3 g
$100 < m \leq 200$	0.24 %	0.3 %
$200 < m \leq 300$	0.48 g	0.6 g
$300 < m \leq 500$	0.16 %	0.2 %
$500 < m \leq 1\ 000$	0.8 g	1.0 g
$1\ 000 < m \leq 10\ 000$	0.08 %	0.1 %
$10\ 000 < m \leq 15\ 000$	8 g	10 g
$15\ 000 < m$	0.053 %	0.067 %

44. Automatic gravimetric weighing instruments

17. Prior to testing the instrument shall be operated for a time period under normal conditions to enable stability.
18. The total measurement uncertainty of the test method shall not exceed one-third the MPE for the filling instrument.
19. The instrument shall be tested at Minfill and Maxfill, and if Minfill is less than one-third Maxfill also at a load near the centre of the range preferably at a value close to, but not exceeding, 100 g, 300 g, 1 000 g or 15 000 g as appropriate.
20. The number of test fills to perform shall be –

Preset value of the fills, F_p (kg)	Minimum number of test fills, n
$F_p \leq 1$ kg	60
1 kg $< F_p \leq 10$ kg	30
10 kg $< F_p \leq 20$ kg	20
20 kg $< F_p$	10

21. The average of each test fill load shall be calculated and the difference between that and the individual fill shall not exceed the maximum permissible deviation (MPD) –

Value of the mass of the fills, F (g)	MPD of each fill from the average of the fills (as a % of F or in grams)	
	Initial verification	In-service inspection
$F \leq 50$	7.2 %	9 %
$50 < F \leq 100$	3.6 g	4.5 g
$100 < F \leq 200$	3.6 %	4.5 %
$200 < F \leq 300$	7.2 g	9 g
$300 < F \leq 500$	2.4 %	3 %
$500 < F \leq 1\ 000$	12 g	15 g
$1\ 000 < F \leq 10\ 000$	1.2 %	1.5 %
$10\ 000 < F \leq 15\ 000$	120 g	150 g
$15\ 000 < F$	0.8 %	1 %

22. Where it is possible to preset a fill value then the difference between the preset value and the average mass of all the fills in a test sequence shall not exceed 0.25 MPD in the table above for in-service inspection.

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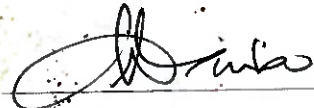
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DR NAOMI BIRIBO

Secretary to the Cabinet