2022-02-07

OBJECTS AND REASONS

This Bill would

(a) give effect to the *Convention du Metre* and related decisions and agreements;

(b) establish the International System of Units as the primary system of measurement in Barbados;

(c) clearly define the legal structure for the administration of metrology within Barbados in order to be in compliance with international standards, and to support the development of industry, improve competitiveness and ensure sustainable development;

(d) ensure that all measurements within Barbados are regulated to ensure compliance with the International System of Units in order to achieve transparency and fairness in the domestic market, and the protection of human life and health;

(e) repeal the *Weights and Measures Act*, Cap. 331; and

(f) provide for related matters.

Arrangement of Sections

FIRST SCHEDULE

The Base Units and Derived Units

SECOND SCHEDULE

Non - SI Units of Practical Importance

THIRD SCHEDULE

The SI Prefixes for multiples and sub-multiples of base, supplementary and derived units of measurement

FOURTH SCHEDULE

Conversion Factors

FIFTH SCHEDULE

Fees For Verification Work And For Registration Of Servicemen

BARBADOS

A Bill entitled

An Act to make provision for matters related to metrology and to

(a) give effect to the *Convention du Metre* and related decisions and agreements;

(b) establish the International System of Units as the primary system of measurement to be used in Barbados in both commercial and domestic affairs;

(c) clearly define the legal structure for the administration of metrology within Barbados in order to be in compliance with international standards, and to support the development of industry, improve competitiveness and ensure sustainable development;

(d) ensure that all measurements within Barbados are regulated to achieve competitiveness and fairness in the commercial and domestic affairs to ensure the protection of human life and health; and

(e) repeal the *Weights and Measures Act*, Cap. 331.

ENACTED by the Parliament of Barbados as follows:

PART I

PRELIMINARY

Short title

1. This Act may be cited as the *Barbados Metrology Act, 2022*.

Interpretation

2. In this Act,

"accuracy" means the closeness of the agreement between the measured quantity value and a true quantity value of a measurand which shall be within the appropriate limits required by this Act or normative standards, as the case may be;

"adjustment" means the set of operations carried out on a measuring instrument or measurement standard so that it provides prescribed indications which correspond to given values of a quantity to be measured;

"Barbados National Standards Institution" means the company incorporated under the *Companies Act*, Cap. 308 and charged with the duty of enforcing and administering the *Standards Act*, Cap. 326A;

"buyer" means a person who makes a purchase for himself or for another person and a person who buys as the agent of another person;

"calibration" means an operation under specified conditions, which

(a) at first establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties; and

(b) then secondly uses the information referred to in paragraph *(a)* to establish a relation for obtaining a measurement result from an indication;

"Caribbean Community" or "CARICOM" means the countries or territories which are party to the Revised Treaty of Chaguaramas establishing the Caribbean Community, including the CARICOM Single Market and Economy, that was signed in The Bahamas on 5th July, 2001;

"Chief Inspector" means the Director of the Department of Commerce and Consumer Affairs;

"container" means any form of packaging in which goods are exposed, packed, offered for sale or sold such as a bag, case, carton, bottle, glass, box, can, envelope, net, sack or wrapper, whether or not such packaging fully encloses the contents;

"*Convention du Metre*" means the Treaty which was

(a) signed in Paris, France on the 20th day of May, 1875; and

(b) established the International Bureau of Weights and Measures; and

(c) assented to by the Caribbean Community, of which Barbados is a member, on the 10th day of October, 2005;

"designated appropriate standard" means an international standard or regional standard approved for the purposes of section 23 by the National Legal Metrology Authority;

"Director" means the Director of the Department of Commerce and Consumer Affairs, a public office established under the *Public Service Act*, Cap. 29;

"former Act" means the *Weights and Measures Act*, Cap. 331;

"General Conference of Weights and Measures" means the *Conference Generale des Poids et Mesures* established under the *Convention du Metre* and serviced by the International Bureau of Weights and Measures;

"industrial metrology" means the subfield of metrology concerned with the application of measurement science to manufacturing and other processes used in society to ensure the suitability of measurement instruments, their calibration and the quality control of measurements;

"initial verification" means verification of a measuring instrument which has not been verified previously;

"in-service verification" means verification of a measuring instrument after an initial verification and includes

(a) mandatory periodic verification;

(b) verification after repair; or

(c) voluntary verification;

"inspector" means a trading standard inspector, a public office established under he *Public Service Act,* Cap. 29 , and includes the Chief Inspector or any public officer assigned to do so by the Director by an instrument in writing;

"International Bureau of Weights and Measures" means the *Bureau International des Poids et Mesures*, established under the *Convention du Metre*;

"International System of Units" or "SI" means

(a) the system of units, based on the International System of Quantities and their names and symbols;

(b) the prefixes associated with the system of units and their names and symbols; and

(c) the rules for the use of the system of units and prefixes

defined and adopted by the General Conference of Weights and Measures;

"International Organisation of Legal Metrology" means the international body established by a treaty signed in Paris on the 12th day of October, 1955 to promote the global harmonization of legal metrology procedures that underpin and facilitate international trade;

"International Organisation of Legal Metrology Certification System" means the certification system established by the International Organisation of Legal Metrology to promote the global harmonization, uniform interpretation and implementation of legal metrological requirements for measuring instruments or modules;

"legal metrology" means the subfield of metrology concerned with the regulatory requirements of measurements and measuring instruments for the protection of health, public safety, the environment, enabling taxation, protection of consumers and fair trade;

"measurand" means a quantity intended to be measured, the measurement of which gives a measured quantity value;

"measuring instrument" means a device used for making measurement, alone or in conjunction with one or more supplementary devices;

"measured quantity value" means a quantity value representing a measured result;

"measurement standard" means the realization of the definition of a given quantity, with stated quantity value and associated measurement uncertainty, used as a reference;

"measurement uncertainty" means the non-negative parameter characterizing the dispersion of quantity values being attributed to a measurand, based on the information used;

"metrological traceability" means the property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty;

"metrology" means the science of measurement and its application, inclusive of the theoretical and practical aspects of the measurement uncertainty and field of application;

"national identification card" means the identification card issued in accordance with the *Barbados Identity Management Act, 2021* (Act 2021-3)or section 25 of the *Representation of the People Act*, Cap. 12, as the case may be;

"National Legal Metrology Authority" or "Authority" means the body designated as such by section 5;

"National Measurement Standard" means the measurement standard with the smallest measurement uncertainty in Barbados authorised by the Barbados National Standards Institution as the standard to serve as the basis for assigning quantity values to other measurement standards for the kind of quantity concerned;

"National Metrology Committee" means the committee composed by combining the National Metrology Institute and National Legal Metrology Authority for the purposes of section 6 or otherwise;

"National Metrology Institute" or "Institute" means the body designated as such by section 4;

"National Reference Standard" means the measurement standard designated by the Barbados National Standards Institution for the calibration of other measurement standards for quantities of a given kind;

"net quantity" means the quantity of a commodity excluding the container and any materials, substances, or items not considered to be part of the commodity;

"premises" includes any place, building, area of land, stall, vehicle, ship or aircraft;

"pre-packaged good" means a good which is placed in a container of any kind, in the absence of the purchaser, where the quantity of the good contained in the packaged has a pre-determined value and cannot be altered without the container being opened or undergoing a modification;

"primary reference measurement procedure" means a reference measurement procedure used to obtain a measurement result without relation to a measurement standard for a quantity of the same kind;

"primary standard" means a measurement standard established using a primary reference measurement procedure, or created as an artifact, chosen by convention;

"public officer" or "officer" means the holder of any office of emolument in the public service and includes a person appointed to act in such an office;

"quantity" means the property of a phenomenon, body or substance, where the property has a magnitude that can be expressed as a number and a reference;

"rejection certificate" means a certificate issued with respect to a measuring instrument certifying that the measuring instrument does not comply with the statutory requirements of this Act and is not suitable for the intended use;

"rejection mark" means a mark applied to a measuring instrument in a conspicuous manner in order

(a) to indicate that the measuring instrument does not comply with the statutory requirements of this Act; and

(b) to obliterate the previously applied verification mark;

"scientific metrology" means the subfield of metrology concerned with the establishment of measurement units, unit systems, the development of new measurement methods, the realization of measurement standards and the transfer of traceability from these standards to users in society;

"seal" or "sealing mark" means a device or mark intended to protect the measuring instrument against any unauthorised modification, readjustment, removal of parts, and such other related interventions;

"Service Commission" has the meaning assigned to it by section 2 of the *Public Service Act*, Cap. 29;

"trade" means the selling, purchasing, exchanging, leasing, rendering, consigning or providing of any goods, land, facility, service or work on the basis of measurement and includes the collecting of tolls, duties and taxes on the basis of measurement and the business of providing facilities for measuring by means of a prescribed measuring instrument;

"trader" means any person who carries on trade in the course of business;

"true value of quantity" means the correct value of any quantity or formula which is considered in practice to be unknown;

"type approval" means a decision of the Department of Commerce and Consumer Affairs, based on an evaluation report, that the type of a measuring instrument complies with the relevant statutory requirements;

"verification" means a conformity assessment procedure, other than type evaluation, which results in the affixing of a verification mark or issuing of a verification certificate;

"verification certificate" means a certificate issued with respect to a measuring instrument certifying that the verification of the measuring instrument was carried out with satisfactory results;

"verification mark" means a mark applied to a measuring instrument certifying that the verification of the measuring instrument was carried out with satisfactory results;

"Working Standard" means a measurement standard established by the Barbados National Standards Institution to calibrate or verify measuring instruments or measuring systems.

PART II

ADMINISTRATION

Barbados National Standards Institution

3.(1) The Barbados National Standards Institution, subject to this Act, shall be responsible for

(a) ensuring that all measurement standards to be used in Barbados are in compliance with the *Convention du Metre* and such other required international standards established by the General Conference of Weights and Measures;

(b) ensuring that all measurement standards and measuring instruments used in Barbados are metrologically traceable to the International System of Units, and are being used in a manner permitted by this Act; and

(c) matters relating to scientific metrology and industrial metrology.

(2) The functions of the Barbados National Standards Institution are to

(a) advise the Minister on all matters related to metrology and the subfields of metrology;

(b) assist and advise the Minster in order to strengthen the national metrology infrastructure of Barbados;

(c) represent Barbados at technical committees, conferences, meetings and activities held by international and regional metrology organisations, where required to do so by the Minister;

(d) advise the Minister of the standards required for Barbados, where required, and recommend that Barbados procure, issue or create National Measurement Standards, National Reference Standards and Working Standards;

(e) participate in inter-laboratory comparisons approved by the International Bureau of Weights and Measures in order to demonstrate the calibration and measurement capability of the Barbados National Standards Institution;

(f) provide suitable transfer standards to transmit the value of the quantities from the National Measurement Standard to the Working Standards used by inspectors; and

(g) provide programmes, workshops, and other forms of training to develop the technical competence of metrologists to ensure that Barbados has suitably trained metrologists to service the local industry.

National Metrology Institute

4.(1) The Barbados National Standards Institution is hereby designated as the National Metrology Institute of Barbados.

(2) The functions of the National Metrology Institute are to

(a) ensure the reliability of all measurements used in Barbados;

(b) ensure that these measurements conform with the International System of Units;

(c) develop new measurement technologies in order to establish the national measurement system required for ensuring the accuracy of measurements used in Barbados;

(d) enhance existing measurement technologies in order to maintain the national measurement system required for ensuring the accuracy of measurements used in Barbados; and

(e) perform such functions as the Minister may require for the purposes of the Act.

(3) The National Metrology Institute shall meet at least once each month and at such other times as may be necessary or expedient for the purposes of this Act.

(4) The National Metrology Institute may

(a) invite a person to attend a meeting of the National Metrology Institute where such a person has information required by the National Metrology Institute; or

(b) engage a person having special or technical knowledge to assist in carrying out its functions.

(5) Where the National Metrology Institute acts under subsection (4)*(b)*, the Minister may pay to that person such remuneration and allowances, as the Minister determines.

National Legal Metrology Authority

5.(1) The Department of Commerce and Consumer Affairs is hereby designated as the National Legal Metrology Authority.

(2) The functions of the National Legal Metrology Authority are to

(a) ensure the awareness and protection of the public in commercial, educational, health and other related fields as it relates to legal metrology;

(b) ensure the proper implementation of legal metrology in Barbados;

(c) issue an identification card to an inspector, and that identification card shall show a photograph of the inspector, give the full name of the inspector, give the national identification card number of the inspector and supply information for a person to contact the Authority;

(d) approve a designated appropriate standard for use in Barbados; and

(e) perform such functions as the Minister may require for the purposes of the Act.

(3) The National Legal Metrology Authority shall meet at least once each month and at such other times as may be necessary or expedient for the purposes of this Act .

(4) The National Legal Metrology Authority may

(a) invite a person to attend a meeting of the National Legal Metrology Authority where such a person has information required by the National Legal Metrology Authority; or

(b) engage a person having special or technical knowledge to assist in carrying out its functions.

(5) Where the National Legal Metrology Authority acts under subsection (4) *(b)*, the Minister may pay to that person such remuneration and allowances, as the Minister determines.

National Metrology Committee

6.(1) The Minister may direct that a meeting of the National Metrology Committee be held at such times as may be necessary or expedient in order

(a) to implement or facilitate the purposes of this Act;

(b) to address matters that may arise from the implementation of the Act; or

(c) to address matters relating to metrology generally.

(2) Notwithstanding subsection (1), the National Metrology Committee shall meet at least once each month.

(3) The National Metrology Committee may

(a) invite a person to attend a meeting of the National Metrology Committee where such a person has information required by the National Metrology Committee; or

(b) engage a person having special or technical knowledge to assist in carrying out its functions.

(4) Where the National Metrology Committee acts under subsection (4)*(b)*, the Minister may pay to that person such remuneration and allowances, as the Minister determines.

Functions of the Director

7.(1) The Director shall have responsibility for all matters relating to legal metrology.

(2) The functions of the Director are to

(a) develop, in consultation with the Barbados National Standards Institution the legal metrology policy of Barbados;

(b) implement and monitor the legal metrology policy of Barbados;

(c) facilitate, where required by the Minster to do so, the cooperation of Barbados with the international and regional metrology community in order to strengthen the national metrology infrastructure of Barbados;

(d) advise the Minister on matters relating to the decisions or recommendations of international and regional metrology agreements, and advise on the implementation of such decisions or recommendations, where required to do so by the Minister;

(e) represent Barbados at technical committees, conferences, meetings and activities held by international and regional legal metrology organisations, where required to do so by the Minister;

(f) ensure that all measurement standards and measuring instruments used in Barbados pursuant to this Act are metrologically traceable to the International System of Units;

(g) implement and monitor the aspects of legal metrology specified in this Act;

(h) verify all regulated measuring instruments to ensure compliance with the limits of error and all other requirements specified in this Act;

(i) develop the technical competence of inspectors;

(j) maintain the metrological traceability of the measurement standards and measuring instruments in its custody;

(k) develop and implement a system of type approval of measuring instruments;

(l) evaluate and when satisfied, recognise the equivalence of type approval certificates issued by a qualified issuing authorities approved by the Minister; and

(m) build public awareness in Barbados of the meaning, relevance and importance of metrology.

Directions of the Minister

8. The Minister may, as it appears to the Minister to be necessary in the public interest give directions of a general nature on matters relating to this Act to be followed by the National Metrology Institute, the National Legal Metrology Authority, the Chief Inspector and any other persons appointed to discharge functions under or in relation to this Act.

PART III

LEGAL METROLOGY INSPECTORS

Functions of the Chief Inspector

9. The functions of the Chief Inspector are to

(a) be responsible for enforcing all matters relating to legal metrology;

(b) supervise inspectors in the discharge of their functions;

(c) deliver to each inspector such Working Standards, measuring instruments, equipment and such other resources or materials as are necessary for the inspector to discharge his functions; and

(d) perform such functions as the Minister may require for the purposes this Act.

Functions of an inspector

10. Every inspector shall

(a) inspect or examine measuring instruments to determine whether those measuring instruments are in compliance with this Act;

(b) inspect articles or goods to determine whether those articles are in compliance with this Act;

(c) keep a record in the form required by the Chief Inspector and enter such particulars as may be required by the Chief Inspector relating to the performance of his functions under this Act and, at such times as may be required, provide such records to the Chief Inspector for examination;

(d) show the identification card provided by the Department of Commerce and Consumer Affairs, identifying him as an inspector, where required to do so;

(e) furnish the owner or person in charge of any premises with a written receipt before removing any measuring instrument or article from the premises;

(f) account for and pay over to the Department of Commerce and Consumer Affairs all fees taken under this Act;

(g) protect the secrecy of information acquired in the exercise of his functions as an inspector and continue to protect such secrecy after the termination of employment;

(h) make such returns and furnish such information to the Chief Inspector as he requires; and

(i) carry out any directions given by the Chief Inspector.

Powers of inspectors

11.(1) An inspector has the power to

(a) enter the premises of any trader or any other place where trade occurs

(i) in which he has reasonable cause to believe there are measuring instruments that are or are to be used in connection with trade or any documents in relation thereto;

(ii) in which he has reasonable cause to believe there are measuring instruments for which limits of error are subject to the provisions this Act;

(iii) in which he has reasonable cause to believe there are goods that are subject to the provisions of this Act; or

(iv) in order to require the production of any good, or to open, examine and measure any good in any container or otherwise for the purposes of this Act;

(b) require the production of a measuring instrument by a person for an examination to determine the accuracy of that measuring instrument;

(c) seize and detain a measuring instrument or goods where he reasonably believes this Act has been contravened;

(d) affix a verification mark or issue a verification certificate to any measuring instrument that is found not to be within the appropriate limits of error and any other requirements established in accordance with this Act;

(e) obliterate or remove, in the circumstances and manner prescribed, the verification mark on a measuring instrument and cancel the verification certificate issued in respect thereof;

(f) affix a rejection mark or issue a rejection certificate to any measuring instrument that is found not to be within the appropriate limits of error and any other requirements that are specified in this Act;

(g) attach a mark or label bearing the words "not for use in trade" to a measuring instrument where the use of that measuring instrument has been prohibited;

(h) affix a seal to a measuring instrument to prevent unauthorised modification, readjustment or removal of parts;

(i) require the production of, and examine and measure any goods which are subject to this Act, and for the purpose of such measurement, open any container; or

(j) purchase, with public funds allocated for that purpose, any goods which, being subject to this Act are offered for sale or exposed or advertised in such a manner as to constitute an invitation to treat;

(2) The powers of an inspector under this section shall in no case include the power to

(a) detain any measuring instrument that is found to comply with the appropriate limits of error and any other requirements that are stated in this Act; and

(b) purchase goods at a price other than that marked or advertised.

(3) An inspector who enters any premises in the exercise of his powers under subsection (l) may take with him such other public officers or persons authorised by the Chief Inspector, and take such equipment as may be reasonable in the circumstances.

(4) Any measuring instrument or goods seized by an inspector pursuant to subsection (1), may be kept or stored in the building or place where seized or may be removed to any other appropriate place by or at the direction of the inspector who, in the case of goods seized, shall take all reasonable steps to ensure

that such goods are not altered in quality or quantity before the conclusion of any proceedings arising out of seizure.

Duty of non-disclosure

12. An inspector who in the exercise of his functions or powers under this Act obtains information with regard to any manufacturing process or trade secret and who, otherwise than in the performance of his functions or powers, communicates such information to any person is guilty of an offence.

Obstruction of inspectors

13.(1) A person who obstructs or hinders an inspector from exercising any of his functions or powers under this Act is guilty of an offence.

(2) A person who, following a lawful request by an inspector under this Act, fails to produce any measuring instrument, good, book, document, or record which the inspector is entitled to examine is guilty of an offence.

Impersonation of inspectors

14. A person who, not being an inspector, acts or purports to act as an inspector, is guilty of an offence.

PART IV

LEGAL UNITS OF MEASUREMENT

Legal units of measurement

15.(1) The International System of Units shall be the primary system of measurement in Barbados and all units of measurement set by the Barbados National Standards Institution shall be determined on the basis of the International System of Units.

(2) The legal units of measurement in Barbados shall consist of the International System of Units specified in the *First Schedule* and the Non-SI Units specified in the *Second Schedule*.

(3) For the purposes of this Act, the multiples and submultiples of the units of measurement referred to in subsection (2) are determined by the application of the prefixes set out and defined in the *Third Schedule*.

(4) The units of measurement shall be converted in accordance with the *Fourth Schedule*.

Measurement standards

16.(1) The Barbados National Standards Institution shall advise the Minister of

(a) the National Measurement Standards;

(b) the National Reference Standards; and

(c) the Working Standards

which are required to facilitate the realization and dissemination of the International System of Units in Barbados.

(2) The Minister shall procure such measurement standards, including the required facilities, equipment, measuring instruments and reference materials, as are necessary to facilitate the implementation and dissemination of the International System of Units.

(3) The Barbados National Standards Institution shall ensure that every measurement standard owned by the Barbados National Standards Institution is maintained, calibrated and stored in such a way as to ensure that each measurement standard conforms to the appropriate class and measurement uncertainty requirements.

(4) Every

(a) National Measurement Standard established and maintained in pursuance of section 17;

(b) National Reference Standard established and maintained in pursuance of section 18; or

(c) Working Standard established and maintained in pursuance of section 19

shall, until the contrary is proved, be deemed to be accurate, and judicial notice shall be taken of every standard so established and maintained.

(5) Every standard shall be calibrated by a standard that either

(a) has a smaller measurement uncertainty than the uncertainty required for the standard being calibrated; or

(b) is of a higher accuracy class than the standard being calibrated.

(6) A current calibration certificate shall be maintained for every measurement standard or set of measurement standards owned by the Barbados National Standards Institution and the Department of Commerce and Consumer Affairs.

(7) The Chief Inspector shall ensure that every measurement standard in the care and custody of the Department of Commerce and Consumer Affairs is maintained, calibrated and stored in such a way as to ensure it conforms to the appropriate class and measurement uncertainty requirements.

National Measurement Standard

17.(1) The National Measurement Standard shall be recalibrated at such appropriate intervals, not exceeding 10 years, as may be required to maintain the metrological traceability of that standard.

(2) The National Measurement Standard shall be calibrated by the Barbados National Standards Institution and thereafter recalibrated by

(a) comparison with an equivalent primary standard owned by a National Metrology Institute or Designated Institute of a State which is a party to the *Convention du Metre* with calibration and measurement capabilities published on the International Bureau of Weights and Measures key comparison database for the required quantity and measurement uncertainty;

(b) a National Metrology Institute or Designated Institute of a State which is party to the *Convention du Metre* with calibration and measurement capabilities published on the International Bureau of Weights and Measures key comparison database for the required quantity and measurement uncertainty; or

(c) a calibration laboratory accredited by a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Agreement to perform calibrations for the required quantity and measurement uncertainty.

(3) The National Measurement Standard and copies thereof shall be kept in the custody of the Barbados National Standards Institution.

National Reference Standard

18.(1) A National Reference Standard shall be recalibrated at such appropriate intervals, not exceeding 5 years, as may be required to maintain the metrological traceability of that standard .

(2) A National Reference Standard shall be calibrated and thereafter recalibrated by a National Measurement Standard or other National Reference Standard with a smaller measurement uncertainty than the National Reference Standard being calibrated.

(3) The National Reference Standard and copies thereof shall be kept in the custody of the Barbados National Standards Institution, and copies thereof may be issued to the Minister and the Chief Inspector.

Working Standard

19.(1) The Working Standard and any related measuring instrument shall be calibrated by the Barbados National Standards Institution.

(2) The Working Standard and any related measuring instrument shall be calibrated annually against the National Measurement Standard, National Reference Standard or another Working Standard with a smaller measurement uncertainty than the Working Standard being calibrated.

(3) Working Standards and testing equipment shall be of a material and form approved by the Barbados National Standards Institution.

(4) The Barbados National Standards Institution and the Department of Commerce and Consumer Affairs may hold such Working Standards as are necessary for its officers to effectively carry out their functions.

Temporary National Measurement Standard

20.(1) The Minister may, in the absence of a National Measurement Standard, declare a National Reference Standard as the Temporary National Measurement Standard.

(2) A Temporary National Measurement Standard may only be used for the purposes of this Act if it has been calibrated in accordance with the methods required by this Act and shall be used until the National Measurement Standard has been replaced.

Use of uncalibrated working standard

21.(1) No inspector shall use a Working Standard or any measuring instrument in the course of performing his functions or exercising his powers

unless that Working Standard or measuring instrument has been calibrated in accordance with this Act.

(2) No inspector shall use any Working Standard for the purposes of verifying any measuring instrument at any time after the expiry of a period of one year from the date on which the standard was last calibrated.

Limits of error

22.(1) No person shall use a measuring instrument which gives an inaccurate measurement which is outside the appropriate limits of error that are permitted by this Act or a standard produced hereunder.

(2) A person who contravenes subsection (1) is guilty of an offence and is liable on summary conviction to a fine of $5 000, and in the case of a subsequent offence, to a fine of $15 000.

Determination of the accuracy of measuring instruments

23.(1) Where a person, for any legal purpose requires a determination as to the accuracy or the degree deviation of a measuring instrument, and it is necessary to ascertain the accuracy of a measuring instrument or the deviation from the appropriate limits of error, this may be ascertained by means of, by reference to, by comparison with or by derivation from any of the following standards:

(a) the National Measurement Standard established in accordance with section 17;

(b) the National Reference Standard established in accordance with section 18;

(c) the Working Standard established in accordance with section 19;

(d) the Temporary National Reference Standard established in accordance with section 20; or

(e) a designated appropriate standard.

(2) Where for the purposes of subsection (1)*(e)*, the National Legal Metrology Authority has to make a determination, it shall make that determination in consultation with the National Metrology Institute.

Use of units of measurement

24.(1) The Minister may by order declare that certain units of measurement and not others shall be used in connection with specified classes of any one or more of the following:

(a) undertakings;

(b) trades;

(c) goods;

(d) services; or

(e) measuring instruments.

(2) A person who

(a) in connection with commerce or a trade, uses or provides for use a unit of measurement other than one of the units of measurement specified and defined in the *Schedules*; or

(b) uses or provides for use, a unit of measurement contrary to the order made under subsection (1)

is guilty of an offence.

(3) Every contract, bargain or sale made or had in Barbados whereby any work, article, good, merchandise or other thing is to be done, sold, hired, delivered, carried, measured, computed, paid for or agreed to by a unit of measurement, shall be made and had according to any of the legal units of measurement specified in accordance with this Act.

(4) All fees and duties whatsoever charged or collected in Barbados shall be based on the legal units of measurement specified in accordance with this Act.

(5) All packaging, labels and stickers affixed or attached to or associated with any article or good intended or offered for sale within Barbados shall indicate measurements in the legal units of measurement specified in accordance with this Act.

(6) A person who contravenes subsection (3), (4) or (5) is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence, to a fine of $15 000.

Expression of numerals for trade and other uses

25.(1) In circumstances where, it is lawful to use a unit of measurement or number in connection with a trade, the numerical representation of that unit of measurement or number shall be the Arabic system of numerals, which may be expressed either in figures or English words representing those figures, unless that use is expressly prohibited.

(2) The unit of the metric carat included in the *Fourth Schedule* shall be used only in connection with trade in precious stones and pearls, and no other unit of measurement of weight shall be used in connection with such trade.

(3) The unit of the troy ounce included in the *Second Schedule* shall be used only in connection with trade in gold, silver or other precious metals including gold or silver thread, lace or fringe, and no unit of measurement other than the troy ounce or the gramme shall be used in connection with such trade.

(4) The unit of the barrel included in the *Second Schedule* shall be used only in connection with trade in petroleum.

Offence of false measurement in the business

26. A person who, in the course of the business of

(a) selling goods by quantity or number, sells any goods the quantity of which, subject to the prescribed limits of error, is less than the quantity contracted to be sold or less than the quantity or number corresponding with the price paid or to be paid;

(b) selling goods by quantity or number

(i) agrees to sell;

(ii) has in his possession for sale; or

(iii) exposes or advertises in such a manner as to constitute an invitation to treat

any goods of a quantity, subject to the prescribed limits of error, less than the quantity or number declared, purported or implied;

(c) rendering a service or providing the use of a facility on the basis of a measurement, renders that service or provides that facility on the basis of a lesser measurement than the measurement on which the underlying contract is based, or less than that corresponding with the price paid or to be paid;

(d) carrying, removing, repairing, handling, cleaning, cropping or otherwise processing any goods, land or building on the basis of a quantity expressed in units of measurement

(i) makes a misrepresentation; or

(ii) commits any other act calculated to mislead any person, as to the quantity of the goods, land or building purported to be carried, removed, repaired, handled, cleaned, cropped or otherwise processed

(e) purchasing any good by quantity, and providing the measuring instrument for the purchase, causes the seller to deliver a greater quantity than

(i) is purported to be purchased; or

(ii) corresponds to the purchase price

is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence, to a fine of $15 000.

PART V

LEGAL METROLOGY CONTROLS

Measuring instruments

27.(1) All measuring instruments for use in trade and for the purposes specified in subsection (2) shall be subject to:

(a) type approval as specified in section 32;

(b) initial verification in accordance with the Act;

(c) in-service verification in accordance with any requirements prescribed in the regulations; and

(d) verification after alteration, repair, adjustment or modification.

(2) The purposes referred to in subsection (1), include the use of measuring instruments in

(a) the betting and gaming industry;

(b) fiscal control and revenue collection;

(c) utility metering;

(d) the field of public health;

(e) environmental protection and control;

(f) public safety;

(g) the postal services;

(h) the petroleum sector;

(i) the rum and spirits industry; and

(j) any other trade or field specified in the regulations.

(3) All measuring instruments used for trade and the purposes specified in subsection (2) shall bear the relevant units of measurement required by this Act.

(4) No person shall use or possess for the purposes of trade any measuring instrument unless the relevant unit of measurement is

(a) indelibly marked on the top or side of the measuring instrument in legible figures and letters; and

(b) marked to indicate the maximum quantity that the measuring instrument is designed to measure.

(5) A person who contravenes subsection (4) is guilty of an offence.

(6) Subsection (4) does not apply where the small size of the measuring instrument renders the marking impracticable, but the information specified in that subsection shall be available in supplementary documentation such as user manuals or calibration certificates.

(7) Where a person is charged with an offence under subsection (4) it shall be a defence to prove that the mark properly applied on a measuring instrument has become defaced through fair wear and tear.

(8) A person who uses, or has in his possession for use, a measuring instrument for the purpose of giving indications, results, readings or information in, or based on a unit of measurement other than a unit of measurement required for that trade by this Act;

(a) contrary to an order made under section 24;

(b) which does not bear a verification mark affixed or a verification certificate issued by an inspector;

(c) which is inaccurate or incorrect; or

(d) which, since its last verification, has been altered or adjusted in a manner that the measuring device cannot be re-verified,

is guilty of an offence.

(9) A person who sells, agrees to sell, offers for sale or exposes or advertises in such a manner as to constitute an invitation to treat, any measuring instrument for use in connection with trade which is inaccurate, false or fraudulent or which is not in conformity this Act, is guilty of an offence.

Evidence of possession

28. Where a measuring instrument or good, subject to the provisions of this Act is found

(a) in the possession of any person carrying on trade; or

(b) at any place or on any premises which are used in connection with a trade,

that person or, as the case may be, the occupier of those premises or of that place shall be deemed for the purposes of this Act, unless the contrary is proved, to have that measuring instrument or good in his possession for use in connection with that trade.

Verification of measuring instruments

29.(1) A person who uses a measuring instrument in the course of trade, business or in other circumstances where members of the public must interface with or use the measuring instrument for a fee or be assessed by the measuring instrument, who uses a measuring instrument that has not been verified by an inspector is guilty of an offence.

(2) A person who wishes to use a measuring instrument in connection with trade or for the purposes of carrying on a trade shall request the verification of that measuring instrument by writing the Director.

(3) The Chief Inspector shall notify the person of the date and time of the inspection and the cost of the inspection in accordance with the *Fifth Schedule*.

(4) A person notified in accordance with subsection (3) shall pay the required cost to the Director and shall, where required, show that receipt to the inspector at the time of the inspection.

(5) An inspector under this section shall attend with the Working Standard provided for his use and use that Working Standard to verify in the manner required by this Act every measuring instrument to which subsection (1) applies.

(6) The inspector shall, where it will be required, tell the person when and with what frequency the measuring instrument must be verified in accordance with this section.

Affixing verification marks

30.(1) An inspector shall affix a verification mark only where the measuring instrument

(a) measures in the legal units of measurement;

(b) is found to operate within the appropriate limits of error that are permitted in accordance with this Act;

(c) meets the requirements for initial verification, in-service verification and verification after alteration, repair, modification or adjustment; and

(d) complies with this Act.

(2) Where a measuring instrument is, in the opinion of the inspector, too small or too delicate to have the verification mark properly affixed; but the measuring instrument satisfies the requirements of subsection (1), the inspector shall issue a certificate granting verification, and that certificate shall specify why the verification mark could not be affixed.

(3) A person who is refused a verification mark or certificate after an examination conducted by an inspector in accordance with subsection (1) may, within 21 days of the refusal, appeal in writing to the Minister.

Effect of verification

31.(1) A measuring instrument which has

(a) a verification mark affixed; or

(b) a certificate of verification,

shall be classified or treated as a measuring instrument authorised for use in accordance with this Act, unless it is found thereafter that the verification mark or certification of verification is false or inaccurate.

(2) The fact that

(a) any measuring instrument or pre-packaged good has been inspected, verified or is alleged to have been verified under this Act; or

(b) any verification mark is used in connection with any measuring instrument

shall not give rise to any claim against the Government of Barbados, the Barbados National Standards Institution or the Department of Commerce and Consumer Affairs.

Type approval of measuring instruments

32.(1) All measuring instruments used in trade and in the fields specified in section 27(2) shall be subject to type approval in accordance with such specifications and limits of error as may be prescribed.

(2) Type approval of a measuring instrument shall be subject to the payment of a prescribed fee.

(3) The Department of Commerce and Consumer Affairs, may with the approval of the Minister, accept and utilise the International Organisation of Legal Metrology Certification System by accepting the type approval and test reports issued by the International Organisation of Legal Metrology.

(4) Where a measuring instrument has been approved and subsequently has been found to be defective or inaccurate, the Minister may cancel the type approval and notify any person concerned of such cancellation.

Licence for measurement standards or measuring instruments

33.(1) No person shall carry on the business of selling, manufacturing, assembling, importing, exporting, repairing or adjusting a measurement standard or measuring instrument unless

(a) he meets the relevant requirements of this Act;

(b) the measuring instrument complies with this Act; and

(c) he possesses a licence issued by the Chief Inspector.

(2) A person who wishes to obtain a licence referred to in subsection (1)

(a) to repair or adjust any measurement standard or measuring instrument shall

(i) demonstrate to the satisfaction of the Chief Inspector his ability or the ability of the persons employed by him, to repair the type of measurement standard or measuring instrument which he seeks to repair; and

(ii) be in possession of such measurement standards, equipment, tools and other facilities as may be required for the proper execution of such repair or adjustment;

(b) to manufacture any measurement standard or measuring instrument shall

(i) demonstrate to the satisfaction of the Chief Inspector his ability or the ability of the persons employed by him, to manufacture the measurement standard or measuring instrument which he seeks to manufacture;

(ii) be in possession of such equipment, tools and other facilities as may be required for the manufacture or assembly of such measurement standard or measuring instrument; and

(iii) submit to the Chief Inspector such drawings and samples as may be required, of the measurement standard or measuring instrument which he intends to manufacture for type approval.

(3) No licence to manufacture, repair or adjust measuring instruments shall be issued to any person except upon satisfactory demonstration of the ability of that person to manufacture, repair or adjust the measuring instruments.

(4) Every licence issued by the Chief Inspector under this section shall be

(a) in the prescribed form;

(b) subject to such terms or conditions as may be prescribed; and

(c) in force until such date as may be specified in the licence.

(5) The Chief Inspector may revoke any licence issued under this section where the holder of the licence breaches any of the terms or conditions of the licence or is convicted of an offence under this Act.

(6) A person who engages in the business of selling, manufacturing, assembling, importing, exporting, repairing or adjusting a measurement standard or measuring instrument without having a license from the Chief Inspector is guilty of an offence.

Register of manufacturers

34. The Chief Inspector shall maintain and publish annually in the *Official Gazette* a register of the names of persons carrying on the business of selling, manufacturing, assembling, importing, exporting, repairing or adjusting measuring instruments for use in trade and for the purposes specified in section 27(2).

Sale by net quantity

35.(1) A person who sells, offers for sale or exposes for sale any article or good shall do so by net quantity, and a person who contravenes subsection (1) is guilty of offence.

(2) A person acting in accordance with subsection (1), may make a statement or declaration of net quantity in respect of a pre-packaged good containing qualifying words which specify that the quantity declared was the net quantity at the time of packaging.

(3) Where a statement or declaration of net quantity in respect of a pre-packaged good contains qualifying words as mentioned in subsection (2), a person who

(a) sells or agrees to sell that good where the net quantity at the time of packing was less than the net quantity stated or declared;

(b) has that good in his possession for sale, knowing that the net quantity at the time of packing was less than the net quantity stated or declared; or

(c) exposes or advertises for sale a good in such a manner as to constitute an invitation to treat, where the net quantity at the time of packing was less than the net quantity stated or declared

is guilty of an offence.

Obligation to measure

36.(1) A person who sells, offers for sale or exposes for sale any article or good shall on request by the purchaser, measure the article in the presence of that purchaser.

(2) A person who purchases any article or good, and provides the measuring instrument for determining the quantity to be purchased shall, on demand by the seller, measure the article or good in the presence of that seller.

(3) This section does not apply to a pre-packaged good.

(4) A person who contravenes subsection (1) or (2) is guilty of offence.

Pre-packaged goods

37.(1) A person who sells, offers for sale or exposes for sale any pre-packaged good shall correctly and clearly indicate the net quantity using the required legal units of measurement specified in this Act, on the container or on the label in a place where it may clearly be seen as applicable to the pre-packaged good by a purchaser or inspector.

(2) Where a declaration of net quantity shows the purported net quantity of the pre-packaged good to which it is applied, that declaration shall be deemed to be correct if the net quantity of the pre-packaged good is, subject to the prescribed tolerance, not less than the declared net quantity of the pre-packaged good and the declaration otherwise meets the requirements of this Act.

(3) The net quantity shall be indicated by

(a) weight, if the commodity is solid, semi-solid, has high viscosity or a mixture of solid and liquid, in kilograms, and for amounts less than 1 kilogram, in grams or milligrams;

(b) volume, if the commodity is liquid or sold by cubic measure, in litres and for amounts less than 1 litre, in millilitres;

(c) length, if the commodity sold by linear measure, in metres for amounts greater than 1000 metres, in kilometers, and for amounts less than 1 metre, in centimetres or millimetres;

(d) area, if the commodity is sold by area measure in metres squared; or

(e) count, if the commodity is sold by number.

(4) A person who contravenes subsections (1) or (3) is guilty of an offence.

(5) The Minister may by order declare that this section shall not apply to a specified pre-packaged good.

Certification of servicemen

38.(1) Where the Chief Inspector approves an application for registration from a person seeking to be a serviceman, he shall issue a certificate of registration to that person on the payment of the registration fee set out in the *Fifth Schedule*.

(2) A certificate of registration is renewable annually by the bearer of the certificate on payment of the annual fee set out in the *Fifth Schedule*.

PART VI

OFFENCES AND PROCEEDINGS

Prosecutions

39.(1) Proceedings for offences under this Act may be instituted by or on behalf of an inspector who may prosecute before a court of summary jurisdiction in respect of any proceedings instituted.

(2) No proceedings for an offence under section 35 or 36 may be instituted after the expiration of the period of 12 months beginning with the date of the alleged offence.

(3) For the purposes of this section the date of the alleged offence is the date when the offence was detected.

Forgery

40. A person who in connection with trade

(a) forges or counterfeits any mark either of verification or type approval or verification certificate used on any measuring instrument;

(b) applies to any measuring instrument a mark which is forged or counterfeit, or which is false or inaccurate; or

(c) uses, sells, exchanges or disposes of any measuring instrument with such forged, counterfeit, false or inaccurate mark thereon, or any mark liable to be confused with marks authorised under the provisions of this Act

with the intent to defraud or deceive, is guilty of an offence and is liable on summary conviction to a fine of $7 500; and in the case of a subsequent offence, to a fine of $ 15 000.

Sale and use of unverified measuring instruments

41.(1) A person who sells, offers for sale or exposes for sale, any measuring instrument which

(a) has not been verified by an inspector; and

(b) does not bear a valid verification mark or verification certificate

is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $15 000 .

(2) A person who, for the purpose of any trade or any other purpose specified in this Act, uses any measuring instrument which

(a) has not been verified by an inspector; and

(b) does not bear a valid verification mark or verification certificate

is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $15 000.

(3) Where a person is charged with an offence under subsection (2) it shall be a defence to prove that the verification mark or verification certificate had been properly applied on the measuring instrument and has become defaced through fair wear and tear.

Tampering with marks and measuring instruments

42. A person who

(a) by any means, wilfully and intentionally renders a measuring instrument false or inaccurate;

(b) for any prescribed purpose, uses, supplies, sells or exchanges a false or inaccurate measuring instrument;

(c) not being an inspector under this Act or authorised by the Chief Inspector to do so, attaches affixes, inscribes, inserts or otherwise applies any verification mark, verification certificate or type approval to a measuring instrument; or

(d) not being an inspector under this Act or authorised by the Chief Inspector to do so, removes, defaces, obliterates, tampers with or otherwise changes any verification mark, verification certificate or type approval

is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $15 000.

Removal of or tampering with tags, seals and devices

43. A person who removes, defaces, obliterates, breaks, tampers with or otherwise changes any tag, seal or device that has been placed, affixed or attached to a measuring instrument by an inspector, is guilty of an offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $15 000.

Damage of standards and measuring instruments

44.(1) A person who falsifies, tampers with or wilfully destroys or otherwise damages any National Measurement Standard, National Reference Standard, Working Standard, a designated appropriate standard, equipment, measuring instrument or reference material made available to that person is guilty of an

offence and is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $15 000.

(2) The Court may also order a person convicted of an offence under subsection (1) to bear the cost of restoring or replacing the damaged standard, equipment, measuring instrument or reference material.

Evidence of facts

45. In any criminal proceedings for an alleged offence under this Act, any certificate or document signed by the Chief Inspector or an inspector regarding

(a) any measuring instrument specified therein that was examined, tested or verified by him on a date specified therein, and the result of that examination, test or verification;

(b) the accuracy or inaccuracy of any measurement given by a measuring instrument; or

(c) any article, good or pre-packaged good specified therein that was weighed, measured or counted by him on a date specified therein and found to be a weight, measurement or number specified therein

shall, upon production thereof be *prima facie* evidence in those criminal proceedings, of the facts certified therein and in the absence of evidence of rebuttal thereof shall be conclusive evidence of the facts stated in the certificate or document.

General penalty provision

46. A person who is found guilty of an offence under this Act, for which no penalty is expressly provided by this Act, is liable on summary conviction to a fine of $7 500 and in the case of a subsequent offence to a fine of $20 000.

Defences

47.(1) In any criminal proceedings for an offence under this Act, it shall be a defence subject to subsection (2), for a person charged to prove that

(a) the commission of the offence was due to a mistake or to reliance on information supplied by another person whom he reasonably believed to have had knowledge of or experience, in the particular subject or to reliance on the act or default of another person, or to an accident or some other cause beyond his control; and

(b) he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence by himself or any person under his control.

(2) Where the defence provided by subsection (1) involves the allegation that the commission of the offence was due to the act or default of another person or to reliance on information supplied by another person, the person charged shall not, without leave of the court, be entitled to rely on that defence unless, within the period ended 14 clear days before the hearing, he has served on the Chief Inspector notice in writing giving information identifying or assisting in the identification of that other person together with copies of any warranties or other relevant written information supplied by that other person.

(3) In any proceedings under this Act, in respect of any alleged excess or deficiency in the quantity of any goods, the court shall have regard to

(a) the average excess or deficiency, as the case may be, in any goods of the same kind tested by an inspector following a prescribed procedure for sampling and testing, on the occasion of the alleged offence;

(b) the number of articles tested by the inspector by comparison with the number of articles available for testing on the occasion of the alleged offence, where there is no prescribed procedure for the sampling of the goods; and

(c) any relevant methods of examination and measurement and any relevant prescribed limits of error.

Disposal of seized articles

48.(1) In proceedings for an offence relating to measuring instruments or articles under this Act, the Court, either at trial or on subsequent application, may order

(a) the forfeiture or destruction of the measuring instruments or articles;

(b) that the disposal of the measuring instruments or articles be in a manner determined by the Court; or

(c) that the measuring instruments or articles be delivered to the person appearing to the Court to be entitled to the measuring instruments or articles.

(2) The Department of Commerce and Consumer Affairs shall provide compensation to the person appearing to the Court to be entitled to the measuring instruments or articles if

(a) it has been found that the measuring instruments or articles comply with this Act; and

(b) the measuring instruments or articles are lost, damaged, destroyed or expires while in the care or custody of the Department of Commerce and Consumer Affairs.

(3) For the purposes of this section, “Court” means the Magistrate's Court.

Regulations

49.(1) The Minister may make regulations prescribing the

(a) circumstances in which, the conditions under which and the manner in which verification marks may be obliterated or removed;

(b) method to be used for type approval;

(c) measuring instruments to be included in classes of prescribed measuring instruments;

(d) form, size and other requirements for measuring instruments;

(e) fees relating to inspectors on verification or approval of measuring instruments;

(f) design of the verification mark, rejection mark and verification certificates to be used for the purposes of this Act;

(g) form of the certificate to be issued by inspectors pursuant to the examination and determination of accuracy of a measuring instrument, and the circumstances under which such certificates shall be cancelled;

(h) materials to be used in construction and principles of construction specified measuring instruments;

(i) methods of inspection, testing and stamping of specified measuring instrument including the limits of error to be permitted and methods of sampling and testing of goods;

(j) patterns of measuring instruments or devices that are approved for manufacture, assembly, importation or exportation, and those that are prohibited for use in trade;

(k) measuring instruments used in the betting and gaming industry, fiscal control and revenue collection, utility metering, the field of public health; environmental protection and control, public safety, the postal services, the petroleum sector, the rum and spirits industry, and any other trade or field which uses a measuring instrument; and

(l) methods to be used and limits of error to be allowed by inspectors exercising their functions or powers under the Act in relation to the examination and measurement of goods; or

(2) Notwithstanding subsection (1), the Minister may make Regulations generally for the purpose of giving effect to this Act.

(3) Where the regulations made under this Act create an offence, the regulations may provide for such offences to be tried summarily or on indictment and the regulations may prescribe the following penalties

(a) in the case of an offence triable summarily, a fine of $50 000 or imprisonment for a term of 5 years or to both; or

(b) in the case of an offence triable on indictment, a fine of $100 000 or imprisonment for a term of 8 years or to both.

Act binds the Crown

50. This Act binds the Crown.

Amendment of Schedules

51. The Minister may, on the advice of the Barbados National Standards Institution, by order amend the *Schedules* to the Act.

Savings

52.(1) The *Weights and Measures Regulations, 1983 (S.I. 1985 No. 217),* with the exception of regulations 5 and 12 and the *Second Schedule* of those Regulations, shall continue in force until amended or revoked under this Act, and shall be so construed as to give effect to the provisions of this Act.

(2) From the commencement of this Act, the fees set out in the *Fifth Schedule* to this Act shall be used for the fees formerly specified in the *Second Schedule* to the *Weights and Measures Regulations, 1983*.

Transitional provision

53.(1) A certificate of registration or verification certificate issued under the former Act shall remain valid for one year from the commencement of this Act.

(2) A person who was issued a rejection certificate for an instrument under the former Act, may apply upon the commencement of this Act for the verification of that instrument.

Repeal of Cap. 331

54. The *Weights and Measures Act*, Cap. 331 is repealed.

FIRST SCHEDULE

(Section 15(2))

Barbados Metrology Act, 2021
(Act 2021-)

The Base Units and Derived Units

1. Definition of the International System of Units

The International System of Units (SI) is the system of units in which:

(a) the unperturbed ground state hyperfine transition frequency of the caesium 133 atom, Δv_{Cs} is 9,192,631,770 Hz;

(b) the speed of light in vacuum, c is 299,792,458 m/s;

(c) the Planck constant, h is $6.62607015 \times 10^{-34}$ J s;

(d) the elementary charge, e is $1.602176634 \times 10^{-19}$ C;

(e) the Boltzmann constant, k is 1.380649×10^{-23} J/K; and

(f) the Avogadro constant N_A is $6.02214076 \times 10^{23}$ mol^{-1}; and

(g) the luminous efficacy of monochromatic radiation of frequency 540×10^{12} Hz, $K_{\_cd}$, is 683 lm/W,

where the hertz, joule, coulomb, lumen and watt, with unit symbols Hz, J, C, lm, and W, respectively, are related to the units second, metre, kilogram, ampere, kelvin, mole and candela, with unit symbols s, m, kg, A, K, mol, and cd, respectively, according to $Hz = s^{-1}$, $J = kg\ m^2\ s^{-2}$, $C = A\ s$, $lm = cd\ m^2\ m^{-2} = cd\ sr$, and $W = kg\ m^2\ s^{-3}$.

2. Base Units

The definitions and symbols of the base units of the SI are:

(1) The second

The second, symbol s, is the SI unit of time. It is defined by taking the fixed numerical value of the caesium frequency Δv_{Cs}, the unperturbed ground-state hyperfine transition frequency of the caesium 133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to s^{-1}.

The exact expression for the second is:

$$1\text{s} = \frac{9\ 192\ 631\ 770}{\Delta v_{Cs}}$$

(2) The metre

The metre, symbol m, is the SI unit of length. It is defined by taking the fixed numerical value of the speed of light in vacuum c to be 299 792 458 when expressed in the unit m/s, where the second is defined in terms of Δv_{Cs}.

The exact expression for the metre is:

$$1\text{m} = \left(\frac{c}{299\ 792\ 458}\right) s = \frac{9\ 192\ 631\ 770}{299\ 792\ 458}\frac{c}{\Delta v_{Cs}} \approx 30.663\ 319\frac{c}{\Delta v_{Cs}}$$

(3) The kilogram

The kilogram, symbol kg, is the SI unit of mass. It is defined by taking the fixed numerical value of the Planck constant h to be $6.626\ 070\ 15 \times 10^{-34}$ when expressed in the unit J s, which is equal to kg m^2 s^{-1}, where the metre and the second are defined in terms of c and Δv_{Cs}.

The exact expression for the kilogram is:

$$1\text{kg} = \left(\frac{h}{6.626\ 070\ 15\ \times\ 10^{-34}}\right) m^{-2} s$$

which is equal to:

$$1\text{kg} = \frac{(299\,792\,458)^2}{(6.626\,070\,15 \times 10^{-34})(9\,192\,631\,770)} \frac{h\Delta v_{Cs}}{c^2} \approx 1.475\,5214 \times 10^{40} \frac{h\Delta v_{Cs}}{c^2}$$

(4) The ampere

The ampere, symbol A, is the SI unit of electric current. It is defined by taking the fixed numerical value of the elementary charge *e* to be 1.602 176 634 × 10^{-19} when expressed in the unit C, which is equal to A s, where the second is defined in terms of Δv_{Cs}.

The exact expression for the Ampere is:

$$1\text{A} = \left(\frac{e}{1.602\,176\,634 \times 10^{-19}}\right) s^{-1}$$

which is equal to:

$$1\text{A} = \frac{1}{(9\,192\,631\,770)(1.602\,176\,634 \times 10^{-19})} \Delta v_{Cs} e \approx 6.789\,687 \times 10^{8} \Delta v_{Cs} e$$

(5) The kelvin

The kelvin, symbol K, is the SI unit of thermodynamic temperature. It is defined by taking the fixed numerical value of the Boltzmann constant *k* to be 1.380 649 × 10^{-23} when expressed in the unit J K^{-1}, which is equal to kg m^2 s^{-2} K^{-1}, where the kilogram, metre and second are defined in terms of h, c and Δv_{Cs}.

The exact expression for the Kelvin is:

$$1\text{K} = \left(\frac{1.380\,649}{k}\right) \times 10^{-23}\text{kg m}^2\text{ s}^{-2}$$

Which is equal to:

$$1K = \frac{1.380\,649 \times 10^{-23}}{(6.626\,070\,15 \times 10^{-34})(9\,192\,631\,770)} \frac{\Delta v_{Cs} h}{k} \approx 2.266\,6653 \frac{\Delta v_{Cs} h}{k}$$

(6) The mole

The mole, symbol mol, is the SI unit of amount of substance. One mole contains exactly 6.022 140 76 × 10^{23} elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A, when expressed in the unit mol^{-1} and is called the Avogadro number.

The amount of substance, symbol n, of a system is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles.

The exact expression for the mole is:

$$1mol = \left(\frac{6.022\ 140\ 76\ \times\ 10^{23}}{N_A}\right)$$

(7) The candela

The candela, symbol cd, is the SI unit of luminous intensity in a given direction. It is defined by taking the fixed numerical value of the luminous efficacy of monochromatic radiation of frequency 540 × 10^{12} Hz, K_{cd}, to be 683 when expressed in the unit lm W^{-1}, which is equal to cd sr W^{-1}, or cd sr kg^{-1} m^{-2} s^3, where the kilogram, metre and second are defined in terms of h, c and Δv_{Cs}.

The exact expression for the mole is:

$$1cd = \left(\frac{K_{cd}}{683}\right) kg\ m^2\ s^{-3}\ sr^{-1}$$

Which is equal to:

$$1cd = \frac{1}{(6.626\ 070\ 15\ \times\ 10^{-34})(9\ 192\ 631\ 770)^2\ 683}(\Delta v_{Cs})^2 h\ K_{cd}$$
$$\approx 2.614\ 830 \times 10^{10}(\Delta v_{Cs})^2 h\ K_{cd}$$

3. Derived Units

(1) Derived units are defined as products of powers of the base units. When the numerical factor of the product is one, the derived units care called *coherent derived units*. The base and coherent derived units of the SI form a coherent set, designated the *set of coherent SI units*. Since there are a limitless number of quantities it is impossible to provide a complete list of derived units however the most commonly used derived units are provided in paragraphs (2), (3) and (4).

(2) The 22 SI derived units with special names and symbols.

Derived Quantity	**Special name of unit**	**Symbol**	**Unit expressed in terms of base units [a]**	**Units expressed in terms of other SI Units**
plane angle	Radian [b]	rad	m/m	
solid angle	Steradian [c]	sr	m^2/m^2	
frequency	Hertz [d]	Hz	s^{-1}	
force	newton	N	kg m s^{-2}	
pressure, stress	pascal	Pa	kg m^{-1} s^{-2}	
energy, work, quantity of heat	joule	J	kg m^2 s^{-2}	N m
power, radiant flux	watt	W	kg m^2 s^{-3}	J/s
electric charge, quantity of electricity	coulomb	C	A s	
electric potential difference [e], volt electromotive force	volt	V	kg m^2 s^{-3} A^{-1}	W/A
capacitance	farad	F	kg^{-1} m^{-2} s^4 A^2	C/V

First Schedule - (Cont'd)

Derived Quantity	**Special name of unit**	**Symbol**	**Unit expressed in terms of base units [a]**	**Units expressed in terms of other SI Units**
electric resistance	ohm	Ω	kg m s^{-3} A^{-2}	V/A
electric conductance	siemens	S	kg^{-1} m^{-2} s^3 A^2	A/V
magnetic flux	weber	Wb	kg m^2 s^{-2} A^{-1}	V s
magnetic flux density	tesla	T	kg s^{-2} A^{-1}	Wb/m2
inductance	henry	H	kg m^2 s^{-2} A^{-2}	Wb/A
Celsius temperature	degree Celsius [f]	°C	K	
luminous flux	lumen	lm	cd sr	Cd sr
illuminance	lux	lx	cd sr m^{-2}	Lm/m2
activity (of a radionuclide)	becquerel	Bq	s^{-1}	
absorbed dose, specific energy (impacted), kerma	gray	Gy	m^2 s^{-2}	J/kg
dose equivalent	sievert	Sv	m^2 s^{-2}	J/kg
catalytic activity	katal	kat	mol s^{-1}	

(a) The order of symbols for base units in this Table is different from that in the 8th edition following a decision by the CCU at its 21st meeting (2013) to return to the original order in Resolution 12 of the 11th CGPM (1960) in which newton was written kg m s^{-2}, the joule as kg m^2 s^{-2} and J s as kg m^{-2} s^{-1}.

The intention was to reflect the underlying physics of the corresponding quantity equations although for some more complex derived units this may not be possible.

(b) The radian is the coherent unit for plane angle. One radian is the angle subtended at the centre of a circle by an arc that is equal in length to the radius. It is also the unit for phase angle. For periodic phenomena, the phase angle increases by 2π rad in one period. The radian was formerly an SI supplementary unit, but this category was abolished in 1995.

(c) The steradian is the coherent unit for solid angle. One steradian is the solid angle subtended at the centre of a sphere by an area of the surface that is equal to the squared radius. Like the radian, the steradian was formerly an SI supplementary unit.

(d) The hertz shall only be used for periodic phenomena and the becquerel shall only be used for stochastic processes in activity referred to a radionuclide.

(e) Electric potential difference is also called "voltage" in many countries, as well as "electric tension" or simply "tension" in some countries.

(f) The degree Celsius is used to express Celsius temperatures. The numerical value of a temperature difference or temperature interval is the same when expressed in either degrees Celsius or in kelvin.

(g) In photometry the name steradian and the symbol sr are usually retained in expressions for units.

(h) Activity referred to a radionuclide is sometimes incorrectly called radioactivity.

(i) See CIPM Recommendation 2 on the use of the sievert (PV, 2002, 70, 205).

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(3) The seven base units and 22 units with special names and symbols may be used in combination to express the units of other derived quantities. Since the number of quantities is without limit, it is not possible to provide a complete list of derived quantities and derived units. Subsection (4) provides some examples of derived quantities and the corresponding coherent derived units expressed in terms of base units. In addition, subsection (5) provides examples of coherent derived units whose names and symbols also include derived units. The complete set of SI units includes both the coherent set and the multiples and sub-multiples formed by using the SI prefixes.

(4) Examples of coherent derived units expressed in terms of base units.

Derived quantity	**Typical symbol of quantity**	**Derived unit expressed in terms of base units**
area	A	m^2
volume	V	m^3
speed, velocity	v	$m\ s^{-1}$
acceleration	a	$m\ s^{-2}$
wavenumber	σ	m^{-1}
density, mass density	ρ	$kg\ m^{-3}$
surface density	ρ_A	$kg\ m^{-2}$
specific volume	v	$m^3\ kg^{-1}$
current density	j	$A\ m^{-2}$
magnetic field strength	H	$A\ m^{-1}$
amount of substance concentration	c	$mol\ m^{-3}$
mass concentration	ρ, γ	$kg\ m^{-3}$
luminance	L_v	$cd\ m^{-2}$

(5) Examples of SI coherent derived units whose names and symbols include SI coherent derived units with special names and symbols.

Derived quantity	**Name of coherent derived unit**	**Symbol**	**Derived unit expressed in terms of base units**
dynamic viscosity	pascal second	$Pa\ s$	$kg\ m^{-2}\ s^{-2}$
moment of force	newton metre	$N\ m$	$kg\ m^2\ s^{-2}$
surface tension	newton per metre	$N\ m^{-1}$	$kg\ s^{-2}$
angular velocity, angular frequency	radian per second	$rad\ s^{-1}$	s^{-1}

First Schedule - (Cont'd)

Derived quantity	**Name of coherent derived unit**	**Symbol**	**Derived unit expressed in terms of base units**
angular acceleration	radian per second squared	rad/s^2	s^{-2}
heat flux density, irradiance	watt per square metre	$W\ m^2$	$kg\ s^{-3}$
heat capacity, entropy	joule per kelvin	$J\ K^{-1}$	$kg\ m^2\ s^{-2}\ K^{-1}$
specific heat capacity, specific entropy	joule per kilogram kelvin	$J\ K^{-1}\ kg^{-1}$	$m^2\ s^{-2}\ K^{-1}$
specific energy	joule per kilogram	$J\ kg^{-1}$	$m^2\ s^{-2}$
thermal conductivity	watt per metre kelvin	$W\ m^{-1}\ K^{-1}$	$kg\ m\ s^{-3}\ K^{-1}$
energy density	joule per cubic metre	$J\ m^{-3}$	$kg\ m^{-1}\ s^{-2}$
electric field strength	volt per metre	$V\ m^{-1}$	$kg\ m\ s^{-3}\ A^{-1}$
electric charge density	coulomb per cubic metre	$C\ m^{-3}$	$A\ s\ m^{-3}$
surface charge density	coulomb per square metre	$C\ m^{-2}$	$A\ s\ m^{-2}$
electric flux density, electric displacement	coulomb per square metre	$C\ m^{-2}$	$A\ s\ m^{-2}$
permittivity	farad per metre	$F\ m^{-1}$	$kg^{-1}\ m^{-3}\ s^4\ A^2$
permeability	henry per metre	$H\ m^{-1}$	$kg\ m\ s^{-2}\ A^{-2}$
molar energy	joule per mole	$J\ mol^{-1}$	$kg\ m^2\ s^{-2}\ mol^{-1}$

First Schedule - (Cont'd)

Derived quantity	Name of coherent derived unit	Symbol	Derived unit expressed in terms of base units
molar entropy, molar heat capacity	joule per mole kelvin	J K^{-1} mol^{-1}	kg m^2 s^{-2} mol^{-1} K^{-1}
exposure (x- and y-rays)	coulomb per kilogram	C kg^{-1}	A s kg^{-1}
absorbed dose rate	gray per second	Gy s^{-1}	m^2 s^{-3}
radiant intensity	watt per steradian	W sr^{-1}	kg m^2 s^{-3}
radiance	watt per square metre steradian	W sr^{-1} m^{-2}	kg s^{-3}
catalytic activity concentration	katal per cubic metre	Kat m^{-3}	mol s^{-1} m^{-3}

4. Non-SI units that are accepted for use with the International System of Units SI

Quantity	Name of unit	Symbol of unit	Value in SI units
time	minute	min	1 min = 60 s
	hour	h	1 h = 60 min = 3,600 s
	day	d	1 d = 24 h = 86,400 s
length	astronomical unit [(a)]	au	1 au = 149,597,870,700 m
plane angle	degree	°	$1^\circ = (\pi/180)$ rad
	minute	'	$1' = (1/60)^\circ = (\pi/10{,}800)$ rad
	Second [(b)]	"	$1'' = (1/60)' = (\pi/648{,}000)$ rad

First Schedule - (Cont'd)

Quantity	Name of unit	Symbol of unit	Value in SI units
area	Hectare (c)	ha	1 ha = 1hm^2 = 10^4 m^2
volume	Litre (d)	L, l	1 L = 1 l = 1 dm^3 = 10^3 cm^3 = 10^{-3} m^3
mass	Tonne (e)	t	1 t = 10^3 kg
	dalton (f)	Da	1 Da = 1.660 539 040 (20) x 10^{-27} kg
energy	electronvolt (g)	eV	1 eV = 1.602 176 634 x 10^{-19} J
logarithmic	neper (h)	Np	
ratio	bel (h)	B	
quantities	decibel (h)	dB	

(a) As decided at the XXVIII General Assembly of the International Astronomical Union (Resolution B2, 2012).

(b) For some applications such as in astronomy, small angles are measured in arcseconds (i.e. seconds of plane angle), denoted as or ″, milliarcseconds, microarcseconds and picoarcseconds, denoted mas, μas and pas, respectively, where arcsecond is an alternative name for second of plane angle.

(c) The unit hectare and its symbol ha, were adopted by the CIPM in 1879 (PV, 1879, 41). The hectare is used to express land area.

(d) The litre and the symbol lower-case l, were adopted by the CIPM in 1879 (PV, 1879, 41). The alternative symbol, capital L, was adopted by the 16th CGPM (1979, Resolution 6; CR, 101 and Metrologia, 1980, 16, 56-57) in order to avoid the risk of confusion between the letter l (el) and the numeral 1 (one).

(e) The tonne and its symbol t, were adopted by the CIPM in 1879 (PV, 1879, 41). This unit is sometimes referred to as “metric ton” in some English-speaking countries.

(f) The dalton (Da) and the unified atomic mass unit (u) are alternative names (and symbols) for the same unit, equal to 1/12 of the mass of a free carbon 12 atom, at rest and in its ground state. This value of the dalton is the value recommended in the CODATA 2014 adjustment. It will be updated in the CODATA 2018 adjustment to take into account the, now fixed, 2017 value of the Planck constant h. This will reduce the 2014 uncertainty by an order of magnitude.

(g) The electronvolt is the kinetic energy acquired by an electron in passing through a potential difference of one volt in vacuum. The electronvolt is often combined with the SI prefixes.

(h) In using these units it is important that the nature of the quantity be specified and that any reference value used be specified.

SECOND SCHEDULE

(Sections 15(2), 25(3) and 25(4))

Barbados Metrology Act, 2021
(Act 2021-)

Non - SI Units of Practical Importance

Quantity	Name	Symbol	Definition	Use
1. length	inch	in	0.9144/36 m	*(a)* Automotive tyres and rims; *(b)* Equipment used, or intended for use, in the manufacturer and repair of automotive tyres or rims; *(c)* Precision pipes, precision tubes, precision fitting and precision screw threads; *(d)* Spare parts for equipment constructed using equipment other than metric measurements; *(e)* Equipment used for, or intended for use in, the manufacture of equipment referred to in paragraphs *(c)* or *(d)*; *(f)* Defence equipment; *(g)* Equipment used, or intended for use, in aviation; *(h)* Equipment used, or intended for use, in the computer industry; *(i)* Equipment used, or intended for use, in the electronics industry; or

Second Schedule - (Cont'd)

Quantity	Name	Symbol	Definition	Use
				(j) Components of equipment referred to in parahraphs *(a)* to *(i)*.
2. length	foot	ft	0.9144/3 m	*(a)* Altitude in aviation; *(b)* Vertical separation in aviation; or *(c)* Submarine depth.
3. Mass	metric carat		0.0002 kg	The mass of precious stones and pearls.
4. Mass	troy ounce	oz tr	480 x 0.45359237/7000 kg	The mass of precious metals.
5. power	horsepower	hp	745.7 W	Engine ratings: *(a)* In the aviation industry; or *(b)* In defence equipment
6. pressure	Bar	bar	100 000 Pa	*(a)* Pressure vessels; *(b)* Boilers
7. pressure	millibar	mb or mbar	100 Pa	*(a)* Air pressure in the aviation industry; *(b)* Meteorology
8. pressure	millimetre of mercury	mmHg	133.32219 Pa	Blood pressure
9. pressure	standard atmosphere	Atm	101 325 Pa	*(a)* Meteorology; *(b)* Environmental measurement
10. velocity	foot per minute	Ft/min	0.3048/60 m/s	Vehicular vertical speed

Second Schedule - (Concl'd)

Quantity	Name	Symbol	Definition	Use
11. volume	barrel	in	1.589 873 x 10^2 L	The volume of crude oil and petroleum.
12. Work and energy	kilocalorie	kcal	4.1868 x 10^3 J	Food energy values
13. concentration	degrees Brix	°Bx	Concentration in grams of solute per 100g of an aqueous solution of pure sucrose, having the same density as a sugar solution at the same temperature.	Measurement of sugar concentration
14. concentration	degrees Z	°Z	Concentration equivalent to 0.26 g of sucrose per 100 g of an aqueous solution of pure sucrose.	Measurement of sugar concentration
15. concentration	Pol	Pol	Concentration in grams of solute per 100 g of an aqueous solution of pure sucrose having the same optical rotation as a sugar solution at the same temperature	Measurement of sugar concentration
16. Mass concentration			Grams of alcohol per 210 litres of exhaled breath	Measurement of the mass concentration of alcohol in exhaled breath

THIRD SCHEDULE

(Section 15(3))

Barbados Metrology Act, 2021
(Act 2021-)

The SI Prefixes for multiples and sub-multiples of base, supplementary and derived units of measurement

(1) Decimal multiples and sub-multiples ranging from 10^{24} to 10^{-24} are provided for use with the SI units. The names and symbols of these multiple and sub-multiple prefixes are presented in subsection (3).

(2) Prefix symbols are printed in upright typeface, as are unit symbols, regardless of the typeface used in the surrounding text and are attached to unit symbols without a space between the prefix symbol and the unit symbol. With the exception of da (deca), h (hector) and k (kilo), all multiple prefix symbols are upper-case letters and all sub-multiple prefix symbols are lowercase letters. All prefix names are printed in lowercase letters, except at the beginning of a sentence.

(3) SI Prefixes

QUANTITY	SYMBOL	FACTOR
yotta	Y	10^{24} = 1 000 000 000 000 000 000 000 000
zetta	Z	10^{21} = 1 000 000 000 000 000 000 000
exa	E	10^{18} = 1 000 000 000 000 000 000
peta	P	10^{15} = 1 000 000 000 000 000
tera	T	10^{12} = 1 000 000 000 000

QUANTITY	SYMBOL	FACTOR
giga	G	10^9 = 1 000 000 000
mega	M	10^6 = 1 000 000
kilo	k	10^3 = 1 000
hecto	h	10^2 = 1 00
deka	da	10^1 = 10
deci	d	10^{-1}= 0.1
centi	c	10^{-2}= 0.01
milli	m	10^{-3} = 0.001
micro	μ	10^{-6} = 0.000 001
nano	n	10^{-9} = 0.000 000 001
pico	p	10^{-12} = 0.000 000 000 001
femto	f	10^{-15} = 0.000 000 000 000 001
atto	a	10^{-18} = 0.000 000 000 000 000 001
zepto	z	10^{-21} = 0.000 000 000 000 000 000 001
yocto	y	10^{-24}= 0.000 000 000 000 000 000 000 001

(4) The symbol of the prefix shall be placed before the symbol of the unit without intermediate space; the whole forms the symbol of the multiple or sub-multiple of the unit. The symbol of the prefix is therefore considered to be combined with the symbol of the unit to which it is directly attached, forming with it a new unit symbol which can be raised to a positive or negative power and which be combined with other unit symbols to form the symbols for compound units.

(5) Compound prefixes, formed by the juxtaposition of several SI prefixes, are not permitted.

(6) The names and symbols of the decimal multiples and sub-multiples of the unit of mass are formed by the addition of the SI prefixes to the word “gram” (symbol g). $1\ g = 0.001\ kg = 10^{-3}\ kg$.

(7) To designate the decimal multiples and sub-multiples and sub-multiples of a derived unit which is expressed in a form of a fraction, a prefix can be attached indifferently to the units which appear either in the numerator, or in the denominator, or in both of these terms.

FOURTH SCHEDULE

(Sections 15(4) and 25(2))

Barbados Metrology Act, 2021
(Act 2021-)

Conversion Factors

Alphabetical listing of the conversion factors to SI Units from the most common Non-SI Units.

To Convert From	To	Conversion
acre	square metre (m^2)	Multiply by 4.046 873 x 10^3
ampere hour	coulomb (C)	Multiply by 3.6 x 10^3
astronomical unit	metre (m)	Multiply by 1.495 979 x 10^{11}
atmosphere (standard)	pascal (Pa)	Multiply by 1.013 250 x 10^5
atmosphere (technical = 1kgf/cm2)	pascal (Pa)	Multiply by 9.806 650 x 10^4
bar	pascal (Pa)	Multiply by 1.0 x 10^5
barrel (for petroleum, 42 gal)	cubic metre (m^3)	Multiply by 1.589 873 x 10^{-1}
barrel (for petroleum, 42 gal)	Litre (L)	Multiply by 1.589 873 x 10^2
bushel (U.S.)	cubic metre (m^3)	Multiply by 3.523 907 x 10^{-2}
caliber (inch)	metre (m)	Multiply by 2.54 x 10^{-2}

Fourth Schedule - (Cont'd)

To Convert From	**To**	**Conversion**
calorie	joule (J)	Multiply by 4.186 8
carat (metric)	kilogram (kg)	Multiply by 2.0×10^{-4}
chain	metre (m)	Multiply by $2.011\ 68 \times 10^{1}$
cubic foot (cu ft or ft^3)	cubic metre (m^3)	Multiply by $2.831\ 685 \times 10^{-2}$
cubic inch (cu in or in^3)	cubic metre (m^3)	Multiply by $1.638\ 706 \times 10^{-5}$
cubic yard (cu yd or yd^3)	cubic metre (m^3)	Multiply by $7.645\ 549 \times 10^{-1}$
degree (angle)	radian (rad)	Multiply by $1.745\ 329 \times 10^{-2}$
degree Celsius	kelvin (K)	$T_K = T_{°C} + 273.15$
degree Centigrade (see degree Celsius)		
degree Fahrenheit	degree Celsius	$T_{°C} = (T_{°F} - 32)/1.8$
degree Fahrenheit	kelvin (K)	$T_K – (T_{°F} + 459.67)/1.8$
foot	metre (m)	Multiply by 3.048×10^{-1}
foot (U.S. survey)	metre (m)	Multiply by $3.048\ 006 \times 10^{-1}$
foot per minute	metre per second (m/s)	Multiply by 5.080×10^{-3}
gallon (U.K. liquid)	cubic metre (m^3)	Multiply by $4.546\ 092 \times 10^{-3}$
gallon (U.S. dry)	cubic metre (m^3)	Multiply by $4.404\ 884 \times 10^{-3}$
gallon (U.S. liquid)	cubic metre (m^3)	Multiply by $3.785\ 412 \times 10^{-3}$
gram	kilogram (kg)	Multiply by 1.0×10^{-3}
hectare	Square meter (m^2)	Multiply by 1.0×10^{4}
horsepower (550 ft-lbf/s)	watt (W)	Multiply by $7.456\ 999 \times 10^{2}$

Fourth Schedule - (Cont'd)

To Convert From	To	Conversion
horsepower (boiler)	watt (W)	Multiply by 9.806 650 x 10^{1}
horsepower (U.K.)	watt (W)	Multiply by 7.457 x 10^{2}
inch	metre (m)	Multiply by 2.54 x 10^{-2}
kelvin	degree Celsius	$T_{°C} = T_{K}$ - 273.15
kilocalorie	joule (J)	Multiply by 4.186 8 x 10^{3}
knot	metre per second (m/s)	Multiply by 5.144 444 x 10^{-1}
micron	metre (m)	Multiply by 1.0 x 10^{-6}
mile	metre (m)	Multiply by 1.609 344 x 10^{3}
mile (international nautical)	metre (m)	Multiply by 1.852 x 10^{3}
mile (U.K. nautical)	metre (m)	Multiply by 1.853 184 x 10^{3}
mile/hr	metre per second (m/s)	Multiply by 4.470 4 x 10^{-1}
mile/hr	Kilometer per hour (km/h)	Multiply by 1.609 344
millibar	pascal (Pa)	Multiply by 1.0 x 10^{2}
millimetre of mercury (mm hg)	pascal (Pa)	Multiply by 1.33 322 19 x10^{2}
minute (angle)	radian (rad)	Multiply by 2.908 882 x 10^{-4}
ounce (avoirdupois)	kilogram (kg)	Multiply by 2.834 952 x 10^{-2}
ounce (troy or apothecary)	kilogram (kg)	Multiply by 3.110 348 x 10^{-2}
ounce (U.K. fluid)	cubic metre (m^3)	Multiply by 2.841 307 x 10^{-5}
ounce (U.S. fluid)	cubic metre (m^3)	Multiply by 2.957 353 x 10^{-5}
pennyweight	kilogram (kg)	Multiply by 1.555 174 x 10^{-3}

Fourth Schedule - (Concl'd)

To Convert From	To	Conversion
pint (U.S. dry)	cubic metre (m^3)	Multiply by $5.506\ 105 \times 10^{-4}$
pint (U.S. liquid)	cubic metre (m^3)	Multiply by $4.731\ 765 \times 10^{-4}$
pound	kilogram (kg)	Multiply by $4.535\ 924 \times 10^{-1}$
pound-force (lbf)	newton (N)	Multiply by 4.448 222
quart (U.S. dry)	cubic metre (m^3)	Multiply by $1.101\ 221 \times 10^{-3}$
quart (U.S. liquid)	cubic metre (m^3)	Multiply by $9.463\ 529 \times 10^{-4}$
second (angle)	radian (rad)	Multiply by $4.848\ 137 \times 10^{-6}$
slug	kilogram (kg)	Multiply by $1.459\ 390 \times 10^{1}$
square foot	square metre (m^2)	Multiply by $9.290\ 304 \times 10^{-2}$
square inch	square metre (m^2)	Multiply by $6.451\ 6 \times 10^{-4}$
square mile	square metre (m^2)	Multiply by $2.589\ 988 \times 10^{6}$
square yard	square metre (m^2)	Multiply by $8.361\ 274 \times 10^{-1}$
stone	kilogram (kg)	Multiply by 6.350 293 18
tablespoon	cubic metre (m^3)	Multiply by $1.478\ 676 \times 10^{-5}$
teaspoon	cubic metre (m^3)	Multiply by $4.928\ 922 \times 10^{-6}$
ton (long)	kilogram (kg)	Multiply by $1.016\ 047 \times 10^{3}$
ton (short)	kilogram (kg)	Multiply by $9.071\ 847 \times 10^{2}$
watthour (W-hr)	joule (J)	Multiply by 3.6×10^{3}
yard	metre (m)	Multiply by 9.144×10^{-1}

FIFTH SCHEDULE

(Sections 29(3), 38 and 52)

Fees For Verification Work And For Registration Of Servicemen

Additional Fees for Verification Work

The following fees are to be collected for the examination and stamping of the measuring instruments indicated below:

1. The extra sum of $100.00 is to be charged where the inspector is required to issue a written certificate in respect of the compliance of the measuring instrument to this Act without mentioning the true value of the measure or the true values of the indications of the measuring instrument.

2. In case the where measuring instrument fails to pass the assessment 50 per cent fee prescribe is to be collected for the examination.

Note : The fees do not include the cost of transportation of the inspector and the verification equipment. If such costs have been incurred they are to be charged additionally according to the actual costs.

1. Masses

	$
(a). Commercial masses of nominal value not exceeding 2 kg.....	50.00
(b). Commercial masses of nominal value greater than 2 kg.....	60.00
(c). Masses used for precious stones and metals.....	50.00

2. Weighing Instruments

	$
(a). Hanging beam scales of ordinary accuracy and of a maximum capacity not exceeding 25 kg.....	90.00
(b). Hanging beam scales of ordinary accuracy and of a maximum capacity greater than 25 kg.....	125.00

(c). Hanging beam scales of medium accuracy and of a maximum capacity not exceeding 25 kg.....	110.00
(d). Hanging beam scales of medium accuracy and of a maximum capacity greater than 25 kg.....	160.00
(e). Counter balances and spring balances of ordinary accuracy and of a maximum capacity not exceeding 10 kg.....	5.00
(f). Counter balances and spring balances of ordinary accuracy and of a maximum capacity greater than 10 kg but not exceeding 50 kg.....	15.00
(g). Counter balances of medium accuracy including computerized types of maximum capacity not exceeding 50 kg.....	25.00
(h). Class four (ordinary accuracy) of maximum capacity not exceeding 25 kg	90.00
(i). Class four (ordinary accuracy) of maximum capacity exceeding 25 kg but not exceeding 250 kg.....	125.00
(j). Class four (ordinary accuracy) of maximum capacity exceeding 250 kg but not exceeding 1000 kg.....	110.00
(k). Class four (ordinary accuracy) of maximum capacity exceeding 1000 kg but not exceeding 3000 kg	160.00
(l). Class three (medium accuracy) of maximum capacity not exceeding 25 kg	160.00
(m). Class three (medium accuracy) of maximum capacity exceeding 25 kg but not exceeding 250 kg.....	200.00
(n). Class three (medium accuracy) of maximum capacity exceeding 250 kg but not exceeding 1000 kg .	200.00
(o). Class three (medium accuracy) of maximum capacity exceeding 1000 kg but not exceeding 3000 kg	240.00
(p). Class two (high accuracy) of maximum capacity not exceeding 15 kg	160.00

(q). Deadweight machines.....	120.00
(r). Steelyards.....	15.00
(s). Platform scales of maximum capacity not exceeding 1000 kg.....	55.00
(t). Platform scales of maximum capacity greater than 1000 kg.....	110.00
(u). Vehicle weighbridges of maximum capacity up to 15 tonnes (bi-annually).....	500.00
(v). Vehicle weighbridges of maximum capacity greater than 15 tonnes (bi-annually).....	750.00

3. Length Measures

	$
(a). Rigid and folding measures not exceeding 1 m.....	50.00
(b). Rigid and folding measures longer than 1 m but not exceeding 2 m.....	70.00
(c). Rigid and folding measures longer than 2 m.....	80.00
(d). Tape measures exceeding 1 m in length.....	50.00
(e). Tape measures longer than 1 m but not exceeding 2 m in length	65.00
(f). Tape measures exceeding 2 m.....	80.00

4. Capacity Measures

	$
(a). Measures, other than pharmaceutical, not exceeding 1 litre capacity.....	115.00
(b). Measures, other than pharmaceutical, greater than 1 litre but not exceeding 20 litres.....	125.00

(c). Measures exceeding 20 litres, other than pharmaceutical, but not exceeding 50 litres ……	140.00
(d). Measures exceeding 50 litres, other than pharmaceutical, but not exceeding 2000 litres……	260.00
(e). Measures exceeding 2000 litres, other than pharmaceutical, but not exceeding 10 000 litres…….	325.00
(f). Measures exceeding 10 000 litres, other than pharmaceutical, but not exceeding 20 000 litres…….	425.00
(g). Measures exceeding 20 000 litres, other than pharmaceutical, but not exceeding 30 000 litres…….	495.00
(h). Measures exceeding 20 000 litres, other than pharmaceutical, but not exceeding 30 000 litres…….	695.00
(i). Measures exceeding 30 000 litres, other than pharmaceutical, but not exceeding 40 000 litres…….	800.00
(j). Measures exceeding 40 000 litres, other than pharmaceutical, but not exceeding 45 000 litres…….	970.00
(k). Measures, other than pharmaceutical, exceeding 45 000 litres…….	1470.00
(l). Pharmaceutical measures not exceeding 0.5 litres…	90.00
(m). Pharmaceutical measures exceeding 0.5 litres……	110.00

5. Petrol Measuring Pumps and other pumps

	$
(a). Liquefied petroleum gas metres on trucks (bi-annually)	$ 70.00
(b). Metering system for dispensing one petroleum product for road vehicles (bi-annually)……	$ 50.00
(c). Metering system for dispensing products to re-fuellers (bi-annually)……	$100.00
(d). Blending pumps containing two measuring pumps.	$ 55.00

(e). Flow meters - milk	$100.00

6. Fees for Registration of Servicemen

	$
Certificate.....	200.00
Registration fee per serviceman.....	200.00
Annual fee per serviceman.....	500.00

7. Fees Miscellaneous Administrative Costs

	$
(a). Storage of items where such items are not collected within 2 days of the collection date	43.00 per day
(b). Where minor to moderate cleaning is required before calibration	25.00 - $79.00
(c). Where major cleaning is required before calibration	80.00

Read three times and passed the House of Assembly this day of , 2022.

Speaker

Read three times and passed the Senate this day of , 2022.

President