Annex (1)

Essential Requirements

- **Introduction:**

The legal measuring instrument must possess a high level of metrological protection, ensuring confidence in any party affected by the measurement results the instrument generates. It must also be designed and manufactured to a high quality, particularly regarding measurement techniques and data security.

This Annex outlines the essential requirements that a legal measuring instrument must meet, in addition to the specific requirements for each legal measuring instrument detailed in Annex (2) of this Resolution.

- **Definitions:**

1. Measurand:

   The specific quantity to be measured.

2. Influence quantity:

   A value that affects the measurement result but is not part of the measurand.

3. Rated Operating Conditions:

   The sum of the measured value plus the influencing quantity, which together constitute the conditions that shall be maintained during the measurement to enable the Legal Measuring Instrument to perform the work for which it was designed under normal conditions.

4. Disturbance:

   It is an influential quantity whose value falls within the limits required by specific requirements but falls outside the operating conditions of the Legal Measuring Instrument. The influence quantity shall be considered a disturbance if the operating conditions are not specified for the legal measuring instrument.

5. Critical Change Value:

   The value at which a change in the measurement result is considered undesirable.

6. Material Measure:

A measuring instrument designed to permanently give or restore specific measurement values, without having a screen or display to show the measurement result.

7. Direct Sale:

   A commercial transaction is considered a direct sale if:

   a. The measurement result is used as the basis for the price paid.
   b. One of the parties involved in the transaction is the consumer or another party requiring a similar level of protection.
   c. The measurement result is accepted by all parties.

8. Climatic Environments:

   The climatic conditions under which the legal measuring instrument will be used. This Resolution specifies the range of temperature limits that the legal measuring instrument can withstand.

1. Allowable Error:

1-1 The allowable error in a legal measuring instrument must not exceed the maximum allowable error specified for the instrument under normal operating conditions and in the absence of disturbances, unless otherwise stated.

1-2 In the presence of disturbance, and under the rated operating conditions of the instrument, the performance requirements for the legal measuring instrument must meet those outlined in the specific annex for that instrument, as detailed in Annex (2) of this Resolution. For legal measuring instruments intended to be used in a specific, continuous electromagnetic field, the instrument must maintain its metrological properties within the maximum allowable error limits.

1-3 The manufacturer must specify the climatic environments, mechanical, and electromagnetic conditions under which the legal measuring instrument is intended to operate, along with the power supply and other influence quantities that may affect measurement accuracy, considering the specific requirements for the legal measuring instrument.

1-3-1 Climatic environment:

The manufacturer must specify the maximum and minimum temperature values as outlined in Table (1) of this Annex unless otherwise stated in the specific requirements for the legal measuring instrument. The manufacturer must also indicate whether the instrument is designed for operation in humid or dry conditions, or in open or closed environments, stating any changes in reading when the ambient temperature changes.

Table (1) Temperature Limits (°C)

Max Limits	30	40	55	70
Min Limits	5	-10	-25	-40

1-3-2 Mechanical Environment:

a. The mechanical environment is classified into the following categories:
   1. (M_1) This category applies to instruments used in areas with light vibrations and shocks, such as instruments mounted on light supporting structures exposed to small amounts of vibrations and shocks.
   2. (M_2) This category applies to instruments used in areas with moderate to high vibrations and shocks, such as those transmitted from machinery and vehicles near heavy machinery and conveyor belts.
   3. (M_3) This category applies to instruments used in areas with high or very high vibrations and shocks, such as instruments directly connected to machinery and conveyor belts.

a. The following influence quantities must be considered as relevant to the mechanical environment:
   1. Vibrations.
   2. Mechanical Shock.

1-3-3 Electromagnetic Environment:

a. The electromagnetic environment is categorized into the following categories unless the specific requirements of legal measuring instruments specify otherwise:

1. (E_1) This category applies to instruments used in areas with electromagnetic disturbances similar to those found in residential, commercial, or light industrial buildings.
2. (E_2) This category applies to instruments used in areas with electromagnetic disturbances similar to those in other industrial buildings.
3. (E_3) This category applies to instruments powered by vehicle batteries, where these instruments must comply with the specific requirements of class (E_2), in addition to the following additional requirements:
    1. Voltage drop resulting from supplying the starter motor circuit for the internal combustion engine.
    2. Decrease in load transition due to the battery disconnection from the circuit while the engine is running.

b. The following influence quantities must be considered as relevant to the electromagnetic environment:
    1. Power failure.
    2. Voltage drop.
    3. Voltage transients in feeder or signal lines.
    4. Electrostatic discharge.
    5. Radio frequency magnetic fields).
    6. Radio frequency magnetic fields applied to feeder or signal lines.
    7. Sudden changes in feeder or signal lines.

1-3-4 The following influence quantities must also be considered, where appropriate:

a. Change in voltage.
b. Mains frequency variation.
c. Power frequency magnetic fields.
d. Any other value that could significantly influence the accuracy of the legal measuring instrument.

1-4 When performing the tests outlined in this Resolution, the following shall apply:

1-4-1 Basic rules for testing and error determination:

a. The basic requirements outlined in Clauses (1-1) and (1-2) of this Annex must be verified for all relevant influence quantities unless otherwise specified in the specific requirements of the legal measuring instrument. The effect of each influence quantity must be identified individually while keeping all other influence quantities fixed, relative to reference values.
b. Metrological tests must be conducted during or after the application of the influence quantity, depending on the likelihood of its effect.

1-4-2 Ambient Humidity:

a. The tests are conducted either in a condensing environment or in a non-condensing environment, depending on the environment under which the legal measuring instrument will be used.
b. The tests are conducted in a condensing environment when it is likely that humidity will enter the legal measuring instrument, either from the surrounding air directly or through breathing, which may accelerate the condensation process inside the legal measuring instrument.

2. Reproducibility:

Measurement results of the same quantity to be measured shall be close to each other when examined in different places or by different persons, keeping the same other environment, so that the difference in the results of the measurement is relatively small when compared with the MPE Value.

3. Repeatability:

Measurement results for the same measured quantity shall be close when examined under the same conditions, such that the difference in the measurement results is relatively small when compared with the MPE Value.

4. Discrimination and Sensitivity:

The legal Measuring Instrument shall be sensitive enough for the examination, and the discrimination threshold shall be small enough for the quantity to be measured.

5. Durability:

The legal measuring instrument shall be designed and manufactured to a high standard to continuously maintain its metrological characteristics over the time period estimated by the manufacturer, provided that installation, usage, and maintenance are performed according to the manufacturer's instructions under the operational conditions for which it is intended.

6. Reliability:

The legal measuring instrument shall be designed in order to minimize the effect of faults which may lead to incorrect measurement results, unless such faults are clearly visible.

7. Suitability:

7-1 The legal measuring instrument must be designed and manufactured in a way that ensures it cannot be tampered with, with the potential for misuse being at minimal limits.

7-2 The legal measuring instrument must be appropriate for the purpose it was designed for, under rated operating conditions, and must not require any unjustified user requirements to obtain correct measurement results.

7-3 The errors arising from using the legal measuring instrument outside the controlled range must not be excessively large.

7-4 When the legal measuring instrument is designed to measure constant values of the measured quantity over time, it must not be sensitive to small variations in the measurand.

7-5 The legal measuring instrument must be robust and made from materials suitable for the environment it is designed to be used in.

7-6 The design of the legal measuring instrument must allow for its supervision once it has been placed on the market or put into use. The instrument must include specific software for its supervision, if necessary, along with the need for the user manual to

explain how to inspect it. When the legal measuring instrument is supplied with software to enable it to perform tasks other than measurement, the software that affects the metrological characteristics must be clearly identified and not influenced by other accompanying software.

8. Protection Against Corruption:

8-1 The metrological properties of the legal measuring instrument, or the measurement results, must not be affected when connected to any other device or tool or any remote control device that can connect to it by any means.

8-2 All important parts of legal measuring instrument that affect the measurement result shall be designed safely and protected from tampering or expected misuse. They shall also be designed in a manner that enables inspectors to obtain physical evidence when tampering or tampering occurs.

8-3 Software affecting metrological properties shall be identified and designed in a manner that is secure, easily identifiable and tamper-proof, and the software shall be provided with a method to enable inspectors to define the occurrence of interference with the Legal Measuring Instrument.

8-4 Measurement data and software affecting metrological properties and important metrological factors and variables stored in the system shall be adequately protected against intentional or unintentional accidents.

9. Information That Should Be Provided with the Legal Measuring Instrument:

9-1 The legal measuring instrument must bear the following information:

a. Manufacturer name or mark.
b. Information related to accuracy class.
c. The following information, where applicable:
    1. Information that relates to usage.
    2. Measurement capacity.
    3. Measurement range.
    4. Identity marking.

5. The type of approval certificate number and the issuing authority.
6. Information indicating whether or not additional devices associated with the device give metrological results that comply with this Resolution.

9-2 For small or sensitive legal measuring instruments, they must be appropriately packaged and include all the documents required by this Resolution in a clear and suitable manner.

9-3 Information on the operating method must be provided with the legal measuring instrument, unless the instrument is user-friendly to the extent that no such information is necessary. This information must be easily understandable and, where applicable, should include the following:

a. Rated Operating Conditions.
b. Classification of the mechanical and electromagnetic environment in which the instrument can operate.
c. Maximum and minimum temperature limits.
d. Possibility of condensation of vapour inside the instrument.
e. Use of the instrument in terms of whether it is for indoor or outdoor use.
f. Instructions for installation, maintenance, repair, and allowed adjustments.
g. Instructions for optimal use and any special conditions for use.
h. Conditions for compatibility with other devices, tools, or accessories that may be connected to the legal measuring instrument.

9-4 In the case of a group of similar legal measuring instruments with the same general use or located in the same area, separate user manuals will not be necessary for each instrument.

9-5 The scale gradations for the measured value shall be in one of the following formats:

a. 1x10n
b. 2x10n
c. 5x10n

Note: (n) is considered an integer or zero unless the requirements of the Legal Measuring Instrument state otherwise. The legal unit of measurement or its symbol shall also be placed near the numerical value.

9-6 The physical scale shall be marked with a nominal value or graduation in addition to the unit of measurement used.

9-7 Only legal measurement unit symbols, prefixes, and units of measurement must be used.

9-6 All marks and required data must be clear, indelible, and cannot be erased, or transferred.

10. Indication of Results:

10-1 Results must be indicated either through a display screen or in paper form.

10-2 The indication of results must be clearly presented without ambiguity in rated operating environments, and there must be clear markings and data to indicate the meaning of each result. The display screen or paper copy may include additional data, provided it does not affect the measurement of result or cause any confusion.

10-3 In the case of printing the results on paper, the results must be clear and non-removable.

10-4 For legal measuring instruments designed for direct sale, they must be designed in a way that allows the indication of results to all parties involved in the commercial transaction when installed for use. If accessories not in compliance with this Resolution are used, the label cards issued by these accessories must display specific and clear information.

10-5 Direct sale measuring instruments must provide the means for the consumer to easily and clearly view the measurement results, with the displayed result forming the basis for payment transactions.

11. Processing Additional Data for Commercial Transaction Certification:

11-1 Except for public utility measuring instruments, the legal measuring instrument must accurately record the measurement result, in alignment with the information defining the commercial transaction process, especially if:

a. The measurement being a non-repeatable.

b. The legal measuring instrument is prepared to be used in the absence of one party to the commercial transaction.

11-2 Clear evidence of the final measurement results and the accompanying information must be provided upon request by the other party.

12. Conformity Evaluation:

The legal measuring instrument must be designed in such a way that it allows for conformity evaluation according to the requirements of this Resolution and in accordance with a pre-established and clear procedure.

Annex (2)

Specific Requirements for the Legal Measuring Instruments

Specific Requirements

Annex (2-1)

Specific Requirements for Continuous and Dynamic Measurement Systems for Quantities of Liquids Other Than Water

Measuring Systems for Continuous and Dynamic Measurement of Quantities of Liquids Other Than Water

Article (1)

Scope:

Measurement systems used for constant and dynamic measurements of quantities of liquids other than water, utilized for commercial purposes.

Article (2)

Definitions:

1. Meter:
   A device designed for the constant measurement, recording, and indication of the quantity under measurement conditions of the liquid flowing through a fully charged, closed conduit.
2. Calculator:
   A part of the meter that receives signals from the measurement transducer or may be part of associated measuring instruments, responsible for calculating and indicating the measurement result.
3. Associated Measuring Instrument:
   A device connected to the calculator, used to determine a specific property of the liquid for correction or conversion purposes.

4. Conversion Device:

   A part of the calculator that converts the measured quantity under actual conditions (temperature, density, etc.) using data from the associated measuring instrument or stored data in memory into one of the following:

   a. The volume of the measurand under base conditions or mass.
   b. The volume of the measurand under measurement conditions.

5. Base Condition:

   The specified conditions under which the liquid measurand under measurement conditions is converted.

6. Measuring System:

   A system comprising the meter itself and all instruments used to ensure the accuracy of the measurement or facilitate the measurement processes.

7. Fuel Dispenser:

   A measuring system designed to refuel vehicles, small boats, and small aircraft.

8. Self-service Arrangement:

   An arrangement allowing the customer to use the measuring system to obtain the liquid for personal use without assistance from another party.

9. Minimum Measured Quantity (MMQ):

   The smallest quantity of liquid at which the measurements of the measuring system are considered metrologically acceptable.

10. Direct Indication:

    The value displayed on the legal measuring instrument, whether volume or mass, corresponding to the measured quantity that the meter can measure.

11. Interruptible / Non-Interruptible:

    A measuring system is considered interruptible when it is possible to stop the liquid flow easily and quickly, and vice versa.

12. Flow Rate Range:

    The range between the minimum flow rate (Qmin) and the maximum flow rate (Qmax).

13. Minimum Permissible Error:

The absolute value of the permissible error for the minimum measured quantity, denoted by the symbol (Emin).

Article (3)

Specific Requirements:

Article (3-1) Rated Operating Conditions:

The manufacturer must specify the rated operating conditions of the device based on the following:

1. Flow rate range.

   The flow rate range is subject to the following conditions:

   a. The flow rate range of the measuring system must fall within the flow rate range of each of its components, specifically the meter.
   b. The Meter and Measuring System (See Table (1) below).

Table (1) Flow Rate Range for the Measuring System

Measuring System Type	Liquid Property	Minimum Ratio Between Qmax: Qmin
Fuel Dispenser	Not liquefied gases	10:1
	Liquefied gases	5:1
Measuring System	Cryogenic liquids	5:1
Pipeline Measuring Systems and Ship Loading Systems	All liquids	Suitable for use
All Other Measuring Systems	All liquids	4:1

2. Liquid properties to be measured by the device by specifying the name or type of the liquid or its related properties, such as:

   a. Temperature range.
   b. Pressure range.
   c. Density range.

d. Viscosity range.

3. Nominal value of the frequency voltage supply or the limits of the direct current voltage supply.

4. The base conditions for the converted values.

Article (3-2) Accuracy Class and Maximum Permissible Errors (MPES):

1. Table (2) below shows the maximum permissible errors for quantities equal to or greater than (2) litres.

Table (2) Maximum Permissible Errors for Quantities ≥ 2 Litres

	Accuracy class				
	0.3	0.5	1.0	1.5	2.5
Measuring Systems (A)	0.3%	0.5%	1.0%	1.5%	2.5%
Meters (B)	0.2%	0.3%	0.6%	1.0%	1.5%

2. Table (3) shows the maximum permissible errors for quantities less than (2) litres.

Table (3) Maximum Permissible Errors for Quantities 2 Litres

Measured volume (V)	MPE
V < 0.1L	4 ^{x}value in table (6-2), applied to 0.1 L
0.1 L ≤ V < 0 . 2 L	4 ^{x}value in table (6-2)
0.2L<;V<0.4L	2 ^{x}value in table (6-2), applied to 0.4 L
0 . 4 L ≤ V < 1 L	2 ^{x}value in table (6-2)
1L ≤ V < 2 L	1 ^{x}value in table (6-2), applied to 2 L

3. Regardless of the measured quantity, the value of (MPE) is given as the higher of the following two values:

a. The absolute value of the permissible error shown in Tables (2) and (3) of this Annex.

b. The absolute value of the permissible error for the minimum measured quantity (Emin).

4. The following requirements apply if (Emin ≥ 2 Litres):

a. 2 R ≤ Emin

Where (R): is the smallest graduation period of the legal measuring instrument.

b. Emin is given by the following relation:

Emin = 2MMQ X A/100

Where (A): is the numerical value specified in row (A) of Table (2) of this Annex.

c. The requirement (R2 ≤ Emin) applies to minimum measurands less than (2) litres, and (Emin) is twice the value specified in Table (3) of this Annex, corresponding to row (A) of Table (2) of this Annex.

5. The (MES) values provided in row (A) of Table (2) of this Annex apply to values transformed by overflow instruments.

6. The (PES) values for values transformed by these instruments are equal to the value (A-B) ±, where (A) and (B) represent the values specified in Table (2) of this Annex. The following parts of the measuring instruments can be inspected separately:

a. Calculator:

The positive or negative (MES) values for calculable liquid quantities are equal to (1/10) of the (PES) values defined in row (A) of Table (2) of this Annex.

b. Associated legal measuring instruments:

The maximum errors of the associated legal measuring instruments, according to the measuring systems used, are as indicated in Table (4) of this Annex.

Table (4): Maximum Permissible Errors for Associated Measuring Instruments According to the Accuracy Class of Measuring Systems

Measured Quantity	Accuracy class of the measuring system				
	0.3	0.5	1.0	1.5	2.5
Temperature	±0.3°C	±0.5°C			±1.0°C

Pressure	Less than 1 MPa: ± 50 kPa		
	From (1 to 4) MPa: ± 5%		
	Greater than 4 MPa: ± 200 kPa		
Density	± 1 kg/m³	± 2 kg/m³	± 5 kg/m³
Note: These values apply to indicate quantities of liquid properties displayed by the conversion instrument.			

c. Accuracy of calculating functions:

The positive or negative values of MPE used to calculate the quantity of each liquid property are equal to (2/5) of the fixed values given in Table (4) of this Annex.

7. The provision in Clause (3-2-6-A) of this Article applies to all calculations, not just those involving converted values.

Article (3-3) Maximum Permissible Effect of Disturbances :

1. The effect of electromagnetic disturbance on measuring systems must meet one of the following conditions:
   a. The change in the measurement result must not exceed the critical change value, as defined in Clause (3-3-2) of this Article.
   b. The measurement result that shows a transient change cannot be interpreted, recorded, or transmitted as a true measurement result. In case of stoppable systems, the presence of disturbance prevents any measurement from being conducted.
   c. If the change in the measurement result exceeds the critical change value, the device must be able to stop the flow and restore the measurement result that was present before the critical change value was exceeded.
2. The critical change value is the one that is greater than the result of dividing the maximum permissible error by 5 for the measured quantity, or Emin.

Article (3-4) Durability:

After the appropriate testing and considering the time period specified by the manufacturer, the difference in the measurement result after conducting durability testing must not exceed the value specified in Row (B) of Table (2) in this Annex when compared to the initial measurement results.

Article (3-5) Suitability:

1. The measurement results obtained by different meters with the same scale interval must not deviate by more than one scale interval. If the scale intervals are different, the deviation must not exceed the largest scale interval. In any case, when arranged for self-service, the scale intervals on the main measuring system and the self-service instrument should be the same, and the measurement results should not deviate from one another.
2. Altering the measured quantity during normal operating conditions must not be possible unless this change is clearly indicated.
3. The presence of air or gas mixed with the liquid, which cannot be easily detected, must not cause a measurement error change greater than:
    a. (0.5%) for non-potable liquids and liquids with a viscosity not exceeding (1 × 10-3) Pascal × second.
    b. (1%) for potable liquids and liquids with a viscosity greater than (1 × 10-3) Pascal × second.

    In case of the presence of gas pockets, the permissible change should not be less than (1%) of MMQ.
4. Instruments for direct sales:
    a. Measurement systems designed for direct sales must be equipped with a means to reset the reading to zero, and it must not be possible to alter the measured quantity.
    b. The device must be capable of retaining the measurement result until it is accepted by all concerned parties.
    c. Measurement systems for direct sales must be suitable and stoppable.
5. Fuel dispensers:

a. The fuel dispenser must not be reset during measurement.
b. A new measurement must not start until the reset is completed.
c. When the measurement system is equipped with a price display unit, the price difference displayed on the price display unit and the price calculated from the price unit multiplied by the quantity sold must not exceed the price corresponding to Emin.

Article (3-6) Power Supply Failure:

The measurement system must be equipped with a power backup device that ensures all measurement functions are protected during a main power supply failure, or be equipped with a means to save and display results, and a means to stop the flow upon power failure.

Article (3-7) Putting Into Use :

Table (5) illustrates the accuracy classes of measuring systems used in various fields.

Table (5): Accuracy Classes of Measuring Systems Used in Various Fields

Accuracy Class	Types of Measuring Systems
0.3	Pipeline Measuring Systems.
0.5	All the following measurement systems unless stated otherwise in this Table: 1. Fuel dispenser (excluding liquefied gases). 2. Measurement systems for tanks intended for low-viscosity liquids (<0.02 Pascal × second).
	3. Measurement systems for ships, trains, and tanks being loaded or unloaded. 4. Measurement systems for milk. 5. Measurement systems for aircraft fuel refilling.
1.0	1. Measurement systems for liquefied gases under pressure measured at temperatures (≥10°C).

	2. Measurement systems with accuracy class (0.3) or (0.5) but used for the following liquids: a. At temperatures (<-10°C) or greater than (50°C). b. With dynamic viscosity (>1 Pascal × second). c. With volumetric flow rates (> 20 litres/hour).
1.5	1. Measurement systems for liquefied carbon dioxide. 2. Measurement systems for liquefied gases under pressure and measured at temperatures (<10°C) (excluding low-temperature liquids).
2.5	Measurement systems for low-temperature liquids (<- 153°C).
Note: The manufacturer may specify a better accuracy for a specific type of measuring system.	

Article (4)

Measurement Units:

1. Quantities of gasoline, diesel, and kerosene should be measured in litres or cubic metres.
2. Quantities of liquefied petroleum gas (LPG) must be measured in kilograms or tons. If measured in litres, the value must be multiplied by the actual or officially approved density of liquefied petroleum gas (LPG).
3. Other quantities must be measured in any of the following units: millilitres (mL), cubic centimetres (cm^3), litres (L), cubic metres (m^3), grams (g), kilograms (kg), or tons (ton).

Article (5)

Requirements of the Conformity Assessment:

The manufacturer must provide a conformity assessment certificate according to one of the following Conformity Modules:

1. B+F

2. B+D

3. H1

Article (6)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, the Meter must meet all the requirements outlined in this Resolution.

Article (7)

Periodic Verification Requirements:

1. For the purposes of Conformity with the Periodic Verification Requirements, the following examinations shall be performed:
   a. Visual inspection, including the reading screen, the integrity of the seals and metrological marks, the Label Card, the absence of visible defects, and the serial number of the Meter.
   b. Maximum Permissible Error Examination.
2. The maximum allowable error value for periodic confirmation purposes is twice the maximum allowable error value for Initial confirmation.
3. Tests referred to in this Article shall be conducted annually.

Article (8)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of Meters to verify their conformity with this Resolution.

Article (9)

Metrological Marks:

Meters shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry.
3. The year the Meter was put into service or the year of verification. However, it is permissible to substitute the year of manufacture or verification of the Meter with the availability of documented records of the Meters with the authorized authorities, stored in an appropriate manner that allows easy tracking of the Meter's serial number with the year it was put into service.

Annex (2-2)

Special Requirements for Automatic Weighing Instruments

Automatic Weighing Instruments

Article (1)

Scope:

Automatic weighing instruments used for determining the mass of an object using the Earth's gravitational force on that object.

Article (2)

Definitions:

1. Automatic Weighing Instrument:
   A device that determines the mass of a product without operator intervention, following pre-programmed automatic procedures according to the properties of the device.
2. Automatic Catchweigher:
   An automatic weighing device that determines the mass of a pre-assembled group of weights (bundles) separately or the mass of a single weight.
3. Automatic Checkweigher:
   An automatic check-weighing device that divides a set of different weights into two or more subgroups according to their differences in mass and pre-determined nominal values.
4. Weigh Labeller:
   An automatic catchweighing instrument that prints the weight value on the product.
5. Weigh/Price Labeller:
   An automatic catchweighing instrument that prints the weight and price on the product.
6. Automatic Gravimetric Filling Instrument:

An automatic weighing instrument that fills containers with a specific, pre-determined weight of a particular product.

7. Discontinuous Totalizer:

   An automatic weighing instrument that weighs the total load of a product by breaking it into small loads, determining the mass of each small load separately, and then summing these small loads to form the total load of the product.

8. Continuous Totalizer:

   An automatic weighing instrument that determines the weight of a full load of product moving on a conveyor belt without the need to break it into smaller loads and interrupt the movement on the conveyor belt.

9. Rail-weighbridge:

   An automatic weighing instrument that receives the load outside the railway tracks to weigh the load of train cars.

Part One:

Common Requirements for All Types of Automatic Weighing Instruments

Article (1)

Rated Operating Conditions:

The manufacturer shall define the operating environment of the instrument as follows:

1. Measured Quantity:

   The measurement range is defined by the maximum and minimum capacity.

2. Quantities Influencing the Power Supply:
   a. In case of altering current power supply: the nominal value of the alternating current power supply or its AC voltage limits.
   b. In case of direct current power supply: the nominal value and the minimum value of the direct current power supply or its DC voltage limits.

3. Quantities of Mechanical and Climatic Influences:
   a. The minimum temperature range (^{30}C), unless specified otherwise in other clauses of this Annex.

b. The classifications based on mechanical environment mentioned in Annex (1), Paragraph (1-3-2), shall not apply. The manufacturer shall define the mechanical operating environment for instruments used in special mechanical stress conditions (such as those used in machinery).

4. Other Influencing Quantities (if any):
   a. Rated Operating Conditions.
   b. Characteristics of the product to be weighed.

Article (2)

Permissible Disturbance - Electromagnetic Environment:

The required performance and critical changes for each type of automatic weighing instrument outlined in the following sections of this Annex.

Article (3)

Suitability:

1. A means must be provided to limit the effects of tilt, load, and rated operating conditions so that the maximum permissible errors do not exceed the natural limits during rated operation.
2. Tools and materials must be provided to handle the equipment so that the maximum permissible errors do not exceed those in rated operation.
3. The operator's control over the machine must be clear and effective.
4. The operator must verify the integrity of the results display.
5. Zero modes must be provided to allow the device to be operated to achieve results within the maximum permissible errors during rated weighing conditions.
6. Any value outside the permissible measurement range must be defined and printed, if possible.

Article (4)

Requirements of the Conformity Assessment:

1. The manufacturer of mechanical automatic weighing devices must provide a conformity assessment certificate according to one of the following Conformity Modules:
   a. B+D
   b. B+E
   c. B+F
   d. D1
   e. F1
   f. G
   g. H1
2. The manufacturer of electromechanical automatic weighing devices must provide a conformity assessment certificate according to one of the following Conformity Modules:
   a. B+D
   b. B+E
   c. B+F
   d. G
   e. H1.
3. The manufacturer of electronic weighing devices or those including software must provide a conformity assessment certificate according to one of the following Conformity Modules:
   a. B+D
   b. B+F
   c. G
   d. H1

Part Two:

Automatic Catchweighers

Article (1)

Accuracy Class:

1. Devices are divided into initial categories determined by the manufacturer, which are: (Y) or (X).
2. These initial categories are subdivided into four accuracy classes, also determined by the manufacturer, which are:

XI	XII	XIII	XIV
Y(1)	Y(II)	Y(a)	(Y(b)

Article (2)

Category (X) Devices:

1. Category (X) devices apply to those used for verifying the actual quantity of pre-packaged goods.
2. The accuracy class is followed by the coefficient (x), which defines the maximum permissible standard deviation as specified in clause (4) of Article (4) of this Annex. The manufacturer must determine the coefficient (x), which should be (≤ 2) and in the form of ($1x10^{k}$), ($2x10^{k}$), or ($5x10^{k}$), where (k) is a negative integer or zero.

Article (3)

Category (Y) Devices:

Category (Y) applies to all other automatic catchweighing devices.

Article (4)

Maximum Permissible Error:

1. Table (1) below shows the maximum permissible error for Category (Y) devices and the average maximum permissible error for Category (X) devices in relation to the net load during the verification of scale intervals.

Table (1): Net Load in Verification Scale Intervals and the Average Maximum Permissible Error for Category (X) Devices and the Maximum Permissible Error for Category (Y) Devices

Maximum Permissible Error	Average Maximum Permissible Error	Net load (m) in verification scale intervals (e)							
Y	X	Y(b)	XIV	Y(a)	XIII	Y(II)	XII	Y(I)	XI
±1 e	± 0.5e	0 < m ≤ 50		0 < m ≤ 500		0 < m ≤ 5000		0 < m ≤ 50000	
± 1.5 e	± 1 e	50 < m ≤ 200		500 < m ≤ 2 000		5 000 < m ≤ 20 000		50 000 < m ≤ 200 000	
± 2 e	± 1.5 e	200 < m ≤ 1 000		2 000 < m ≤10 000		20 000 < m ≤ 100 000		200 m	

2. Standard Deviation:

   The maximum permissible value for the standard deviation for devices of class (x) is obtained by multiplying the Parameter (x) by the value specified in Table (2) below.

Table (2): Net Load and Maximum Permissible Standard Deviation for Class X (1)

Net load (m)	Maximum Permissible standard deviation for class X (1)
M ≤ 50 g	0.48 %
50 g < m ≤ 100 g	0.24 g
100 g < m ≤ 200 g	0.24%
200 g < m ≤ 300 g	0.48 g
300 g < m ≤ 500 g	0.16%
500 g <m≤ 1000 g	0.8 g
1000 g <m≤ 10 000g	0.08 %
10 000 g <m≤ 15 000g	8 g
15 000 g < m	0.053 %
For class XI and XII (x) shall be less than 1. For class XIII (x) shall be not greater than 1. For class XIV (x) shall be greater than 1.	

3. Verification Scale Interval for Single-Interval Instruments:

Table (3) below shows the verification scale interval for single-interval instruments according to the accuracy class.

Table (3): Verification Scale Interval for Classes (X) and (Y) for Single-Interval Instruments

Accuracy classes		Interval Verification scale	Number of verification scale intervals n = Max/e	
			Minimum	Maximum
XI	Y(I)	0.001 g < e	50 000	-
XII	Y(II)	0.001 g ≤ e ≤ 0.05g	100	100 000
		0.1 g ≤ e	5 000	100 000

XIII	Y(a)	0.1 g ≤ e ≤2 g	100	10 000
		5g ≤ e	500	10 000
XIV	Y(b)	5g ≤ e	100	1 000

4. Verification Scale Interval for Multi-Interval Instruments:

Table (4) below shows the verification scale interval for multi-interval instruments according to the accuracy class.

Table (4): Verification Scale Interval for Classes (X) and (Y) for Multi-Interval Instruments

Accuracy classes		Interval Verification scale	Number of verification scale intervals n = Max/e	
			Minimum value[1] $N = Max_i/e_{(i+1)}$	Maximum value $N = Max_i/e_i$
XI	Y(I)	0.001 g < e	50 000	-
XII	Y(II)	0.001 g ≤ e ≤ 0.05g	5 000	100 000
		0.1 g ≤ e	5 000	100 000
XIII	Y(a)	0.1 g ≤ e ≤2 g	500	10 000
XIV	Y(b)	5g ≤ e	50	1000

Where:

i=1,2, … r

i = partial weighing range

r = total number of partial ranges

([1]) For i = r the corresponding column of Table 3 applies with e replaced by e_r

Article (5)

Measuring Range:

When defining the measuring range for instruments of class (X), the manufacturer must ensure that the minimum measuring range is not less than the values specified in Table (5) below.

Table (5): Accuracy Class and Minimum Capacity

Accuracy class	Minimum capacity
Y(I)	100 e
Y(II)	20 e for 0.001 g ≤e ≤ 0.05 g, and 50 e for 0.1g≤e
Y(a)	20 e
Y(b)	10 e
Scales used for classification (e.g., postal scales and garbage scales)	e 5

Article (6)

Dynamic Setting:

1. Dynamic settings operate within a specific load range determined by the manufacturer.
2. Dynamic settings that are exposed to any dynamic effects on the moving load must prevent operation outside the permissible load range and be protected from operating beyond the allowed range.

Article (7)

Performance of Devices Under Electromagnetic Influences:

1. Maximum permissible errors due to influence of coefficients:

1-1 For devices of Class (X):

a. For automatic operation as specified in Tables (1) and (2) of this Annex.

b. For static weighing in non-automatic operation as specified in Table (1) of this Annex.

1-2 For devices of Class (Y):

a. For each load in automatic operation, as specified in Table (1) of this Annex.

b. For static weighing in non-automatic operation as specified for Class (X) in Table (1) of this Annex.

2. The critical change value due to disturbances is a single value for the verification period.

3. Temperature range:

a. The minimum range for Class (XI) and (YI) is (5^{o}C).

b. The minimum range for Class (XII) and (YII) is (15^{o}C).

Part Three:

Automatic Gravimetric Filling Instruments

Article (1)

Accuracy Class:

1. The manufacturer must specify the reference accuracy class (Ref (x) and the operational accuracy class (x)X.

2. The type of instrument is clarified by the reference accuracy class (Ref (x), which corresponds to the best possible accuracy for instruments of this type. Individual instruments may have one or more of the (x)X after installation, taking into account the specific products to be weighed. The coefficient (x) should be (≤ 2) and in the form of ($1x10^{k}$), ($2x10^{k}$), or ($5x10^{k}$), where (k) is a negative integer or zero.

3. Ref(x) applies to static loads.

4. The operational accuracy class X(x), where (X) is the system linking the accuracy to the measured load, and (x) represents the error limits specified for accuracy class (1) X, as shown in Table (6) below.

Article (2)

Maximum Permissible Error:

1. Fixed Weighing Error:

1-1 The maximum permissible error for the reference accuracy class (Ref(x) for static loads under rated operating conditions is (0.312) times the maximum permissible deviation for each filling as specified in Table (5) of this annex, multiplied by the accuracy class coefficient (0X).

1-2 The maximum permissible error for fixed weights is the required accuracy for the selected weights, as specified in Table (6) below, for instruments with multiple load fillings (weights, cumulative loads defined for filling). This does not represent the sum of the maximum deviation for individual loads.

2. Deviation from Filling Rate: See Table (6) below.

Table (6) Deviation from Filling Rate

Value of the mass, m (g), for the fills	Maximum permissible deviation from the average for class X(1)
M ≤ 50	7.2%
50 ≤ m≤ 100	3.6%
100<m≤ 200	3.6%
200 < m ≤ 300	7.2%
300 < m ≤ 500	2.4%
500 < m ≤ 1 000	12%
1 000 < m ≤ 10 000	1.2%
10 000 < m ≤ 15 000	12%

15 000 < m	0.8%
Note: The calculated deviation from the average for each filling can be adjusted to account for the effect of the material's part volume.	

3. Error Relative to Pre-set Value (Error Position):

   The maximum deviation between the pre-set value for the weight and the average mass for filling, for instruments where a pre-set weight value can be determined, must not exceed (0.312) of the maximum permissible deviation for each filling from the average, as specified in Table (5) of this Annex.

Article (3)

Performance Under Influence Factors and Electromagnetic Disturbances:

1. The maximum permissible error due to influence factors shall be as specified in Table (8) of Article (8) of this Annex.
2. The Critical Change Value Due to Disturbance is the change in the reading of the fixed weight, and it equals the maximum permissible error as specified in Table (8) of Article (8) of this Annex, calculated for the lowest filling rate, or a change that can have an equivalent effect on the filling in cases where instruments are required when the package consists of multiple loads. The calculated critical change value must be rounded to the next higher scale interval.
3. The manufacturer must specify the minimum filling value.

Part Four:

Discontinuous Totalizers

Article (1)

Accuracy Class:

The weighing instruments are divided into four accuracy classes: (1, 2, 0.2, 0.5).

Article (2)

Maximum Permissible Errors:

Table (7) below shows the maximum permissible error for each accuracy class.

Table (7) Maximum Permissible Error for Each Accuracy Class

Accuracy class	MPE of totalized load
0.2	±0.10%
0.5	±0.25%
1	±0.50%
2	±1.00%

Article (3)

Totalizer Scale Interval:

The totalizer scale interval (d) must be within the following range:

$0.01\%\ Max \leq d_t \leq 0.2\%\ Max$

Article (4)

Minimum Total Load ($\sum_{min}$):

The minimum total load must not be less than the load at which the maximum permissible error equals the totalizer scale interval (D_t), and must not be less than the minimum load specified by the manufacturer.

Article (5)

Zeroing Modes:

Instruments that do not have the zeroing feature after each weighing must be equipped with a zeroing tool. Automatic operation must be prevented if the zero changes as follows:

1. ($1d_t$) for instruments with automatic zeroing.
2. ($0.5d_t$) for instruments with semi-automatic or non-automatic zeroing.

Article (6)

Operator Interaction:

Adjustment and reset must be prevented during automatic operation.

Article (7)

Printing:

Resetting the total must be prevented for instruments equipped with a printing machine until it has been fully printed. Additionally, the total must be printed in case of an interruption to automatic operation.

Article (8)

Performance under Influence Factor and Electromagnetic disturbances:

1. The maximum permissible errors due to influence factors are specified in Table (8) below.

Table (8) Load in Totalization Scale Intervals and Maximum Permissible Errors

Load (m) in Totalization Scale Intervals (d_t)	MPE Maximum Permissible Error
$0 < m \leq 500$	$\pm 0.5\ d_t$
$500 < m \leq 2\ 000$	$\pm 1.0\ d_t$
$2\ 000 < m \leq 10\ 000$	$\pm 1.5\ d_t$

2. The critical change value due to disturbance is considered to be one scale interval for any weight reading and any stored total.

Part Five:

Continuous Totalizers

Article (1)

Accuracy Class:

The instruments are divided into three accuracy classes: (0.5, 1, 2).

Article (2)

Measurement Range:

1. The manufacturer must specify the measuring range and the ratio between the minimum net load on the weighing unit and the maximum capacity, as well as the minimum total load.
2. The minimum total load ($\sum$min) must not be less than:
   a. (800d): for accuracy class (0.5).
   b. (400d): for accuracy class (1).
   c. (200d): for accuracy class (2).

Note: (d) refers to the totalization scale interval in general totalizer instruments.

Article (3)

Maximum Permissible Error:

Table (9) shows the maximum permissible error for the totalized load for each accuracy class.

Table (9) Accuracy Class and Maximum Permissible Error for Totalized Load

Accuracy Class	MPE of Totalized Load
0.5	± 0.25 %
1	± 0.50 %
2	± 1.00 %

Article (4)

Belt Speed:

The belt speed must be determined by the manufacturer, and the belt speed must not change by more than (5%) from the nominal speed value for single-speed and variable-speed belt scales that have a manual speed controller. The product must not have a speed different from that of the belt.

Article (5)

General Totalizer Instruments:

The instrument must not be able to be reset to zero.

Article (6)

Performance Under Influence Factors and Electromagnetic Disturbances:

1. The maximum permissible error caused by influence factors for the load, not less than ($\sum_{min}$), is (0.7) multiplied by an appropriate value specified in Table (9) of this Annex and rounded to the nearest scale interval (d).
2. The critical change in reading due to disturbance must be (0.7) multiplied by an appropriate value specified in Table (9) of this Annex, for a load equal to the minimum operating load (min), and according to the type of weighing instrument used, the reading must be rounded to the next higher scale interval.

Part Six:

Automatic Rail Weighbridges

Article (1)

Accuracy Class:

The instruments are divided into four accuracy classes: (1, 2, 0.2, 0.5).

Article (2)

Maximum Permissible Error:

1. Table (10) below shows the maximum permissible error for weighing during movement of a single vehicle or a full train.

Table (10) Accuracy Class and Maximum Permissible Error

Accuracy Class	MPE of Totalized Load
0.2	± 0.10 %
0.5	± 0.25 %
1	± 0.50 %
2	± 1.00 %

2. The maximum permissible error for weighing connected or unconnected locomotives must be one of the following values, taking the higher value:
   a. The value calculated according to Table (10) of this Annex, rounded to the nearest scale interval.
   b. The value calculated according to Table (10) of this Annex, rounded to the nearest scale interval for a weight equal to (35%) of the maximum weight of the train car (as marked on the train car).
   c. One scale interval (d).
3. The maximum permissible error for weighing a complete locomotive during movement must be one of the following values, taking the higher value:
   a. The value calculated according to Table (10) of this Annex, rounded to the nearest scale interval.

b. The value calculated according to Table (10) of this Annex for a single train car weight, equal to (35%) of the maximum weight (as marked on the train car), multiplied by the number of reference wagons in the train (where the number of train cars do not exceed (10), rounded to the nearest scale interval.

c. One scale interval (d) for each train car in the train, not exceeding the total number of train cars of (10d).

4. When weighing connected train cars, errors not exceeding (10%) of the total weight of the full wagons may exceed the maximum permissible error specified in Paragraph (2) of this Article, but must not exceed twice the maximum permissible error.

Article (3)

Scale Interval (d):

The relationship between accuracy class and scale interval must be determined as shown in Table (11) below:

Table (11): Scale Interval for Each Accuracy Class

Accuracy class	Scale interval (d)
0.2	$d \leq 50$ kg
0.5	$d \leq 100$ kg
1	$d \leq 200$ kg
2	$d \leq 500$ kg

Article (4)

Measurement Range:

1. The minimum capacity must not be less than (1) ton and must not exceed the minimum value of the train car weight divided by the number of partial weights.
2. The minimum weight of the train car must not be less than (50 d).

Article (5)

Performance Under the Effect of Influence Factors and Electromagnetic Disturbances:

1. The maximum permissible error due to disturbance must be determined as shown in Table (12) below:

Table (12): Load in Verification Scale Intervals and Maximum Permissible Error

Load (m) in Totalization Scale Intervals (d_1)	Maximum Permissible Error
$0 < m \leq 500$	± 0.5 d
$500 < m \leq 2\,000$	± 1.0 d
$2\,000 < m \leq 10\,000$	± 1.5 d

2. The change in the critical value due to disturbance is one scale interval.

Part Seven:

Subsequent Verification Requirements and Compliance Marks for Automated Weighing Instruments

Article (1)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, these instruments must meet all the requirements outlined in this Resolution.

Article (2)

Periodic Verification Requirements:

1. For the purposes of Conformity with the Periodic Verification Requirements, the following examinations shall be performed:
   a. Visual inspection, which includes, but is not limited to, ensuring the integrity of seals and metrological marks, the absence of visible defects, and the serial number.
   b. Maximum Permissible Error Examination.
   c. Testing for repeatability.
2. The maximum allowable error value for periodic confirmation purposes is twice the maximum allowable error value for Initial confirmation.
3. Tests referred to in this article shall be conducted annually.

Article (3)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of automated weighing instruments to verify their conformity with this Resolution.

Article (4)

Metrological Marks:

Automated weighing instruments shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark/ seal approved by the Ministry.

Annex (2-3)

Special Requirements for Taxi Meters

Taxi meters

Article (1)

Scope:

Taxi meters used in taxi vehicles.

Article (2):

Definitions:

1. Taximeter:

   An instrument that works with a signal generator to form the measuring device, which measures the time period and calculates the distance based on the signal received from the distance signal generator. Additionally, the taxi meter calculates and displays the fare for the trip based on the calculated distance or the measured time period of the trip.

2. Fare:

   The total amount due for the trip based on the initial hiring fee, the trip distance, and the trip duration, excluding any additional service charges.

3. Cross-over Speed:

   The speed value resulting from dividing the time tariff by the distance tariff value.

4. Normal Calculation Mode (S) (Single Application of Tariff):

   Calculating the fare based on applying the time tariff when the speed is below the cross-over speed and applying the distance tariff when the speed exceeds the cross-over speed.

5. Normal Calculation Mode (D) (Double Application of Tariff):

   Calculating the fare based on the simultaneous application of the time and distance tariffs for the entire trip.

6. Operating Mode:

   The different modes of the taxi meter that indicate its operational status, which are:

   a. For Hire:

      The mode where the meter is not calculating the fare.

   b. Hired:

      The mode where the meter is calculating the fare.

   c. Stopped:

      The mode where the due fare is displayed on the screen, but the meter is not calculating the fare at that moment.

Article (3)

Design Requirements:

1. The taxi meter must be designed to calculate the distance and time of the trip.
2. The taxi meter must be designed to calculate and display the fare in monetary units.
3. The meter must allow adjustment of the decimal places for the fare, from one to three decimal places.
4. The taxi meter must be designed to calculate and display the fare in UAE Dirhams with two decimal places accuracy and show zero value (0.xx).
5. The meter must have three buttons to determine the operating mode.
6. The taxi meter must be designed to display the final trip value when in the "Stopped" operating mode.
7. The taxi meter must be capable of applying the normal calculation mode (S), and if it allows the application of the normal calculation mode (D), the design must permit selection between these two modes through a mechanism accessible only after removing the protective seals.
8. The taxi meter must be capable of providing the following data through secure and tamper-proof connections:

   a. Operating Mode.

   b. Totalizer data.

c. General information related to the constant of the distance signal generator, date of securing, taxi identifier, real-time, and identification of the tariff.

d. Fare information for the trip, including:

1) Total fare for the trip.

2) How the fare was calculated.

3) Additional charges.

4) Date, start time, and end time of the trip.

5) Distance travelled.

6) Tariff information and factors determining the fare.

e. The meter must not be equipped with any means to modify any factors affecting the measurement result without removing the protective seals.

9. The meter must be adjustable for all variables affecting the measurement result (fare), such as the constant of the distance signal generator, the initial fare value, the cross-over speed, and the distance travelled per fills, within an area protected by the official protective seal.

Article (4)

Rated Operating Conditions:

1. The mechanical environment class is (M3).
2. The minimum range for temperature is ($80^{\circ C}$).
3. The manufacturer must specify the limits of the direct current power supply on which the device was designed.

Article (5)

Maximum Permissible Errors (MPES):

The maximum permissible errors, excluding any error resulting from the operation of the taxi meter, are:

1. For elapsed time: (±0.1%), with a minimum of (0.2) seconds.
2. For distance travelled: (±0.2%), with a minimum of (4) metres.
3. For fare calculation: (±0.1%), with a minimum of (0.25) Dirhams.

Article (6)

Influence of Permissible Disturbance / Electromagnetic Immunity:

1. The electromagnetic environment class is (E3).
2. The maximum permissible errors must be taken into account in the presence of electromagnetic disturbances.

Article (7)

Power Supply Failure:

The taxi meter must achieve the following in the event of a voltage drop below the minimum operating limit specified by the manufacturer:

1. Continue functioning correctly or resume its correct function without losing the data available before the voltage drop if the drop is temporary (e.g., due to engine restart).
2. Terminate existing measurements and return to the "For Hire" mode if the voltage drop lasts longer.

Article (8)

Other Requirements:

1. The manufacturer must specify the compatibility conditions between the taxi meter and the distance signal generator.
2. If there are additional charges for extra services entered by the driver, they must be displayed separately and clearly.
3. All values displayed to the passenger must be appropriately shown, clearly readable in both day and night, and without any ambiguity.
4. The meter must be protected against any potential tampering, whether directly by the user, through connected instruments and devices, or by any other means.
5. The taxi meter must be equipped with a non-adjustable or non-resettable totalizer for all the following values:
    a. The total distance travelled by the taxi.
    b. The total distance travelled when the taxi meter is in the "Hired" mode.

c. The total number of hired trips.
d. The total amount due for additional charges.
e. The total amount due for the fare.

6. The totalized values must include stored values as mentioned in Clause (7) of this Article, under the conditions of power supply loss.
7. In the event of a power outage, the taxi meter must have the capability to store the totalized values for one year to enable reading the meter values from another medium.
8. Adequate precautions must be taken to prevent the use of totalized values in deceiving passengers.
9. The meter must be equipped with tamper-proof means for automatically adjusting the tariff according to:
   a. The distance of the trip.
   b. The duration of the trip.
   c. The time of day.
   d. The date.
   e. The day of the week.
   f. The initial engagement according to the time of day.
10. The meter must be installed in a protected and secure manner to ensure that the measurement result (fare) is not affected by the taxi's equipment.
11. The meter must be installed in an easy way that ensures it can be checked after installation for time accuracy, distance measurements, and accuracy of fare calculations.
12. The meter must be installed in a clear place for passengers in all seats of the taxi.
13. The meter must be installed and equipped according to the manufacturer's instructions in a way that ensures easy verification.
14. The taxi meter must be protected in a way that ensures the interests of the passenger, driver, employer, and official authorities.
15. The taxi meter must be designed so that it does not exceed the Maximum Permissible Error (MPE) without adjustment for a period of one year under normal usage.

16. The taxi meter must be equipped with a real-time clock, meaning that if the time of day and date are stored, either or both can be used for automatic tariff changes. The real-time clock requirements are:
    a. Maintaining time accuracy of (0.02%).
    b. The possibility of clock correction not exceeding two minutes per week, and it must automatically adjust for daylight saving time if needed.
    c. Manual or automatic correction during the trip must be prevented.
17. The distance travelled must be displayed in the unit (km) and time in the format (hh:mm:ss).
18. Printer Requirements:

    The meter must be equipped with a directly linked printer that cannot be adjusted in a way that affects the measurement result (fare), and the printed receipt must show the following:
    a. The name of the entity to which the taxi belongs and the phone number.
    b. The vehicle number.
    c. The driver's identification number.
    d. The start date of the trip in the format (DD/mm/yyyy) and the start time of the trip in the format (hh:mm:ss).
    e. The end date of the trip in the format (DD/mm/yyyy) and the end time of the trip in the format (hh:mm:ss).
    f. The distance travelled in the unit (km).
    g. The fare for the trip.
    h. Additional charges.
    i. The total fare.
    j. The start and end locations of the trip.

Article (9)

A taxi meter may be equipped with a payment system using bank cards or smart cards, subject to the following conditions:

1. The system must be tamper-proof and not adjustable externally.

2. The system must be directly linked to the meter so that the fare can be taken from the meter without any intervention from the driver.
3. The system must be secure for use.
4. The system must be equipped with a printer that provides the passenger with a receipt indicating the amount paid.

Article (10)

A taxi meter may be equipped with a system for wireless tariff modification, with the approval of the official authorities in the country, provided that the tariff manipulation is protected.

Article (11)

The meter must be equipped with a means to connect the "For Hire" button to the taxi's signal light, allowing the signal to light up when the taxi is not for hire and to turn off when the taxi is in hire mode.

Article (12)

Requirements of the Conformity Assessment:

The manufacturer of taxi meters must provide a conformity assessment certificate according to one of the following Conformity Modules:

a. B+D
b. B+F
c. H1

Article (13)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, the Meter must meet all the requirements outlined in this Resolution.

Article (14)

Periodic Verification Requirements:

1. For the purposes of Conformity with the Periodic Verification Requirements, the following examinations shall be performed:
   a. Visual inspection, including the reading screen, the integrity of the seals and metrological marks, the Label Card, the absence of visible defects, and the serial number of the Meter.
   b. Maximum Permissible Error Examination.
2. The maximum permissible error for periodic verification shall be as follows:
   a. For elapsed time: (± 0.2%).
   b. For the distance travelled: (±2%).
3. Tests referred to in this article shall be conducted annually.

Article (15)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of Meters to verify their conformity with this Resolution.

Article (16)

Metrological Marks:

Meters shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry.

Annex (2-4)

Specific Requirements for Material Legal Measuring Instruments (With Fixed Quantity)

Material Measures

First:

Material Measures of Length

Article (1)

Scope:

Material length measures used for commercial purposes.

Article (2):

Definitions:

Material Measure of Length:

A tool containing scaled marks such that the distances between them are given in the legal units of length.

Article (3):

Reference Conditions:

1. For length tapes that are equal to or greater than (5) metres, the maximum permissible error (MPE) values must conform to the values indicated in Table (1) of this Annex, when pulled with a force of (50) newtons or other force values as defined by the manufacturer and indicated on the tape. This also applies to rigid or semi-rigid length measures that do not require pulling force.
2. The reference temperature is ($20 \pm {}^{5°C}$) unless the manufacturer determines another value, provided that it is indicated on the measure.

Article (4)

Maximum Permissible Error (MPE):

1. The maximum permissible error, in millimetres (mm), positive or negative, between two non-consecutive scale marks, which are (a+bL), where they represent the following:
   a. (L) is the length value rounded up to the nearest full metre.
   b. (a) and (b) are values specified in Table (1) below.
2. When the measuring tool's end is bounded by a surface, the MPE for any distance starting from this point increases by a value of (c), as per the following equation:
   (a + bL + c)

Table (1)

Accuracy class	a (mm)	B	C (mm)
I	0.1	0.1	0.1
II	0.3	0.2	0.2
III	0.6	0.4	0.3
D - Special class for dipping tapes (1) Up to and including (30) m (2)	1.5	0	0
S-special class for tank strapping tapes for each (30) m length when the tape is supported on a flat surface.	1.5	0	0
1. Applied to the weight of the dipping tape. 2. If the nominal length of the tape exceeds (30) m, an increase in MPE of (0.75 mm) is allowed for every additional (30) m of tape length.			

3. The dipping tapes can also be of accuracy class (I) or (II), in which case the MPE value for any length between two non-consecutive graduation marks, one on the dipping

and the other on the tape, is (0.6) when the value derived from applying the relationship defined in Article (3-2) is less than (0.6) mm.

4. Table (2) below shows the MPE values for both the length between two consecutive scale marks and the maximum allowable difference between two consecutive periods.

Table (2)

Length i of the interval	MPE or difference in mm according to accuracy class		
	I	II	III
i < 1 mm	0.1	0.2	0.3
1 mm < i ≤ 1 cm	0.2	0.4	0.6

5. If the measuring rule is of the type that folds (bends), the maximum permissible error should not exceed the values stated in Table (2) of this Annex, plus:
   1) (0.3) mm for Class II.
   2) (0.5) mm for Class III.

Article (5)

Materials:

1. The material measures must be made from materials such that the change in length due to temperature variation up to ($\pm 8^{5}$°C) from the reference temperature does not exceed the MPE. This does not apply to accuracy classes (S) and (D), where the manufacturer intends to apply thermal expansion corrections to account for readings wherever necessary.
2. The materials used for measures must have dimensions that may change permanently when exposed to a wide range of relative humidity, only for accuracy classes (II) or (III).

Article (6)

Marks:

1. The nominal value of the measure.
2. The millimetres scale must be numbered for every centimetre.
3. All scales must be numbered for measures with a scale interval greater than (2) cm.

Article (7)

Requirements of the Conformity Assessment:

The manufacturer of material length measures must provide a conformity assessment certificate according to one of the following Conformity Modules:

a. B+D
b. F1
c. D1
d. H
e. G

Article (8)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, these measuring instruments of material length must meet all the requirements outlined in this Resolution.

Article (9)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of measuring instruments of material length to verify their conformity with this Resolution.

Article (10)

Metrological Marks:

Measuring instruments of material length shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry.

Second:

Capacity Serving Measure

Article (1)

Scope:

Capacity serving measures used for food and drink, which are of fixed capacity and provided for direct consumption for a price, such as juice glasses and drinks served in restaurants.

Article (2)

Definitions:

1. Capacity Serving Measure:
   A measure of capacity (e.g., a drinking glass or pitcher) designed to determine a specific volume of materials that take the shape of the container they are placed in (such as viscous and non-viscous liquids and bulk materials), which are sold directly for immediate consumption, excluding medicinal products.
2. Line Measure:
   A capacity serving measure marked with a line indicating the nominal capacity.
3. Brim Measure:

A capacity serving measure where the total internal volume is equal to the nominal capacity.

4. Transfer Measure:

   A capacity measure that is opened before consumption.

5. Capacity:

   The total internal volume of the brim measure or the internal volume up to the fill mark of the line measure.

Article (3)

Reference Conditions:

1. The reference temperature for measuring capacity is (20^{5}°C).
2. The appropriate position for correct reading is to stand freely on a level surface.

Article (4)

Maximum Permissible Errors (MPES):

Table (3) below specifies the values of MPES for the line measure and brim measure.

Table: (3) MPES for the Line Measure and Brim Measure

		Line measure	Brim measure
Transfer measure	< 100 ml	± 2 ml	- 0 + 4 ml
	≥ 100 ml	± 3 %	- 0 +6%
Serving measure	< 200 ml	± 5 %	- 0 +10%
	≥ 200 ml	± 5 ml + 2.5%	- 0 + 10 ml + 5%

Article (5)

Materials:

Capacity serving measures must be made from sufficiently solid material with stable dimensions to maintain the capacity within the MPES.

Article (6)

Shape:

1. The transfer measure must be designed so that a change in the contents equal to the MPES causes a change in the level by at least (2) mm at the brim or fill mark.
2. The transfer measure must be designed so that there is no obstruction of the measured liquid during full discharge.

Article (7)

Marks:

1. The declared nominal capacity must be marked on the measure clearly and permanently.
2. Capacity measures can be marked with up to three distinct capacities, provided that no overlap occurs between any of them.
3. All fill marks must be sufficiently clear and permanent to ensure that the maximum permissible errors (MPES) are not exceeded during usage.

Article (8)

Requirements of the Conformity Assessment:

The manufacturer of capacity serving measures must provide a conformity assessment certificate according to one of the following Conformity Modules:

a. A2
b. F1
c. D1
d. E1

e. B+E

f. B+D

g. H

Article (9)

Initial Verification Requirements:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, the capacity serving measures must meet all the requirements outlined in this Resolution.

Article (10)

Surprise Verification Requirements:

The Ministry has the right to conduct surprise verifications on all entities importing, manufacturing, or using capacity serving measures to assess their compliance with this Resolution.

Article (11)

Metrological Marks:

Capacity serving measures shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry

Annex (2-5)

Dimensional Measuring Instruments

Article (1)

Scope:

1. Length measuring instruments.
2. Area measuring instruments.
3. Multi-dimensional measuring instruments.

Article (2)

Definitions:

1. Length measuring instrument:
   Instruments used to determine the length of materials in the form of ropes (e.g., textiles, belts, and cables during the feed movement of the product to be measured).
2. Area measuring instrument:
   Instruments used to determine the area of irregularly shaped materials (e.g., leather).
3. Multi-dimensional measuring instrument:
   Instruments used to measure the length of edges (length, height, and width) of the smallest rectangular parallelepiped containing the product.

First:

Common Requirements for All Dimensional Measuring Instruments

Article (1)

Electromagnetic Immunity:

The effect of electromagnetic disturbance on dimensional measuring instruments must be as follows:

1. The change in the measurement results shall not be greater than the critical change value defined in Article (2) of this Annex.

2. No measurement can be performed.
3. Instantaneous changes in measurement results that cannot be explained, stored, or transmitted as a measurement result.
4. Sharp changes in measurement results observable by those concerned with those results.

Article (2)

The critical change value is equal to one scale interval.

Article (3)

Requirements of the Conformity Assessment:

1. The manufacturer of mechanical or electromechanical dimensional measuring instruments must provide a conformity assessment certificate according to one of the following Conformity Modules:
   a. F1
   b. E1
   c. D1
   d. B+F
   e. B+E
   f. B+D
   g. H
   h. H1
   i. G
2. The manufacturer of electronic dimensional measuring instruments or those including software must provide a conformity assessment certificate according to one of the following Conformity Modules:
   a. B+F
   b. B+D
   c. H1

d. G

Article (4)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, these measuring instruments of dimensional measuring must meet all the requirements outlined in this Resolution.

Article (5)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of instruments of dimensional measuring to verify their conformity with this Resolution.

Article (6)

Metrological Marks:

Capacity serving measures shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry.

Second:

Length Measures of Length

(Length)

Article (1)

Product Properties to be Measured:

Textiles are characterized by the differentiation coefficient (K), which considers the stretchability and force per unit area of the product, defined by the following equation:

$$K=\mathcal{E} \times (G_A + 2{,}2\ N/m^2)$$

Where:

Ɛ: Relative elongation of a fabric sample 1 m wide under a tensile force of 10 Newtons.

G_A: Force resulting from the weight per unit area of the fabric sample measured in Newtons/m^2.

Article (2)

Operating Conditions:

Article (2-1) Range:

The dimensions and the coefficient (K) applicable within the range specified by the instrument manufacturer are shown in Table (1) below:

Table (1) Coefficient (K) Range

Group	Range of K (N/m^2)	Product stretchability
I	$0 < K < 2 \times 10^{-2}$	Low
II	$2 \times 10^{-2} < K < 8 \times 10^{-2}$	Medium
III	$8 \times 10^{-2} < K < 24 \times 10^{-2}$	High
IV	$24 \times 10^{-2} < K$	Very high

Article (2-2) The material being measured is not conveyed by the measuring instrument. Therefore, its speed must be within the range specified by the instrument manufacturer.

Article (2-3) If the measurement result depends on thickness, surface conditions, and the type of delivery (e.g., from a large roll or from a stack), the corresponding specifications must be determined by the manufacturer.

Article (3)

Maximum Permissible Errors (MPES):

1. Table (2) specifies the MPE values for each accuracy class.

Table (2) Accuracy Class and MPE Values

Accuracy Class	MPE
I	0.125% but not less than 0.005 L_m
II	0.25%, but not less than 0.01 L_m
III	0.5%, but not less than 0.02 L_m
* L_m: The smallest measurable length, i.e., the smallest length specified by the instrument manufacturer.	

2. The true length value of various types of materials must be measured using an appropriate instrument (e.g., a length measuring tape), and the material to be measured must be extended over a suitable (flat) table surface without stretching.

Article (4)

Other Requirements:

The instruments must ensure the measurement of the product in an unstretched state and according to the intended stretchability for which the instrument was designed.

Third:

Area Measuring Instruments

(Area)

Article (1)

Operating Conditions:

Article (1-1) Range:

The dimensions must be within the range specified by the instrument manufacturer.

Article (1-2) Product Condition:

The manufacturer must determine the instrument's limits due to the legal measuring instrument speed and surface thickness.

Article (2)

Maximum Permissible Errors (MPES):

The value of (MPE) (%1.0), but not less than (1) dcm^2.

Article (3)

Other Requirements:

Article (3-1) Indication of the Legal Measuring Instrument:

There shall be no measurement error in the case of pulling back the legal measuring instrument, stopping it, or when the indication is empty.

Article (3-2) Scale Interval:

The instruments must have a scale interval of (1) dcm^2, and it must be possible to have a scale interval of (0.1) dcm^2 for testing purposes.

Fourth:

Multi-Dimensional Measuring Instruments

Article (1)

Operating Conditions:

Article (1-1) Range:

The dimensions must be within the range specified by the instrument manufacturer.

Article (1-2) Minimum Dimension:

Table (3) below indicates the minimum limit for the minimum dimension for all scale interval values.

Table (3) Minimum Dimension Limit

Scale interval (d) (cm)	Minimum dimension (min) (Lower limit)
$d \leq 2$	10 d
$2 < d \leq 10$	20 d
$10 < d$	50 d

Article (1-3) Product Speed:

The product speed must be within the range specified by the instrument manufacturer.

Article (2)

Maximum Permissible Error = 1.0 d±.

Annex (2-6)

Tyre Pressure Gauges for Motor Vehicles

Article (1)

Scope:

Tyre pressure gauges for vehicles include:

1. Legal measuring instruments fixed in service stations, which are used to measure tire pressure during inflation.
2. Handheld legal measuring instruments used to check the air pressure value inside the tire, provided they are not connected to a compressed air source during tire inflation.

Article (2)

Special Requirements:

Article (2-1) Reading Device:

1. The reading device must allow for the direct reading of the measured pressure values (without applying a multiplication factor), and the reading error must not exceed (0.2) of the scale interval.
2. Table (1) below shows the scale intervals for pressure gauges used in service stations and handheld pressure gauges, and the scale interval must remain constant along the scale.

Table (1)

Max Measurement Limits Mega Pascal	Scale Intervals for Tyre Pressure Gauges (Mega Pascal)	
	Fixed	Handheld
Less than or equal to (0.4)	0.01	0.01
From (0.4) and up to (1.0)	0.01	0.02 or 0.025

Article (3)

Additional Instruments:

1. Handheld pressure gauges may include a stop mechanism to allow the reading of the indicator after being disconnected from the tyre valve. In this case, these instruments must have a mechanism to reset the indicator to its initial position (corresponding to atmospheric pressure).
2. The connection openings between the pressure gauge and the tyre valve must be equipped with an air-tight seal to prevent any errors caused by air leakage during the pressure measurement.

Article (4)

Maximum Permissible Error (MPE):

1. Table (2) below shows the maximum permissible error values for tyre pressure gauges within the temperature range of (20±5°C).

Table No. (2)

Max Measurement Limits Mega Pascal	Maximum Permissible Error Mega Pascal	
	For Periodic Verification	For initial verification or verification after maintenance
Less than or equal to (0.4)	0.01 ±	0.008 ±
(1.0) is greater than (0.4) to (inclusive)	0.02 ±	0.016 ±

2. An additional value of (0.4%) of the upper measurement limit shall be added to values provided in Table (2) of this Annex for every (10 °C) outside the range of (20 ± 5 °C).

Article (5)

Hysteresis:

The hysteresis value for pressure gauges must not exceed the values indicated in Table (2) of this Annex.

Article (6)

Annex.

The pressure gauge pointer must stop at atmospheric pressure, opposite the zero mark on the scale, within a deviation that does not exceed the maximum permissible error value.

Article (7)

The pointer must stop at atmospheric pressure below the mark corresponding to the minimum measurement limit, towards zero, at a distance greater than three times the value of the maximum permissible error. This applies to pressure gauges whose scale does not contain a zero mark.

Article (8)

Measurement Units:

The following units of measurement must be used:

1. Pascal (Pa) or its multiples.
2. Bar.

Article (9)

Requirements of Installation and Proper Use:

1. Pressure measuring instruments must not be used periodically at pressures exceeding (75%) of the upper measurement limit.
2. Tyre pressure gauges must be installed and used in accordance with the manufacturer's requirements.

Article (10)

Requirements of the Conformity Assessment:

The manufacturer of tyre pressure measuring instruments must provide a conformity assessment certificate according to one of the following Conformity Modules:

a. B+F
b. B+D
c. H1

Article (11)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, the legal measuring instruments must meet all the requirements outlined in this Resolution.

Article (12)

Periodic Verification Requirements:

For the purposes of Conformity with the Periodic Verification Requirements, the following examinations shall be performed:

1. Visual inspection, including the reading screen, the integrity of the seals and metrological marks, the Label Card, the absence of visible defects, and the serial number of the legal measuring instrument.
2. Maximum Permissible Error Examination.
3. Tests referred to in this article shall be conducted annually.

Article (13)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of tyre pressure measuring instruments to verify their conformity with this Resolution.

Article (14)

Metrological Marks:

Tyre pressure measuring instruments shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark / seal approved by the Ministry.

Annex (2-7)

Special Requirements for Exhaust Gas Analysers

Exhaust Gas Analysers

Article (1)

Scope:

Exhaust gas analysers, as outlined below, are intended for the inspection, maintenance, or licensing of vehicles, in coordination with local authorities and authorized authorities.

Article (2):

Definitions:

1. Exhaust gas analyser:

   A measuring instrument used to determine the partial volume of the components of exhaust gas emitted from vehicles with spark ignition engines at the humidity level of the analysed sample. It must include the following:

   a. Exhaust Gas Components:
      1) Carbon monoxide (CO).
      2) Carbon dioxide (CO2).
      3) Oxygen (O2).
      4) Hydrocarbons (HC).
   b. The content of HC is expressed as the concentration of n-hexane (C6H14) and is measured using infrared absorption range.

c. The partial volume of exhaust gas components is expressed as a percentage (%) volume for CO, CO2, and O2 gases, and is also expressed as parts per million (ppm) volume.

d. The exhaust gas analyser calculates a value for Lambda (λ) from the partial volumes of the gas components.

2. Lambda (λ):

A unitless value representing the fuel combustion efficiency of the engine, expressed as the air-to-fuel ratio in the exhaust gas and determined using a reference standard formula.

Article (3)

Measurements Range:

Table (1) below shows the minimum measurement ranges for exhaust gas analysers.

Table (1) Measurement Ranges

Parameter	Minimum measuring range for Class 0 and class 2
CO fraction	From 0 to 5% vol
CO_2 fraction	From 0 to 16% vol
HC fraction	From 0 to 2000 ppm vol
O_2 fraction	From 0 to 21% vol
λ	From 0.8 to 1.2

Article (4)

Operating Conditions:

The values relevant to the operating conditions must be defined by the manufacturer as follows, and must be adhered to by the user:

1. Quantities of Mechanical and Climatic Effects:

a. The minimum temperature range for the required climatic conditions (35 °C).

b. The classification of the surrounding mechanical conditions is (M1).

2. Electrical Power Effects:
   a. The voltage and frequency range for the (AC) power supply.
   b. The limits of the (DC) power supply.
3. Pressure surrounding the Operating Environment for Both Classes:
   a. The minimum pressure value (310 x 86 ≥ Pascals).
   b. The maximum pressure value (≥ 310 x 106 Pascals).

Article (5)

Maximum Permissible Errors:

The maximum permissible errors are defined as follows:

1. For each measured exhaust gas fraction, the maximum permissible error under operating conditions is the greater value between the two values shown in Table (2) below. The absolute values are expressed as a percentage (% volume) or volume unit per million parts, while the percentage values (shown in the same table) represent a fraction of the true value.

Table (2) Maximum Permissible Errors for Vehicle Exhaust Emissions Measuring Instruments

Class	Type of Error	CO	CO_2	O_2	HC
00	Absolute	± 0.02% vol	± 0.3 % vol	±0.1% vol	±4 ppm vol
	Relative	±5%	±5%	±5%	±5%
0	Absolute	± 0.03 % vol	± 0.5 % vol	± 0.1 % vol	±10 ppm vol
	Relative	±5%	±5%	±5%	±5%
1	Absolute	± 0.06 % vol	± 0.5 % vol	± 0.1 % vol	±12 ppm vol
	Relative	±5%	±5%	±5%	±5%
* The greater of absolute or relative error.					

2. The maximum permissible errors for the λ (Lambda) calculations are 0.3%, where the true nominal value is calculated according to the formula specified in Annex (1) of this Resolution, Section (3-7-3) of European Directive (98/69/E) and amended European Directives (70/220/EC), based on measurements taken from the materials emitted from vehicle exhausts. For this purpose, the values displayed by the device are used for the calculations.

Article (6)

Permissible Disturbance Influence:

1. For each partial volume measured by the device, the critical change value is equal to the maximum permissible error value.
2. In the presence of electromagnetic disturbance, the following conditions must be met:
   a. The change in the measurement result should be less than the critical change value specified in Clause (1) of this Article.
   b. Or the measurement result must be considered incorrect.

Article (7)

Other Requirements:

1. The device's reading accuracy must be equal to or better than the values shown in Table (3) below.

Table (3) Device Reading Accuracy

Class	CO	CO2	O2	HC
Class 0	0.1% vol	0.1% vol	([1])	1 ppm vol
Class 1				
([1]) 0.01 vol for measurand values below or equal to 4 % vol, otherwise 0.1% vol. Note: The value of λ must be displayed with an accuracy of 0.001.				

2. The standard deviation of twenty measurements must not exceed (1/3) of the maximum permissible error for each gas partial volume.
3. When measuring (CO), (CO2), and (HC) gases, the device should be able to measure and display the result within 15 seconds, with at least 95% of the final value for these gases. For example: in the case of clean air, when measuring the (O2) percentage, the device, under similar conditions, should show a value that differs by less than 0.1 from zero within 60 seconds after shifting from clean air to oxygen-free gas.
4. Other exhaust gas components, not the ones intended to be measured, must not affect the measurement results by more than half of the maximum permissible error when these other components are present at the following maximum partial volumes: (CO) 6%,(CO2) 16%, (CO2) 10%, (H2) 5%, (NO) 0.3%, 2,000 ppm (HC) (hexane), water vapour up to saturation.
5. The exhaust gas analyser must have adjustment capabilities that include zero calibration, gas calibration, and internal calibration. The zero calibration and internal calibration must be automatic.
6. The device used for performing automatic and semi-automatic adjustments must not be capable of conducting measurements until these adjustments are completed.
7. The exhaust gas analyser must detect residual (HC) in the dedicated gas carrying system and ensure that no measurement can be performed if the residual (HC) percentage before conducting the measurement exceeds 20 ppm.
8. The exhaust gas analyser must have an automatic device capable of identifying any malfunction in the oxygen channel sensor due to a break or wear in the connection line.
9. It must be possible to select the appropriate coefficients for calculating lambda (λ) without ambiguity using the appropriate formula if the exhaust gas analyser can handle different types of fuel (petrol or LPG).

Article (8)

Requirements of the Conformity Assessment:

The manufacturer of exhaust gases measuring instruments must provide a conformity assessment certificate according to one of the following Conformity Modules:

a. B+F
b. B+D
c. H1

Article (9)

Initial Verification and Post-Maintenance Verification Requirement:

For the purpose of conformity with the requirements of initial verification and post-maintenance verification, these measuring instruments of exhaust gases must meet all the requirements outlined in this Resolution.

Article (10)

Periodic Verification Requirements:

1. For the purposes of Conformity with the Periodic Verification Requirements, the following examinations shall be performed:
   a. Visual inspection, including the reading screen, the integrity of the seals and metrological marks, the Label Card, the absence of visible defects, and the serial number of the exhaust gases measuring instrument.
   b. Maximum Permissible Error Examination.
2. Tests referred to in this article shall be conducted annually.

Article (11)

Surprise Verification Requirements:

The Ministry has the right to conduct a Surprise Verification of all entities involved in the maintenance, repair, installation, manufacturing, importation, leasing, and usage of exhaust gases measuring instruments to verify their conformity with this Resolution.

Article (12)

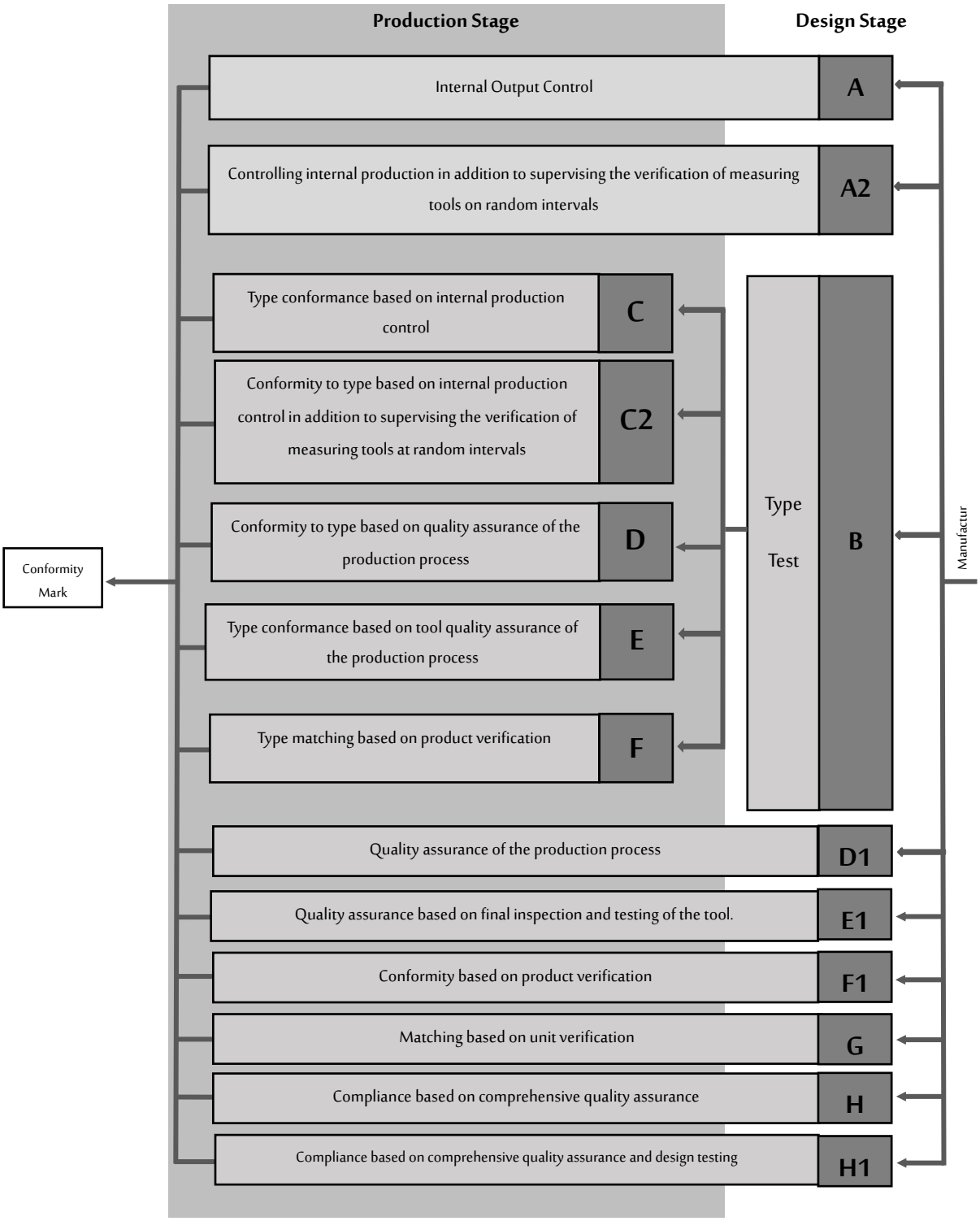
Metrological Marks:

Exhaust gases measuring instruments shall bear the following metrological marks:

1. Type approval or conformity mark.
2. Verification mark/ seal approved by the Ministry

Annex (3)

Conformity Modules



Conformity Modules Diagram

Conformity Module (A)

Internal Production Control

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in Clauses (2), (3), and (4) of this module, and guarantees and declares full responsibility that the legally manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Technical Documents:

a. The manufacturer must prepare the technical documents in accordance with Article (16) of this Resolution.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include an adequate analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

3. Manufacturing:

The manufacturer shall take all necessary measures to ensure that all manufacturing processes and their monitoring guarantee that the instruments produced conform to the technical documents mentioned in Clause (2) of this module and the requirements stipulated in this Resolution.

4. Conformity Mark and Declaration of Conformity:

a. The manufacturer shall affix the conformity mark and the supplementary mark specified in this resolution on each legal measuring instrument that meets the relevant requirements of this Resolution.

b. The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it along with the technical documents to be readily available upon request from the competent

authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

c. The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

5. Authorized Representative:

The obligations of the manufacturer specified in Clause (4) of this module may be fulfilled by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (A2)

Internal Production Control Plus Supervised Instrument Checks at Random Intervals

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in Clauses (2), (3), (4) and (5) of this module, and guarantees and declares full responsibility that the legally manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Technical Documents:

a. The manufacturer must prepare the technical documents in accordance with Article (16) of this Resolution.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include an adequate analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

3. Manufacturing:

The manufacturer shall take all necessary measures to ensure that all manufacturing processes and their monitoring guarantee that the instruments produced conform to the technical documents mentioned in Clause (2) of this module and the requirements stipulated in this Resolution.

4. Verification of the Legal Measuring Instrument:

a. The manufacturer has the right to choose any concerned authority to verify the legal measuring instrument.

b. The concerned authority chosen by the manufacturer shall continuously or at random intervals verify the legal measuring instrument to ensure the quality of internal production control procedures, considering the complexity of the technological processes and the quantities produced.

c. The concerned authority shall take an appropriate sample from the final product of the legal measuring instruments for inspection before the product is marketed.

d. The appropriate tests for the legal measuring instrument to verify its conformity with the relevant requirements in this Resolution must be specified through the guidance documents stated in Annex (6) of this Resolution.

e. If guidance documents are not available in Annex (6) of this Resolution, the concerned authority shall specify the appropriate tests to meet the requirements in this Resolution.

f. In cases where a certain number of instruments within the sample are found not to comply with the acceptable quality level, the concerned authority shall take appropriate measures.

g. If the tests are conducted by the concerned authority, the manufacturer shall affix the identification number of the concerned authority during the manufacturing process under the responsibility of the concerned authority.

5. Conformity Mark and Declaration of Conformity:

a. The manufacturer shall affix the conformity mark and the supplementary metrology mark specified in this resolution on each legal measuring instrument that meets the requirements of this Resolution.

b. The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it along with the technical documents to be promptly available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

c. The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

6. Authorized Representative:

The obligations of the manufacturer specified in Clause (5) of this module may be fulfilled by the authorized representative, on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (B)

Type Examination

1. It is part of the conformity assessment procedure through which the Concerned Authority tests the technical design of a legal measuring instrument and verifies and certifies that the technical design of this legal measuring instrument meets the requirements of this Resolution to which it applies.
2. The gender test can be done in one of the following ways:
   a. Production Type Testing, which involves testing a sample from the expected production of the complete legal measuring instrument.
   b. Design Type Testing, which assesses the adequacy of the technical design of the legal measuring instrument by examining the technical documents and supporting evidence stipulated to in Clause (3) of this module, without examining a sample.
   c. Combination of Production Type Testing and Design Type Testing. This involves evaluating the adequacy of the technical design of the legal measuring instrument through the examination of technical documents and supporting evidence as

specified in Clause (3) of this module, along with testing samples of the expected production.

3. The Manufacturer shall submit a request for type testing to one concerned authority of its choice, and the request shall contain the following:
   a. Name and address of the Manufacturer.
   b. A written undertaking that the application has not been submitted to any other concerned authority.
   c. Technical documents as specified in Article (16) of this Resolution, ensuring that the documentation is sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution. It must include a comprehensive risk analysis and assessment, specify the applicable requirements, and cover the design and operation of the legal measuring instrument with respect to the assessment.
   d. Samples of the expected production, and the Concerned Authority may request additional samples when necessary to implement the testing programme.
   e. Supporting evidence of the adequacy of the technical design solutions. This supporting evidence shall mention any documents that were used, especially with regard to the guidance documents contained in Annex (6) of this Resolution that were not fully implemented. The supporting evidence shall also contain, when necessary, the results of tests carried out based on other relevant technical specifications by a laboratory approved by the Manufacturer, or by another testing laboratory that carried out the tests on behalf of the Manufacturer and under its responsibility.

4. The concerned authority shall carry out the following concerning the legal measuring instrument and the sample(s):

4.1 Examine technical documents and supporting evidence to assess the adequacy of the technical design of the legal measuring instrument.

4.2 Confirm that the sample/samples have been manufactured in accordance with the technical documents and identifying the elements that have been designed in accordance with the provisions applicable to them from the guidance documents

contained in Appendix (6) of this Resolution, in addition to the elements that have been designed based on other related technical specifications.

4.3 Conduct appropriate examinations and tests, or supervising their conduct, to ensure that the Manufacturer, if it selects to apply the solutions contained in the guidance documents contained in Annex (6) of this Resolution, has applied them correctly.

4.4 Conduct appropriate examinations and tests, or supervising their conduct, to ensure that the Manufacturer meets the basic requirements contained in this Resolution, in the event that the Manufacturer selects not to apply solutions not included in the guidance documents set forth in Annex (6) of this Resolution, and selects to apply the solutions contained in other related technical specifications.

4.5 Agree with the Manufacturer on the place where the examinations and tests will be carried out for the other parts of the legal measuring instrument.

4.6 Examine technical documents and supporting evidence to assess the adequacy of the technical design of the other parts of the legal measuring device.

5. The Concerned Authority shall prepare assessment report recording all the procedures undertaken pursuant to Clause (4) of this module and their results, without prejudice to its obligations towards the Notifying Authority. The Concerned Authority shall also declare the contents of this report in full or in part, after obtaining the approval of the Manufacturer.

6. If the type meets the requirements of this resolution, the Concerned Authority shall issue a Type Test Certificate to the Manufacturer, which shall contain the name and address of the Manufacturer, the results of the tests, and the conditions (if necessary) of its powers and the data necessary to identify the approved type. The Type Test Certificate may also contain one or more Annexes. The Type Test Certificate and its Annexes shall also include all the following information, which makes it possible to assess the conformity of the legal measuring instrument manufactured in accordance with the type being tested, especially with regard to metrological properties when it is properly adjusted using appropriate methods, as follows:

   a. Metrological characteristics of the type of the legal measuring instrument.

b. Procedures required to ensure the integrity of the legal measuring instrument (seal, unique number of the software used, etc.).

c. Information about other elements necessary to identify the legal measuring instrument and ensure its theoretical external conformity to the type.

d. Any other information necessary to confirm the characteristics of the manufactured legal measuring instrument, if appropriate.

6.1 The validity of the Type Test Certificate is for a period of (10) years from the date of issue. It may be renewed for subsequent periods of (10) years each.

6.2 If the type does not meet the requirements related to it in this Resolution, the Concerned Authority shall refuse to issue the Type Test Certificate, and shall inform the party submitting the application of this, stating the reason for the refusal in detail.

7. The Concerned Authority shall be kept fully informed of any change in the legal Measuring Instrument which renders it non-compliant with the requirements of this Resolution, if a change occurs to it. Such authority shall define whether the change in the Measuring Instrument requires further investigation, and shall inform the Manufacturer accordingly.

8. The Manufacturer shall inform the Concerned Authority holding the technical documents for the Type Test Certificate of all changes to the approved type which may affect the conformity of the legal measuring instrument with the essential requirements of this Resolution or special circumstances of the validity of the certificate, which require additional checks to be carried out in addition to those contained in the original Type Test Certificate.

9. Each Concerned Authority shall provide the Competent Authorities (Notifying Authority) with the Type Test Certificates it has issued, amended, specified the scope of, suspended or cancelled, on a periodic basis or upon request. The Ministry or other concerned authorities shall be entitled to obtain a copy of such certificates, technical documents or results of examinations conducted by the Concerned Authority. The Concerned Authority shall retain a copy of the Type Test Certificate, its Annexes and amendments, the technical documents file, and the documents submitted by the Manufacturer, until the expiry of the certificate validity.

10. The Manufacturer shall keep a copy of the Type Test Certificate, its attachments and amendments, and the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

11. The authorized representative may submit the application in accordance with Clause (3) of this form and meet the requirements set out in Clauses (8) and (10) of this module, provided that they are supported by the authorized representative obligations.

Conformity Module (C)

Conformity to Type Based on Internal Production Control

1. It is a conformity assessment procedure during which the Manufacturer meets the requirements stated in clauses (2) and (3) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it conforms to the approved type as indicated in the Type Test Certificate in addition to the requirements stated in this Resolution.

2. Manufacturing:

The Manufacturer shall take all necessary measures so that all manufacturing and control operations ensure that the manufactured devices conform to the approved type as indicated in the Type Test Certificate in addition to the requirements contained in this Resolution.

3. Conformity Mark and Declaration of Conformity:

a. The manufacturer shall affix the conformity mark and the supplementary metrology mark specified in this Resolution on each legal measuring instrument that meets the requirements of this Resolution.

b. The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it along with the technical documents to be promptly available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

c. The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

4. Authorized Representative:

The obligations of the manufacturer specified in Clause (3) of this module may be fulfilled by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (C2)

Conformity to Type Based on Internal Production Control Plus Supervised Instrument Checks at Random Intervals

1. It is a conformity assessment procedure during which the Manufacturer meets the requirements stated in clauses (2), (3) and (4) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it conforms to the approved type as indicated in the Type Test Certificate in addition to the requirements stated in this Resolution.

2. Manufacturing:

The Manufacturer shall take all necessary measures so that all manufacturing and control operations ensure that the manufactured devices conform to the approved type in the Type Test Certificate in addition to the requirements contained in this Resolution.

3. Verification of the Legal Measuring Instrument:

a. The manufacturer has the right to choose any concerned authority to verify the legal measuring instrument.

b. The concerned authority chosen by the manufacturer shall continuously or at random intervals verify the legal measuring instrument to ensure the quality of internal production control procedures, provided that the complexity of the technological processes and the quantities produced shall be considered.

c. The concerned authority shall take a sample from the final product of the legal measuring instruments for inspection before the product is marketed.

d. Appropriate tests for the legal measuring instrument must be determined to verify that the manufactured instruments conform to the approved type as indicated in the Type Examination Certificate, in addition to the relevant requirements in this Resolution through the guidance documents specified in Annex (6) of this Resolution or equivalent tests specified in other relevant technical specifications.

e. If guidance documents are not available as stipulated in Annex (6) of this Resolution, the concerned authority shall determine the appropriate tests that must be conducted.

f. In cases where a certain number of the legal measuring instruments within the sample are found not to comply with the acceptable quality level, the concerned authority shall take appropriate measures.

g. The purpose of the applied sample acceptance procedure is to determine whether the production process of the legal measuring instruments is within acceptable limits to ensure their conformity to the requirements.

h. If the tests are conducted by the concerned authority, the manufacturer shall affix the identification number of the concerned authority during the manufacturing process under the responsibility of the concerned authority.

4. Conformity Mark and Declaration of Conformity:

a. The manufacturer shall affix the conformity mark and the supplementary metrology mark specified in this resolution on each legal measuring instrument that meets the requirements of this Resolution.

b. The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it along with the technical documents to be promptly available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

c. The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

5. Authorized Representative:

The obligations of the manufacturer specified in Clause (4) of this module may be fulfilled by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (D)

Conformity to Type Based on Quality Assurance of the Production Process

1. It is a conformity assessment procedure during which the Manufacturer meets the requirements stated in clauses (2) and (5) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it conforms to the approved type as indicated in the Type Test Certificate in addition to the requirements stated in this Resolution.

2. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.
b. The final product shall be inspected and examined in accordance with Clause (3) of this module.
c. To be subject to continuous monitoring operations in accordance with Clause (4) of this module.

3. Quality System:

3-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.

b. A written undertaking that the application has not been submitted to any other Concerned Authority.
c. All relevant information for the legal measuring instrument to be manufactured.
d. Documents related to the quality system.
e. Technical documents stipulated in Article (16) of this Resolution.

3-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.
b. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.
c. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.
d. Quality records such as inspection reports, test data, calibration data, qualification reports of relevant persons.
e. Means of monitoring the achievement of the required product quality and effective management of the quality system.

3-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (3-2) of this module.

3-4 The Review Team shall also be qualified and experienced in assessment processes, provided that the team shall also include at least one technical expert who has technical experience in the field of the measurement device and has good knowledge of the requirements of this Resolution. The Review Process shall include an assessment visit to the Manufacturer site. The review team must review the technical documents specified in paragraph (E) of Clause (3-1) of this module to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and its

capacity to conduct all necessary tests to ensure compliance. The Review Team shall inform the Manufacturer of the Review results, which shall include the results and decisions of the Review Process.

3-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

3-6 The Manufacturer shall keep the Concerned Authority that approved the quality system informed of any changes proposed to be made to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (2-3) of this module or whether there is a need for re-assessment if necessary. The Concerned Authority shall inform the Manufacturer of its resolution, which shall include a summary of the assessment process and the reasons for its decision.

4. Follow-Up Visits Under the Responsibility of the Concerned Authority:

4-1 The follow-up visit aims to ensure that the Manufacturer continues to perform its obligations stipulated in the quality system in full.

4-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.
b. Quality records such as inspection reports, test data, calibration data, qualification reports of relevant persons.

4-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

4-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report and a report

on the examinations and tests that were conducted by the Concerned Authority or upon its request.

5. Conformity Mark and Declaration of Conformity:

5-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (3-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

5-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

5-3 The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

6. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

   a. The documents specified in Clause (3-1) of this module.
   b. Information relating to the change stipulated in Clause (3-6) of this module, as approved.
   c. Resolutions and reports issued by the Concerned Authority stipulated in clauses (3-6), (4-3) and (4-4) of this module.

7. Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon request, provide a list of quality systems that have been rejected, suspended or identified.

8. Authorized Representative:

The obligations of the manufacturer specified in Clauses (3-1), (3-6), (5) and (6) of this module may be fulfilled by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (D1)

Quality Assurance of the Production Process

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in Clauses (2), (4), and (7) of this module, and guarantees and declares full responsibility that the legally manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Technical Documents:

a. The manufacturer must prepare the technical documents in accordance with Article (16) of this Resolution.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include a sufficient analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

3. The Manufacturer shall keep the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

4. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.

b. The final product shall be inspected and examined in accordance with Clause (5) of this module.

c. To be subject to continuous monitoring operations in accordance with Clause (6) of this module.

5. Quality System:

5-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.
b. A written undertaking that the application has not been submitted to any other Concerned Authority.
c. All relevant information for the legal measuring instrument to be manufactured.
d. Documents related to the quality system.
e. The technical documents specified in Clause (2) of this module.

5-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.
b. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.
c. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.
d. Quality records such as inspection reports, test data, calibration data and qualification reports of relevant persons.
e. Means of monitoring the achievement of the required product quality and effective management of the quality system.

5-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (5-2) of this module.

5-4 The Review Team shall also be qualified and experienced in assessment processes, provided that the team shall also include at least one technical expert who has technical experience in the field of the legal measuring instrument and has good knowledge of the requirements of this Resolution. The review process must include an evaluative visit to the manufacturer's site. The review team shall review the technical documents specified in Clause (2) of this module to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and its capacity to conduct all necessary tests to ensure conformity. The Review Team shall inform the Manufacturer of the Review results, which shall include the results and resolutions of the Review Process.

5-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

5-6 The Manufacturer shall keep the Concerned Authority that approved the quality system informed of any changes proposed to be made to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (5-2) of this module or whether there is a need for re-assessment if necessary. The concerned authority shall notify the manufacturer of its decision, which must include a summary of the assessment process and the reasons for its decision.

6. Follow-Up Visits Under the Responsibility of the Concerned Authority:

6-1 The follow-up visit aims to ensure that the Manufacturer continues to perform its obligations stipulated in the quality system in full.

6-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.
b. The technical documents specified in Clause (2) of this module.

c. Quality records such as inspection reports, test data, calibration data, qualification reports of relevant persons.

6-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

6-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report and a report on the examinations and tests that were conducted by the Concerned Authority or upon its request.

7. Conformity Mark and Declaration of Conformity:

7-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (5-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

7-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

7-3 The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

8. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

a. The documents specified in Clause (5-1) of this module.

b. Information relating to the change stipulated Clause (5-6) of this module, as approved.

c. Resolutions and reports issued by the Concerned Authority stipulated in clauses (5-6), (6-3) and (4-6) of this module.

9. Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon request, provide a list of quality systems that have been rejected, suspended or identified.

10. Authorized Representative:

The obligations of the manufacturer specified in Clauses (3), (5-1), (5-6), (7) and (8) of this module may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (E)

Conformity to Type Based on Instrument Quality Assurance

1. It is a conformity assessment procedure during which the Manufacturer fulfils the requirements stated in clauses (2) and (5) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it conforms to the approved type as indicated in the Type Test Certificate in addition to the requirements stated in this Resolution.

2. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.

b. The final product shall be inspected and examined in accordance with Clause (3) of this module.

c. To be subject to continuous monitoring operations in accordance with Clause (4) of this module.

3. Quality System:

3-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.
b. A written undertaking that the application has not been submitted to any other Concerned Authority.
c. All relevant information for the legal measuring instrument to be manufactured.
d. Documents related to the quality system.
e. Technical documents stipulated in Article (16) of this Resolution.

3-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.
b. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.
c. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.
d. Quality records such as inspection reports, test data, calibration data and qualification reports of relevant persons.
e. Means of monitoring the achievement of the required product quality and effective management of the quality system.

3-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (3-2) of this module.

3-4 The review team must be qualified and experienced in assessment processes, including at least one technical expert with experience in the technical aspects of the

legal measuring instrument and a good understanding of the requirements of this Resolution. The review process must include an assessment visit to the manufacturer's site. The review team must review the technical documents specified in paragraph (E) of Clause (3-1) of this module to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and to conduct all necessary tests to ensure conformity. The review team must notify the manufacturer of the review results, which must include the findings and decisions of the review process.

3-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

3-6 The manufacturer must keep the concerned authority that approved the quality system informed of any proposed changes to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (3-2) of this module or whether there is a need for re-assessment if necessary. The concerned authority shall notify the manufacturer of its decision, which must include a summary of the assessment process and the reasons for its decision.

4. Follow-Up Visits Under the Responsibility of the Concerned Authority:

4-1 The follow-up visit aims to ensure that the Manufacturer continues to fulfil its obligations stipulated in the quality system in full.

4-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.
b. Quality records such as inspection reports, test data, calibration data, qualification reports of relevant persons.

4-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

4-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report, and a report on the examinations and tests that were conducted by the Concerned Authority or upon its request.

5. Conformity Mark and Declaration of Conformity:

5-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (3-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

5-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market. A copy of the Declaration of Conformity must be attached to each legal measuring instrument placed on the market, and a single copy may be attached for a batch of legal measuring instruments intended for one user.

6. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

   a. The documents specified in Clause (3-1) of this module.

   b. Information relating to the change stipulated in Clause (6-3) of this module, as approved. C. Resolutions and reports issued by the Concerned Authority stipulated in clauses (3-6), (4-3) and (4-4) of this module.

7. Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon

request, provide a list of quality systems that have been rejected, suspended or identified.

8. Authorized Representative:

The obligations of the manufacturer specified in Clauses (3-1), (6-3), (5) and (6) of this module may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (E1)

Quality Assurance of Final Instrument Inspection and Testing

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in Clauses (2), (4), and (7) of this module, and guarantees and declares full responsibility that the legally manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Technical Documents:

a. The manufacturer must prepare the technical documents in accordance with Article (16) of this Resolution.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include a sufficient analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

3. The Manufacturer shall keep the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

4. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.

b. The final product shall be inspected and examined in accordance with Clause (5) of this module.

c. To be subject to continuous monitoring operations in accordance with Clause (6) of this module.

5. Quality System:

5-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.

b. A written undertaking that the application has not been submitted to any other Concerned Authority.

c. All relevant information for the legal measuring instrument to be manufactured.

d. Documents related to the quality system.

e. The technical documents specified in Clause (2) of this module.

5-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.

b. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.

c. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.

d. Quality records such as inspection reports, test data, calibration data and qualification reports of relevant persons.

e. E. Means of monitoring the achievement of the required product quality and effective management of the quality system.

5-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (5-2) of this module.

5-4 The review team must be qualified and experienced in assessment processes, including at least one technical expert with experience in the technical aspects of the legal measuring instrument and a good understanding of the requirements of this Resolution. The review process must include an assessment visit to the manufacturer's site. The review team must review the technical documents specified in Clause (2) of this module to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and to conduct all necessary tests to ensure conformity. The review team must notify the manufacturer of the review results, which must include the findings and decisions of the review process.

5-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

5-6 The manufacturer must keep the concerned authority that approved the quality system informed of any proposed changes to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (5-2) of this module or whether there is a need for re-assessment if necessary. The concerned authority shall notify the manufacturer of its decision, which must include a summary of the assessment process and the reasons for its decision.

6. Follow-Up Visits Under the Responsibility of the Concerned Authority:

6-1 The follow-up visit aims to ensure that the Manufacturer continues to perform its obligations stipulated in the quality system in full.

6-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.

b. The technical documents specified in Clause (2) of this module.

c. Quality records such as inspection reports, test data, calibration data, qualification reports of relevant persons.

6-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

6-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report and a report on the examinations and tests that were conducted by the Concerned Authority or upon its request.

7. Conformity Mark and Declaration of Conformity:

7-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (5-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

7-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

7-3 The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

8. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

a. The documents specified in Clause (5-1) of this module.

b. Information relating to the change stipulated Clause (5-6) of this module, as approved.

c. Resolutions and reports issued by the Concerned Authority stipulated in clauses (5-6), (6-3) and (6-4) of this module.

9. Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon request, provide a list of quality systems that have been rejected, suspended or identified.

10. Authorized Representative:

The obligations of the manufacturer specified in Clauses (3), (5-1), (5-6), (7) and (8) of this module may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (F)

Conformity to Type Based on Product Confirmation

1. It is a conformity assessment procedure during which the Manufacturer fulfils the requirements stated in clauses (2), (5-1) and (6) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it and is subject to provisions of clause (3) of this module conforms to the approved type as indicated in the Type Test Certificate in addition to the requirements stated in this Resolution.

2. Manufacturing:

The Manufacturer shall take all necessary measures so that all manufacturing and control operations ensure that the manufactured legal measuring instruments conform to the approved type in the Type Test Certificate in addition to the requirements contained in this Resolution.

3. Verification:

The concerned authority chosen by the manufacturer shall perform, or request the performance of, appropriate tests and inspections to verify that the legal measuring

instrument conforms to the approved type as indicated in the Type Examination Certificate and meets the requirements of this Resolution. The manufacturer shall choose one of the following methods for verifying the legal measuring instruments:

a. Confirm conformity by testing and inspecting each legal measuring instrument, as indicated in Clause (4) of this module.
b. Confirm conformity by statistical methods each device, as indicated in Clause (5) of this module.

4. Verify conformity by testing and checking each legal measuring instrument:

4-1 The manufacturer shall individually test all legal measuring instruments and perform the appropriate tests and inspections specified in the guidance documents listed in Annex (6) of this Resolution or the equivalent tests specified in the relevant technical specifications. This is to ensure that the manufactured legal measuring instruments conform to the approved type as indicated in the Type Examination Certificate and meet the requirements of this Resolution. If the guidance documents listed in Annex (6) of this Resolution are not available, the concerned authority shall determine the appropriate tests to be performed.

4-2 The concerned authority shall issue a Certificate of Conformity for the tests and inspections performed and must affix its identification number or allow the manufacturer to affix it under the responsibility of the concerned authority. The manufacturer shall retain the Certificate of Conformity for inspection by the relevant authorities for a period of ten (10) years from the date the legal measuring instrument is placed on the market.

5. Conformity verification by statistical methods:

5-1 The Manufacturer shall take all necessary measures so that the manufacturing process and its control ensure the homogeneity of the manufactured batch, and shall provide legal measuring instruments for confirmation in the form of homogeneous batches. 5-2 The manufacturer shall take arbitrary samples in accordance with clause (5-3) of this module to perform the appropriate tests and inspections on such samples individually in accordance with the guidance documents listed in Annex (6) of this Resolution or the equivalent tests specified in the relevant technical specifications. This is to ensure

that the manufactured legal measuring instruments conform to the approved type as indicated in the Type Examination Certificate and meet the requirements of this Resolution. If the guidance documents listed in Annex (6) of this Resolution are not available, the concerned authority shall determine the appropriate tests to be performed.

5-3 The statistical procedure shall meet the following requirements:

a. A level of quality corresponding to a level of acceptance of (95%) with a non-conformity of less than (1%).

b. A limit of quality corresponding to a level of acceptance of (5%) with a non-conformity of less than (7%).

5-4 If the batch is accepted, the entire batch is considered approved except for the samples that failed during the inspection. The concerned authority shall issue a Certificate of Conformity for the tests and inspections performed and must affix its identification number or allow the manufacturer to affix it under the responsibility of the concerned authority. The manufacturer shall retain the Certificate of Conformity for inspection by the relevant authorities for a period of ten (10) years from the date the legal measuring instrument is placed on the market.

5-5 In case of rejection, the Concerned Authority shall take the necessary measures to prevent non-compliant batches from being placed on the market. In the event that Batches are repeatedly rejected, the Concerned Authority may suspend confirmation of conformity in accordance with the statistical procedure and take appropriate measures.

6. Conformity Mark and Declaration of Conformity:

6-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (3) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

6-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

6-3 The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

7. If the Appointing Authority stipulated in Clause (3) of this form agrees, and under its responsibility, the Manufacturer may affix the identification number of the Appointing Authority to the legal measuring instrument during the Manufacture Process.

8. Authorized Representative:

The obligations of the manufacturer may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative. The authorized representative may not execute the requirements specified in Clauses (2) and (5-1) of this module on behalf of the manufacturer.

Conformity Module (F1)

Conformity Based on Product Verification

1. It is a conformity assessment procedure during which the Manufacturer fulfils the requirements stated in clauses (2), (3), (6-1) and (7) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it and is subject to provisions of clause (4) of this module conforms to the requirements stated in this Resolution.

2. Technical Documents:

a. The manufacturer must prepare the technical documents in accordance with Article (16) of this Resolution.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include a sufficient analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

e. The Manufacturer shall keep the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

3. Manufacturing:

The Manufacturer shall take all necessary measures so that all manufacturing and control operations ensure that the manufactured legal measuring instruments conform to the approved type in the Type Test Certificate in addition to the requirements contained in this Resolution.

4. Verification:

The concerned authority chosen by the manufacturer shall perform, or request the performance of, appropriate tests and inspections to verify that the legal measuring instrument conforms to the approved type in the Type Examination Certificate and meets the requirements of this Resolution. The manufacturer shall choose one of the following methods for verifying the legal measuring instruments:

a. Verify conformity by testing and inspecting each legal measuring instrument, as indicated in Clause (5) of this module.

b. Confirm conformity by statistical methods each device, as indicated in Clause (6) of this module.

5. Verify Conformity by Testing and Checking Each Legal Measuring Instrument:

5-1 The manufacturer shall individually test all legal measuring instruments and perform the appropriate tests and inspections specified in the guidance documents listed in Annex (6) of this Resolution or the equivalent tests specified in the relevant technical specifications. This is to ensure that the manufactured legal measuring instruments conform to the approved type as indicated in the Type Examination Certificate and meet the requirements of this Resolution. If the guidance documents listed in Annex (6) of this Resolution are not available, the concerned authority shall determine the appropriate tests to be performed.

5-2 The concerned authority shall issue a Certificate of Conformity for the tests and inspections performed and must affix its identification number or allow the manufacturer to affix it under the responsibility of the concerned authority. The manufacturer shall retain the Certificate of Conformity for inspection by the relevant authorities for a period of ten (10) years from the date the legal measuring instrument is placed on the market.

6. Conformity Verification by Statistical Methods:

6-1 The Manufacturer shall take all necessary measures so that the manufacturing process and its control ensure the homogeneity of the manufactured batch, and shall provide legal measuring instruments for confirmation in the form of homogeneous batches.

6-2 The manufacturer shall take arbitrary samples in accordance with clause (6-3) of this module to perform the appropriate tests and inspections on such samples individually in accordance with the guidance documents listed in Annex (6) of this Resolution or the equivalent tests specified in the relevant technical specifications. This is to ensure that the manufactured legal measuring instruments conform to the approved type as indicated in the Type Examination Certificate and meet the requirements of this Resolution. If the guidance documents listed in Annex (6) of this Resolution are not available, the concerned authority shall determine the appropriate tests to be performed.

6-3 The statistical procedure shall meet the following requirements:

a. A level of quality corresponding to a level of acceptance of (95%) with a non-conformity of less than (1%).
b. A limit of quality corresponding to a level of acceptance of (5%) with a non-conformity of less than (7%).

6-4 If the batch is accepted, the entire batch is considered approved except for the samples that failed during the inspection. The concerned authority shall issue a Certificate of Conformity for the tests and inspections performed and must affix its identification number or allow the manufacturer to affix it under the responsibility of the concerned authority. The manufacturer shall retain the Certificate of Conformity for inspection

by the relevant authorities for a period of ten (10) years from the date the legal measuring instrument is placed on the market.

6-5 In case of rejection, the Concerned Authority shall take the necessary measures to prevent non-compliant batches from being placed on the market. In the event that Batches are repeatedly rejected, the Concerned Authority may suspend confirmation of conformity in accordance with the statistical procedure and take appropriate measures.

7. Conformity Mark and Declaration of Conformity:

7-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (4) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

7-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

7-3 The manufacturer shall attach a copy of the Declaration of Conformity to each legal measuring instrument placed on the market, and a single copy may be attached to a batch of legal measuring instruments for one user.

8. If the Appointing Authority stipulated in Clause (3) of this form agrees, and under its responsibility, the Manufacturer may affix the identification number of the Appointing Authority to the legal measuring instrument during the Manufacture Process.

9. Authorized Representative:

The obligations of the manufacturer may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative. The authorized representative may not execute the requirements specified in Clauses (2), (3) and (6-1) of this module on behalf of the manufacturer.

Conformity Module (G)

Conformity Based on Unit Verification

1. It is a conformity assessment procedure during which the Manufacturer fulfils the requirements stated in clauses (2), (3) and (5) of this module and guarantees and declares its full responsibility that the Measuring Instrument manufactured by it and is subject to provisions of clause (4) of this module conforms to the requirements stated in this Resolution.

2. Technical Documents:

a. The manufacturer shall prepare the technical documents in accordance with Article (16) of this Resolution and make it available to the designated body referred to in clause (4) of this module.

b. The technical documents must be sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution.

c. The technical documents must include a sufficient analysis and evaluation of risks.

d. The technical documents must specify the relevant requirements, covering the design, manufacturing, and operation of the legal measuring instrument, wherever possible.

e. The Manufacturer shall keep the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

3. Manufacturing:

The manufacturer shall take all necessary measures to ensure that all manufacturing operations and their control guarantee the conformity of the manufactured legal measuring instruments to the requirements set forth in this Resolution.

4. Verification:

The concerned authority chosen by the manufacturer must conduct or request the appropriate tests and inspections specified in the guidelines outlined in Annex (6) of this Resolution or equivalent tests specified in the relevant technical specifications, to verify the conformity of the legal measuring instrument to the requirements set forth in this Resolution. If the guidance documents outlined in Annex (6) of this Resolution

are unavailable, the concerned authority shall determine the appropriate tests to be conducted. The concerned authority shall also issue a Certificate of Conformity for the tests and inspections conducted, affixing its identification number, or allowing it to be affixed by the manufacturer under the responsibility of the concerned authority. The manufacturer shall retain the Certificate of Conformity for inspection by the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market.

5. Conformity Mark and Declaration of Conformity:

5-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (4) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to the approved type indicated in the Conformity Certificate declaration that meets the relevant requirements contained in this Resolution.

5-2 The manufacturer shall issue a written Declaration of Conformity for each legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market. A copy of the Declaration of Conformity must be provided with each legal measuring instrument placed on the market.

6. Authorized Representative:

The obligations of the manufacturer specified in Clauses (2) and (5) may be performed by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (H)

Conformity Based on Full Quality Assurance

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in clauses (2) and (5) of this module, and guarantees and declares full responsibility that the legal manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.
b. The final product shall be inspected and examined in accordance with Clause (3) of this module.
c. To be subject to continuous monitoring operations in accordance with Clause (4) of this module.

3. Quality System:

3-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.
b. Technical documents as specified in Article (16) of this Resolution, for each model of each category of the legal measuring instrument intended to be manufactured, ensuring that the documentation is sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution. It must include a comprehensive risk analysis and assessment, specify the applicable requirements, and cover the design, manufacturing, and operation processes of the legal measuring instrument, wherever possible.
c. A written undertaking that the application has not been submitted to any other Concerned Authority.
d. Documents related to the quality system.

3-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.
b. The design technical specifications, including the standards to be applied, a statement of any exceptions from these standards, and any provisions relied upon in other technical specifications to meet the essential requirements set out in this Resolution.
c. Design control and confirmation techniques, processes and methodological procedures that will be used when designing the legal measuring instrument in question.
d. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.
e. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.
f. Quality records such as inspection reports, test data, calibration data and qualification reports of relevant persons.
g. Means of monitoring the achievement of the required product quality and effective management of the quality system.

3-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (3-2) of this module.

3-4 The review team must be qualified and experienced in assessment processes, including at least one technical expert with experience in the technical aspects of the legal measuring instrument and a good understanding of the requirements of this Resolution. The review process must include an assessment visit to the manufacturer's site. The review team must review the technical documents specified in Paragraph (B)

of Clause (3-1) to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and to conduct all necessary tests to ensure conformity. The review team must notify the manufacturer of the review results, which must include the findings and decisions of the review process.

3-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

3-6 The manufacturer must keep the concerned authority that approved the quality system informed of any proposed changes to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (2-3) of this module or whether there is a need for re-assessment if necessary. The concerned authority shall notify the manufacturer of its decision, which must include a summary of the assessment process and the reasons for its decision.

4. Follow-Up Visits Under the Responsibility of the Concerned Authority:

4-1 The follow-up visit aims to ensure that the Manufacturer continues to perform its obligations stipulated in the quality system in full.

4-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.
b. Quality records as provided in the design part of the quality system, such as results of analyses, calculations and tests.
c. Quality records as provided in the manufacturing part of the quality system, such as inspection reports, testing and calibration data, and competency reports of the concerned persons.

4-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

4-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report and a report on the examinations and tests that were conducted by the Concerned Authority or upon its request.

5. Conformity Mark and Declaration of Conformity:

5-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (3-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to requirements contained in this Resolution.

5-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market. A copy of the Declaration of Conformity must be attached to each legal measuring instrument placed on the market, and a single copy may be attached for a batch of legal measuring instruments intended for one user.

6. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

   a. The documents specified in Clause (3-1) of this module.
   b. The documents relevant to quality system specified in Clause (3-1) of this module.
   c. Information relating to the change stipulated in Clause (6-3) of this module, as approved.
   d. Resolutions and reports issued by the Concerned Authority stipulated in clauses (3-6), (4-3) and (4-4) of this module.

7. Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon

request, provide a list of quality systems that have been rejected, suspended or identified.

8. Authorized Representative:

The obligations of the manufacturer specified in Clauses (3-1), (3-6), (5) and (6) of this module may be fulfilled by the authorized representative on behalf of the manufacturer and under their responsibility, provided that these obligations are defined by the authorized representative.

Conformity Module (1)

Compliance Based on Comprehensive Quality Assurance and Design Testing

1. This is a conformity assessment procedure where the manufacturer ensures compliance with the requirements stated in clauses (2) and (6) of this module, and guarantees and declares full responsibility that the legal manufactured measuring instrument complies with all the requirements stipulated in this Resolution.

2. Manufacturing:

The manufacturer shall comply with the following:

a. Operate in accordance with a quality system approved by the concerned authority.
b. The final product shall be inspected and examined in accordance with Clause (3) of this module.
c. To be subject to continuous monitoring operations in accordance with Clause (5) of this module.
d. A test shall be carried out to suit the technical design of the legal measuring instrument in accordance with Clause (4) of this module.

3. Quality System:

3-1 The Manufacturer shall submit application to the Concerned Authority of its selection to assess the quality system used in the manufacture of legal Measuring Instruments, provided that the application shall include the following:

a. Name and address of the manufacturer or the authorized representative, as applicable.

b. All relevant information for the category of the legal measuring instrument to be manufactured.
c. A written undertaking that the application has not been submitted to any other Concerned Authority.
d. Documents related to the quality system.
e. Technical documents stipulated in Article (16) of this Resolution.

3-2 The manufacturer shall ensure that the quality system guarantees the conformity of the legal measuring instrument with the requirements of this Resolution, documenting all elements, conditions, and provisions adopted in a systematic, organized, and clear manner in the form of policies, procedures, and written work instructions. The quality system must include a sufficient and appropriate description as follows:

a. Quality objectives, organizational structure, responsibilities and powers of management, in relation to production quality.
b. The design technical specifications, including the standards to be applied, a statement of any exceptions from these standards, and any provisions relied upon in other technical specifications to meet the essential requirements set out in this Resolution.
c. Design control and confirmation techniques, processes and methodological procedures that will be used when designing the Measuring Device in question.
d. Quality control and quality assurance procedures, processes and methodologies that will be used during manufacturing.
e. The tests that will be conducted before, during and after the manufacturing process and the frequency of conducting them.
f. Quality records such as inspection reports, test data, calibration data and qualification reports of relevant persons.
g. Means of monitoring the achievement of the required product quality and effective management of the quality system.

3-3 The concerned authority shall evaluate the quality system to verify its compliance with the requirements outlined in Clause (3-2) of this module.

3-4 The review team must be qualified and experienced in assessment processes, including at least one technical expert with experience in the technical aspects of the legal measuring instrument and a good understanding of the requirements of this Resolution. The review process must include an assessment visit to the manufacturer's site. The review team must review the technical documents specified in Paragraph (E) of Clause (3-1) to verify the manufacturer's capacity to meet the requirements set forth in this Resolution and to conduct all necessary tests to ensure conformity. The review team must notify the manufacturer of the review results, which must include the findings and decisions of the review process.

3-5 The Manufacturer shall take all actions and obligations stipulated in the approved quality system, and maintain them appropriately and effectively.

3-6 The manufacturer shall keep the concerned authority that approved the quality system informed of any proposed changes to the quality system. The Concerned Authority shall assess the submitted proposals and decide whether the quality system will continue to meet the requirements set out in Clause (3-2) of this module or whether there is a need for re-assessment if necessary. The concerned authority shall notify the manufacturer of its decision, which must include a summary of the assessment process and the reasons for its decision.

3-7 Each Concerned Authority shall inform the notifying authority of each established quality system that has been issued or withdrawn, and shall, periodically or upon request, provide a list of quality systems that have been rejected, suspended or identified.

4. Design tests:

4-1 The manufacturer shall submit a request to the concerned authority specified in Clause (3-1) of this module regarding the design test.

4-2 The request must be clear to ensure understanding of the design, manufacturing, and operation of the legal measuring instrument, to evaluate its conformity with the requirements of this Resolution. The request must include the following:

a. Name and address of the Manufacturer.

b. A written undertaking that the application has not been submitted to any other Concerned Authority.

c. Technical documents as specified in Article (16) of this Resolution, ensuring that the technical documents are sufficient to assess the conformity of the legal measuring instrument with the requirements of this Resolution. It must include a comprehensive risk analysis and assessment, specify the applicable requirements, and cover the design, manufacturing, and operation processes of the legal measuring instrument, wherever possible.

d. Evidence and documents supporting the adequacy of the technical design that shall mention any documents that have been used, and in particular the requirements that have not been met from the guidance documents set out in Annex (6) of this Resolution, and shall also include, whenever necessary, the results of the tests that have been conducted in accordance with the technical specifications in approved laboratories.

4-3 The Concerned Authority shall test the application, and if the design complies with the requirements of this resolution, the Concerned Authority shall issue a design test certificate in favour of the Manufacturer, which shall contain the following:

a. Name and address of the Manufacturer.

b. Test results.

c. Conditions of validity of the certificate, if applicable.

d. The necessary data to identify the approved design, and the certificate may include one or more annexes.

4-4 The design test certificate and its annexes shall contain all the necessary information to allow in-service control of legal measuring instruments and to assess the examined design, especially concerning the reproducibility of the metrological properties when adjusted using appropriate tools, which shall include the following:

a. Metrological properties of the design.

b. Measures required to ensure that the device is not tampered with (software seal, etc.).

c. Information about other elements necessary to characterize the measuring instrument and ensure its visual external conformity to the design.

d. Any information to confirm the manufactured legal measuring instrument, when necessary.

e. All information necessary to ensure that sub-assembly units are compatible with the legal measuring instrument or other required units.

4-5 The concerned authority shall prepare an assessment report on the design tests and keep it available to the notifying authority. The concerned authority shall disclose the contents of this report either fully or partially, after obtaining the manufacturer's approval. The validity of the design test certificate is ten (10) years from the date of issuance, and it can be renewed for subsequent periods of ten (10) years each. If the design does not meet the requirements related to it in this Resolution, the Concerned Authority shall refuse to issue the Design examination certificate, and shall inform the entity submitting the application of such procedure, stating the reason for the refusal in detail.

4-6 The Concerned Authority shall be kept fully informed of any change in the legal Measuring Instrument which renders it non-compliant with the requirements of this Resolution, if a change occurs to it. Such authority shall define whether the change in the Measuring Instrument requires further investigation, and shall inform the Manufacturer accordingly.

4-7 The Manufacturer shall inform the Concerned Authority holding the technical documents for the design test certificate of all changes to the approved type which may affect the conformity of the legal measuring instrument with the essential requirements of this Resolution or special circumstances of the validity of the certificate, which require additional checks to be carried out in addition to those contained in the original Type Test Certificate.

4-8 Each Concerned Authority shall provide the Notifying Authority with the Design Test Certificates it has issued, amended, specified the scope of, suspended or cancelled, on a periodic basis or upon request. The Ministry or other designated bodies shall have the right to obtain a copy of such certificates, technical documents or results of tests

conducted by the Concerned Authority. The Concerned Authority shall retain a copy of the Design Test Certificate, its Annexes and amendments, the technical documents file, and the documents submitted by the Manufacturer, until the expiry of the certificate validity.

4-9 The Manufacturer shall keep a copy of the Design Test Certificate, its attachments and amendments, and the technical documents file to be immediately available upon request from the Competent Authorities for a period of (10) years from the date of placing the legal measuring instrument on the market.

5. Follow-Up Visits Under the Responsibility of the Concerned Authority:

5-1 The follow-up visit aims to ensure that the Manufacturer continues to perform its obligations stipulated in the quality system in full.

5-2 The Manufacturer shall allow the Concerned Authority access to the design, manufacturing, inspection and storage sites, and provide the Concerned Authority with all the necessary information for the assessment processes, in particular the following:

a. Quality system documents.
b. Quality records as provided in the design part of the quality system, such as results of analyses, calculations and tests.
c. Quality records as provided in the manufacturing part of the quality system, such as inspection reports, testing and calibration data, and competency reports of the concerned persons.

5-3 The Concerned Authority shall conduct a periodic Review of the Manufacturer to ensure that the Manufacturer continues to maintain and apply the quality system, and the Concerned Authority shall provide the Manufacturer with the Review report.

5-4 The Concerned Authority may conduct Unannounced visits to the Manufacturer, during which examinations or tests are conducted, or requested to be conducted, with the aim of ensuring that the quality system is operating properly. In this case, the Concerned Authority shall provide the Manufacturer with a visit report and a report on the examinations and tests that were conducted by the Concerned Authority or upon its request.

6. Conformity Mark and Declaration of Conformity:

6-1 The Manufacturer, under the responsibility of the Concerned Authority stipulated to in Clause (3-1) of this module, shall affix the conformity mark and the complementary metrological mark specified in this Resolution, in addition to the identification number of the Concerned Authority, on every legal measuring instrument conforming to this Resolution.

6-2 The manufacturer shall issue a written Declaration of Conformity for each model of the legal measuring instrument, clearly and specifically, and keep it to be readily available upon request from the competent authorities for a period of (10) years from the date the legal measuring instrument is placed on the market. A copy of the Declaration of Conformity must be attached to each legal measuring instrument placed on the market, and a single copy may be attached for a batch of legal measuring instruments intended for one user.

7. The Manufacturer shall provide the following to the competent authorities upon request, for a period of (10) years from the date of placing the legal measuring instruments on the market:

a. The documents relevant to quality system specified in Clause (3-1) of this module.
b. Information relating to the change stipulated in Clause (6-3) of this module, as approved.
c. Resolutions and reports issued by the Concerned Authority stipulated in clauses (3-6), (5-3) and (5-4) of this module.

8. Authorized Representative:

The authorized representative may submit the request outlined in clauses (4-1) and (4-2), and may carry out the manufacturer's requirements specified in clauses (3-1), (3-6), (4-4), (4-6), (6), and (7) on behalf of the manufacturer and under the manufacturer's responsibility, provided that these shall be specified for the obligations of the authorized representative.

Annex (4)

Declaration of Conformity

Declaration of Conformity shall include the following details as minimum:

1. The use of a unique conformity number issued by the declaration.
2. The model, type, batch, or serial number of the legal measuring instrument.
3. Name and address of the Manufacturer.
4. The name and address of the authorized representative, where applicable.
5. A statement that the declaration has been issued by the manufacturer and under its full responsibility.
6. A description of the legal measuring instrument in a way that allows for the identification of its supply chain, and if necessary, include a picture of the legal measuring instrument.
7. A statement declaring that the product described above conforms to all the relevant requirements of the applicable technical regulations.
8. An indication to the reference standards specified in Annex (7) of this Resolution or the standardization documents referred to in Article (13) of this Resolution, or the relevant technical characteristics according to which the legal measuring instrument has been conformed.
9. The name of the concerned authority, its identification number, and the certificate number issued by it, as applicable.
10. Additional relevant information.
11. The name, signature, position of the authorized person, and the date and place of issuance.

Annex (5)

Conformity Marks

Article (1)

Definitions

1. Conformity Mark:

   A specific mark that is placed on the product or the Declaration of Conformity document when it is not possible to affix it to the product, indicating that the product conforms to all the requirements outlined in this Resolution.

2. Complementary Metrology Mark (Complementary Mark):

   A mark placed after the conformity mark and specific to the Legal Measuring Instruments mentioned in this Resolution.

3. The conformity mark affixed to the product indicates that it meets all the requirements specified in this Resolution for the product, and that the natural or legal person who affixed the mark, or who became responsible for affixing it, has ensured that the product conforms to all the requirements stipulated in this Resolution for the product. It is placed after all the procedures outlined in this Resolution and other relevant technical regulations have been completed.

4. The conformity mark shall be affixed to all products subject to this Resolution that are required to bear the mark before they are placed on the market.

5. The conformity mark is the sole mark that confirms that the product conforms to this Resolution.

Article (2)

The Ministry shall issue the design and dimensions of the UAE Conformity Mark and the Complementary Mark.

Article (3)

The following conformity marks shall be deemed approved for the purposes of this Resolution:

1. The European mark (CE marking) and the Complementary Metrology Mark that meet the requirements of the European Directive for this purpose (Measuring Instrument Directive).
2. Any other conformity mark approved by the Ministry.

Annex (6)

Guidance Documents

Article (1)

The guidance documents issued by the European Cooperation in Legal Metrology (WELMEC) shall be deemed accepted for the purposes of this Resolution.

Article (2)

The interpretations provided in these documents shall be considered legally non-binding interpretations.

Annex (7)

Reference Standards

1. Directive 2024/32/EU of the European Parliament and of the council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of measuring instruments.
2. Arabian Directive for legal measuring instruments issued by Arab Industrial Development, Standardization, and Mining Organization in 2015.