



Title: **Terms and conditions for the approval of timber dimension measuring devices**

Effective Date: **2016-01-01**

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Revision: 1

1.0 Interpretation

The following definitions apply in these terms and conditions.

Audit trail – means an electronic feature that counts the number of changes made to the calibration or configuration parameters of the device and records the values related to these changes.

Diameter – means the theoretical diameter calculated by measuring the actual circumference of an object and dividing this value by the mathematical constant pi (π), which is the ratio of a circle's circumference to its diameter.

Dimensions – means an area, diameter, length and/or volume measured in units of cm^2 , cm, m or m^3 respectively.

Disturbance – means an identified phenomenon or event to which a timber dimension measuring device is exposed and whose characteristics fall outside the operating parameters of the device.

Full vision (true view) scanner – means a scanner designed to view the full cross sectional shape of a log as it passes by the scan heads to produce a digitized three dimensional model of the log. These scanners are not the same as early "XY" scanners that simply looked at two dimensions of the log.

Indicator – means that part of a timber dimension measuring device that displays measurements and information related to the measurement process.

Influence factor – means an identified phenomenon or event to which a timber dimension measuring device is exposed and whose characteristics fall within the operating parameters of the device.

Interval or d – means the difference between two consecutively indicated values for any axis measurement of a timber dimension measuring device.

Length – means the maximum length of the log measured as a straight line from one end to the other.

Measuring element – means that part of a timber dimension measuring device that does not include the indicator.

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Timber dimension measuring device – means a non-mobile and permanently installed measuring machine that measures the dimensions of a tree stem or log in order to determine its area, diameter, length and/or volume.

Ready condition – in respect of a timber dimension measuring device, means the condition of it being ready to make a measurement.

Registration – means a displayed, printed or recorded representation of any measurement or other information required under these terms and conditions.

Tare – means a value in units of length that is used to reduce the dimensions of an object. Tare is a prohibited feature for a timber dimension measuring device.

Tare function – in respect of a timber dimension measuring device, means a process, mechanism or feature that reduces or adjusts the gross measured value by the tare value. Tare is a prohibited feature for a timber dimension measuring device.

Zero reference – in respect of a timber dimension measuring device, means the point from which a measurement is made.

2.0 Scope

2.1 Approval of timber dimension measuring devices

- a) In accordance with subsection 3(2) of the *Weights and Measures Act*, types of timber dimension measuring devices (TDMDs) may be approved on a temporary basis, if:
 - i) an application is submitted which includes evidence that the device type has been tested and found to meet the requirements of the terms and conditions set out in this document; and
 - ii) a sample of the device type has been evaluated in the field prior to trade use and found to be in compliance with the terms and conditions set out in this document and the applicable sections of the *Weights and Measures Regulations*.
- b) TDMDs will not be approved on a temporary basis once metrological requirements have been established and suitable means to conduct evaluations developed. At the discretion of Measurement Canada, types of TDMDs approved in accordance with subsection 3(2) of the *Weights and Measures Act* prior to the establishment of requirements and means to evaluate the devices may be granted full approval or may be required to be submitted for further evaluation.

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3.0 Application

These terms and conditions apply to all stationary or portable TDMDs designed to produce a digitized three dimensional model of a log that are used to determine timber dimensions, specifically length and diameter, where the diameter is calculated from the circumference. TDMDs may be used only for the measurement of logs or bolts of a naturally occurring cross section. TDMDs are not to be used to measure processed or partially processed beams, posts, cants or other sawn timber if the cross section has been altered. TDMDs are not approved to measure the area or volume of an object.

4.0 Design, composition and construction

4.1 A TDMD must be of a design, composition and construction that under normal conditions of use enable it to measure accurately and do not facilitate the perpetration of fraud.

4.2 A TDMD must be designed, constructed and installed in a way that enables inspection procedures and physical test standards or test objects to be applied to the device and recovered before further processing.

4.3 A TDMD must be equipped with a feature to identify the software and indicate the version of the software that it is using.

4.4 Each interval of a TDMD must be presented in a decimal format and must be equal to 1×10^n , 2×10^n or 5×10^n , where the power n is a positive or negative whole number or zero.

4.5 A TDMD must be equipped with the following items:

- a) an indicator or printer that has digits, letters or symbols of a design, number and size that permit a clear presentation of accurate measurement; and
- b) if it is installed with two or more measuring elements connected to a single primary indicator or printer that is separated from one or more of its measuring elements by a distance that does not allow easy inspection, a portable indicator that:
 - i) is configured to provide the same information as the primary indicator or printer;
 - ii) provides information that is in exact agreement with the information provided by the primary indicator or printer; and
 - iii) is readily connectable to all of the measuring elements without affecting the performance of those elements.

4.6 A TDMD that has a means of registration that is connected to two or more measuring elements must be equipped with features that:

- a) automatically identify, on the means of registration, the measuring element that is providing the displayed information; and
- b) prevent the activation of any measuring element that is not in use.

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4.7 A TDMD that is equipped with an indicator which consists of display elements or segments that may fail individually and produce incorrect information must have a display test mode that shows all relevant elements and segments of the indicator.

4.8 A TDMD must not provide a measurement registration until the operating temperature and other conditions necessary for accurate measurement have been attained.

4.9 A TDMD must be equipped with a feature with which the zero reference or ready condition can be established. The feature must be interlocked so that its use is prevented during measurement.

4.10 A TDMD must automatically maintain a zero reference or ready condition when no object is in or on the measuring element or, when a zero reference or a ready condition has not been established and maintained, it must not provide any measurement registrations. When a zero reference or ready condition has been established, a TDMD must indicate that fact.

4.11 The measurement registrations of a TDMD and any equipment or accessories connected to the device or used in conjunction with it must:

- a) agree exactly;
- b) be clear, accurate and unambiguous; and
- c) when provided in printed form, be printed indelibly.

4.12 A TDMD must not provide a negative measurement registration.

4.13 A TDMD may not employ a tare function, including the ability to manually or automatically remove bark or other undesirable material from the log measurement.

4.14 A TDMD may employ algorithms to smooth surface features of a log when determining circumference measurements provided they do not detrimentally affect the ability of the device to accurately measure the circumference and calculate the diameter of the log.

4.15 A TDMD must be used for measurement of naturally occurring cross sectional log shapes only.

4.16 A TDMD must not provide a measurement registration or must indicate an error message with its measurement registration, if the object being measured is:

- a) smaller than the minimum dimensions marked on the device;
- b) larger than the maximum dimensions marked on the device;
- c) smaller than the minimum measurement capability of the device; or
- d) larger than the maximum dimensions capability of the device.

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4.17 A TDMD, its auxiliary equipment or its system must record and make available to every customer party to the transaction who is not present at the time of the measurement, either by printed statement or electronic data transmission, the following information in respect of each object measured for the customer by the device:

- a) The dimensions of the object.
- b) The lot identifier for the group of objects.
- c) The item count within the lot.

4.18 If the information required to be provided under section 4.17 of this document is provided by electronic data transmission, a TDMD, its auxiliary equipment or its system must retain the information for a minimum of 90 days following the date on which the information was originally generated by the device, its auxiliary equipment or its system.

4.19 The adjustable components of a TDMD must maintain a setting after any adjustment is made.

4.20 The metrological functions and the adjustable components of a TDMD must be protected by means of:

- a) readily accessible and observable physical seals that make apparent access to the adjustable components; or
- b) electronic sealing, such as an audit trail, that makes apparent any adjustment of the metrological functions of the device.

Note: The information contained in an audit trail must be available and printable on site.

4.21 A TDMD that is equipped with interfaces that allow the connection of auxiliary equipment must be designed so that:

- a) the metrological functions of the device are not adversely affected by the operation of the auxiliary equipment or by disturbances or influence factors acting on the auxiliary equipment or interfaces; and
- b) the interfaces do not allow access to the metrological functions and adjustable components of the device.

4.22 A TDMD must be designed to operate over a temperature range of $-10\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$ unless a different temperature range is specified by its manufacturer, in which case it must operate over a temperature range of at least $30\text{ }^{\circ}\text{C}$. If a different temperature range is specified by the manufacturer, the TDMD must monitor the ambient temperature in the scan area and cease scanning if the temperature is outside of the approved range.

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5.0 Marking

5.1 A TDMD or a descriptive plate affixed to it must be permanently marked with the following information so that it is clearly visible at all times:

- a) the approval number;
- b) the manufacturer's name;
- c) the model designation;
- d) the serial number;
- e) the minimum and maximum dimensions for each axis being measured;
- f) the interval for each axis and measuring range;
- g) the number of scan heads required for the device installation and capacity;
- h) the minimum and maximum operating speeds; and
- i) the temperature range, if other than $-10\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$

If there are any restrictions, limitations or conditions on the use of a TDMD or if there are any special applications or uses for it, that information must be clearly and permanently marked on the device or be posted in close proximity to the device so as to be clearly visible to the operator and any customer who is present at the time of the measurement.

6.0 Installation and use

6.1 A TDMD and any equipment or accessories connected to or used in conjunction with it must be installed, maintained and used in a manner that:

- a) ensures accurate measurement;
- b) respects the parameters, restrictions, limitations and conditions of use set out in the notice of approval issued for the device;
- c) is in accordance with the manufacturer's or importer's instructions;
- d) does not detrimentally affect the performance of the device; and
- e) does not facilitate the perpetration of fraud.

6.2 A TDMD must be suitable for its intended use with respect to the elements of its design, composition and construction.

6.3 Every TDMD must be positioned and maintained so that all measurement indications and related information may be easily read, and the measurement of the object observed by an operator or customer who is present at the time of the measurement.

6.4 The minimum net measurement for any axis being measured by a TDMD, designed to measure in units of length, is $10d$ for the axis and measuring range in use.

7.0 Performance

7.1 The acceptance and in-service limits of error for registrations and tests of a TDMD designed to measure in units of length are $\pm 1d$ for the axis and measuring range in use.

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8.0 Influence factor testing

8.1 A TDMD must perform within the applicable limits of error when it is tested under controlled conditions for the following influence factors:

- a) any voltage from -15% to +10% of the nominal voltage for devices that use alternating current electricity as a power source;
- b) any voltage level at which the device is capable of displaying measurements for devices powered by direct current electricity;
- c) any temperature within the temperature range marked on the device or, if no range is marked, any temperature within the range of -10 °C to +40 °C;
- d) humidity variations at any level up to 85% relative humidity and at any temperature within the temperature range specified for the device;
- e) ambient light level variations at any light level intensity from 100 lx to 1500 lx for devices using optical principles of operation;
- f) any acoustic interference at intensity levels of up to 100 dB at the nominal centre frequency of the ultrasonic transducers used in the device for devices using acoustic principles of operations; and
- g) any other influence factor that may affect the device's performance.

8.2 The difference between a measurement registration subjected to a disturbance, such as electromagnetic or electrostatic fields, short-time power reduction, electrostatic discharges, electrical bursts or other disturbances, and an undisturbed measurement registration of the same object, must not exceed 1*d* for the axis and measuring range in use. If the difference exceeds 1*d*, the TDMD must:

- a) blank out the registration and prevent the transmission, printing and storage of the registration;
- b) provide an error message and prevent the transmission, printing and storage of the registration; or
- c) provide registrations that are so completely unstable that they cannot be interpreted or transmitted into memory or to a printer as a correct measurement result.

9.0 Revisions

- Modified section 4.15 to remove requirement for the TDMD to identify and reject non-naturally occurring cross sectional objects. This remains a user requirement.
- Corrected reference in section 4.18.

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President