

EXPLANATORY STATEMENT

Issued by the Chief Metrologist

National Measurement Act 1960

National Measurement Amendment Guidelines 2016

Purpose and Operation

The principal objects of the *National Measurement Act 1960* (the Act) are to:

- establish a national system of units and standards of measurement of physical quantities;
- provide for the uniform use of those uniform units and standards of measurement throughout Australia;
- co-ordinate the operation of the national system of measurement; and
- provide the legal framework for a national system of trade measurement.

The Act and the *National Measurement Regulations 1999* (the Regulations) prescribe SI (International System of Units) base units of measurement and Australian legal units of measurement. They also prescribe certain additional, non-SI, legal units of measurement that may be used for particular purposes.

Section 7B of the Act provides that the Chief Metrologist may make guidelines governing the way in which Australian legal units of measurement may be combined to produce Australian legal units of measurement, and the way in which Australia legal units of measurement may be combined with a prefix for the purposes of section 7A(3) of the Act.

The purpose of the *National Measurement Guidelines 2016* (the Guidelines) is to support the national measurement system by prescribing a uniform system to express Australian legal units of measurement to ensure a common and consistent understanding of measurement units used in Australia and to align the expression of measurement units in Australia with internationally accepted practice.

The Guidelines commenced on 1 April 2016.

Consultation

The Guidelines are a legislative instrument for the purposes of the *Legislative Instruments Act 2003*. Sections 17 and 18 of the *Legislative Instruments Act 2003* require details of consultation undertaken to be provided in the Explanatory Statement accompanying such instruments or their exemption from it. In the case of this legislative instrument, only minor adjustments are being made and there is no change in regulatory policy and no new fee items are introduced. In these circumstances, it is not appropriate to engage in a consultation process.

Details of the Guidelines are set out in the Attachment.

ATTACHMENT**Details of the *National Measurement Amendment Guidelines 2016*****Clause 1 – Name of Guidelines**

This specifies the name of the Guidelines as the *National Measurement Guidelines 2016*.

Clause 2 – Authority

This sets out the provision of the *National Measurement Act 1960* under which the Guidelines are made.

Clause 3 – Commencement

This provides that the Guidelines commenced on 1 April 2016.

Clause 4 – Revocation

This provides that the Guidelines revokes the *National Measurement Guidelines 1999* (the former Guidelines) on 1 April 2016.

Clause 5 – Objects of the Guidelines

This item provides that the objects of the Guidelines are to provide a uniform system to express Australian legal units of measurement by governing the way in which Australian legal units of measurement may be combined to produce an Australian legal unit of measurement, and how they may be combined with prefixes to produce Australian legal units of measurement.

Clause 6 – Definitions

This item provides for definitions of terms used in the Guidelines.

Clause 7 – Physical quantities

The manner of expression of physical quantities in Australian legal units of measurement is prescribed under schedule 1 and schedule 2 of the *National Measurement Regulations 1999* (the Regulations). This item replaces the unnecessary duplication of listing physical quantities expressed in Australian legal units of measurement under the former Guidelines to an amended provision that Australian legal units of measurement may be formed only for the physical quantities prescribed under the Regulations. The amendment removes the requirement to amend the instrument when new Australian legal units of measurement are introduced to ensure that the national measurement legislation provides for the current formation of Australian legal units of measurement.

Clause 8 – Combining Australian legal units of measurement

This item provides that if a physical quantity is formed by combining two or more physical quantities then the Australian legal unit of measurement used to describe the combined physical quantity would be the same as the relationship between the Australian legal units of measurement for those physical quantities. The resulting Australian legal unit of measurement may be then represented by either a name or symbol that is itself derived from an Australian legal unit of measurement. For example the Australian legal unit of measurement of *pascal* can either be represented as Pa or N/m². See schedule 1 and 2 of the Regulations for the list of names and symbols of Australian legal units of measurement.

Clause 9 – Combining Australian legal units of measurement and SI prefix

This item provides that a decimal multiple or submultiple of an Australian legal unit of measurement must be formed using a single SI prefix, as prescribed under schedule 3 of the Regulations, with the exemption of a *kilogram* which due to historical reasons is the only SI base unit which already contains a prefix (*kilo*) as part of its name.

This item includes a typographical amendment from the former Guidelines. The amendment corrects the example annotating how a decimal multiple or submultiple of an Australian legal unit of measurement, formed using a single SI prefix, is expressed to render it consistent with the requirements in section 13(10) of the instrument. The previous wording may have caused confusion in relation to the use of a space when expressing Australian legal units of measurement.

The item also provides that an additional derived unit of measurement, as listed under part 4 of schedule 1 of the Regulations, may also be combined with another Australian legal unit of measurement to form an Australian legal unit of measurement. For example the amount of gram per mole unit may be represented as grams/mol.

In addition, this item provides that an Australian legal unit of measurement and a SI prefix may be combined with other Australian legal units of measurement symbols, as listed under schedule 1 and 2 of the Regulations, to form a symbol for a compound unit that is an Australian legal unit of measurement. For example the Australian legal unit measurement of *metre* (m) with the prefix of *kilo* (k) can be combined with the non-SI unit of time (*hour*), represented with the symbol (h), to form km/h for a measurement of speed.

Clause 10 – Australian legal units of measurement that must not be combined with prefixes

This item provides the list of Australian legal units of measurement which must not be combined with SI prefixes as to avoid confusion and that as *kilogram* already contains a prefix a decimal multiple of sub-multiple of *kilogram* must be formed by attaching a prefix to *gram*.

Clause 11 – Australian legal units of measurement that may only be combined with prefixes that form multiples of the unit

This item provides the Australian legal units of measurement of *tonne* may only be combined with an SI prefix that gives a decimal multiple of *tonne*. For example *tonne* may be combined with the SI prefix of *kilo* to form kilotonne which is a multiple of a

tonne but not with the SI prefix of *milli* to form millitonne as it is a decimal sub-multiple of a *tonne*.

Clause 12 – Combination of a prescribed SI prefix with a combination of Australian Legal units of measurement

This item provides that an Australian legal unit of measurement must be formed from a combination of Australian legal units of measurement as prescribed under section 8 of the instrument and the use of an SI prefix as prescribed under schedule 3 of the Regulations.

Clause 13 – Expression of Australian legal units of measurement

This item provides for requirements when expressing Australian legal units of measurement to align the expression of measurement units in Australia with internationally accepted practice.

This item includes the following amendments from the former Guidelines:

- (i) The use of the product symbol of a space is excluded when the symbol for an Australian legal unit of measurement is the same as an SI prefix to align the expression with internationally accepted practice. The previous wording may have caused confusion in relation to the correct expression of Australian legal units of measurement. For example the Australian legal unit of measurement of thermo-dynamic temperature (*kelvin*) represented with the symbol (K) and length (*metre*), represented with the symbol (m), may be combined with the SI derived unit of measurement of power (*watt*), represented with the symbol (W), to form the expressed as m·K/W (*metre kelvin per watt*) as a measurement for thermal resistivity which if the product symbol of a space was used to form the expression m K/W it may be confused with millikelvin per *watt* (which itself may be expressed as mK/W). The amendment replaces the requirement previously under section 11(8) of the instrument.
- (ii) The example annotating how an Australian legal unit of measurement derived from the division of 2 other Australian legal units of measurement may be expressed to produce an unambiguous expression has been corrected to render it consistent with the requirements in section 13(6) of the instrument. The previous wording may have caused confusion in relation to the correct expression of Australian legal units of measurement.
- (iii) The example annotating how a complex expression, negative exponents or parentheses must be used when expressing Australian legal unit of measurement has been corrected to render it consistent with the requirements in section 13(6) of the instrument. The previous wording may have caused confusion in relation to the correct expression of Australian legal units of measurement.

- (iv) An exemption to the requirements regarding the use of a space after the numerical value of an Australian legal unit of measurement and the symbol of unit of measurement has been provided for expressing angles. When expressing geographic coordinates no space must be left between the numerical values and the symbols for degrees, minutes and seconds. On consultation with Geoscience Australia the former Guidelines may have caused confusion in relation to expressing geographic coordinates.