



Title: **Terms and Conditions for the Approval of Multiple Dimension Measuring Devices**

Effective Date: **2006-03-16**

Page: **1 of 8**

Revision:

1.0 Application

These terms and conditions apply to devices that measure the dimension and/or volume of objects by calculating the smallest cuboidal shape in which the object may be placed for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object. Insofar as they are clearly applicable, these terms and conditions apply also to devices designed to automatically make multiple measurements to determine a volume for other applications¹.

In addition to these terms and conditions, multiple dimension measuring devices shall meet the applicable requirements of the *Weights and Measures Act and Regulations*.

These terms and conditions do not apply to:

- a) devices designed to indicate automatically (with or without value-computing capabilities) the length of fabric passed through the measuring elements;
- b) devices designed to automatically indicate the length of cordage, rope, wire, cable, or similar flexible material passed through the measuring elements; or
- c) any linear measure or measure of length or devices used to measure individual dimensions for the purpose of assessing a charge per unit of measurement of the individual dimension.

2.0 Definitions

In this document:

Billed Weight – means the weight used in the computation of the freight, postal, or storage charge, whether actual weight or dimensional weight.

"d", Dimension Division Value – means the smallest increment, for the range in use, that the device displays for the dimension of the object in that axis. The value of "d" may be different for all three axes.

Dimensional Weight (or dim. weight) – means a value computed by dividing the object's volume by a conversion factor; it may be used for the calculation of charges when the value is greater than the actual weight.

Measuring Element – means that portion of a complete device which does not include the indicating element.

¹ The requirements of these terms and conditions were included in draft specifications related to Multiple Dimension Measuring Devices (SGM-7).

3.0 Indicating and Recording Elements and Recorded Representations

The device shall indicate or record either:

- (a) a zero or ready condition; or
- (b) an out-of-zero or non-ready condition.

Note: A zero or ready condition may be indicated by other than a continuous digital zero indication, provided that an effective automatic means is provided to inhibit a measuring operation when the device is in an out-of-zero or non-ready condition.

The value of the division recorded shall be the same as the division value indicated.

Except when in the tare mode, negative values shall not be indicated or recorded.

If in normal operation the device indicates volume rather than individual dimensions, a testing mode shall be provided to indicate individual dimensions for all objects measured.

The value of a device division "d" expressed in a unit of dimension shall be presented in a decimal format with the value of the division expressed as:

- (a) 1, 2 or 5; or
- (b) a decimal multiple or submultiple of 1, 2 or 5; or
- (c) a binary submultiple of a specific inch-pound unit of measure.

Examples: device divisions may be 0.01, 0.02, 0.05; 0.1, 0.2, or 0.5; 1, 2, or 5; 10, 20, 50 or 100; .5, .25, .125, .0625, etc.

For indirect sales only, in addition to the values specified in the list above, the value of the division may be 0.3 inch and 0.4 inch.

Multiple dimension measuring systems must provide information as specified in Table A.

Title: **Terms and Conditions for the Approval of Multiple Dimension Measuring Devices**

Effective Date: **2006-03-16**

Page: **3 of 8**

Revision:

Table A - Information to be provided by Multiple Dimension Measuring Systems

Information	customer is present at the time of measurement			Customer is not present at the time of measurement ^A
	printer only	display only	printer and display	
System identification	Printed ^B	Displayed ^B	Displayed ^B or Printed ^B	Printed or Available upon request from the customer ^C
Object identification	n/a	n/a	n/a	Printed or Available upon request from the customer ^C
Dimensions and/or volume, with units of measurement	Printed	Displayed	Displayed and Printed	Printed or Available upon request from the customer ^C
Measurement error indication	Printed	Displayed	Displayed and Printed	n/a
Billing method	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Billed weight	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Total price	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Dimensional weight (if applicable)	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Scale weight (if applicable)	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Tare (if applicable)	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Oversized object indication ^D	Printed	Displayed	Displayed or Printed	Printed or Available upon request from the customer ^C
Dimensions are of smallest box statement ^E	Printed or Marked	Displayed or Marked	Displayed or Printed or Marked	Printed or Available upon request from the customer ^C
Billing rate or rate chart	Available upon request from the customer ^C	Available upon request from the customer ^C	Available upon request from the customer ^C	Printed or Available upon request from the customer ^C
Conversion factors	Available upon request from the customer ^C			Available upon request from the customer ^C

A When the customer is not present at the time of measurement and

- Customer receives a bill stating quantity or
- Customer agrees to receiving a bill not stating quantity or
- Customer has a contract based on the service, not the quantity.

B Only required when more than one multiple dimension measuring device or measuring element is installed in the same premises.

C Information must be retained for at least 30 days after invoicing.

D If individual dimensions are not provided as required in the table.

E Representations of dimensions and volume must be identified to show that the dimensions and/or volume shown are those of the smallest box in which the object may be enclosed.

4.0 Minimum Lengths

Minimum lengths to be measured by the device are specified in Table B. The manufacturer may specify a longer minimum length.

Table B: Minimum Lengths	
Minimum Increment Size (d)	Minimum Length Permitted to be Measured by Device
$0 < d \leq 1 \text{ cm}$ $(0 < d \leq 0.5\text{'})$	12 d
$1 \text{ cm} < d \leq 5 \text{ cm}$ $(0.5\text{' } < d \leq 2\text{'})$	30 d
$5 \text{ cm} < d$ $(2\text{' } < d)$	50 d

Except for entries of tare, when objects are smaller than the minimum dimensions identified in Table B, or larger than 105% of the maximum dimensions and/or volume marked on the device, the indicating or recording element shall either:

- (a) not display or record any usable values; or
- (b) identify the displayed or recorded representation with an error indication.

5.0 Operating Temperature

An indicating or recording element shall not display nor record any usable values until the operating temperature necessary for accurate measuring and a stable zero reference or ready condition have been attained.

6.0 Adjustable Components

Adjustable components shall be held securely in adjustment and, except for a zeroing mechanism (when applicable), shall be located within the housing or enclosure of the device.

7.0 Provision for Sealing

A device shall be provided with readily accessible and observable means that make apparent any alteration or modification of the metrological parameters, or any access to the means of adjustment.

8.0 Zero and Tare

A device shall be equipped with means by which the zero reference or ready condition can be adjusted, or the zero reference or ready condition shall be automatically maintained. The zero reference or ready control circuits shall be interlocked so that their use is prohibited during measurement operations.

The zero-setting adjustment of a multiple dimension measuring device shall be maintained so that, with no object in or on the measuring element, the device shall indicate or record a zero or ready condition. After the removal of any object, the zero indication shall not change.

The tare function shall operate only in a backward direction (that is, in a direction of under registration) with respect to the zero reference or ready condition of the device. The value of the tare division or increment shall be equal to the division of its respective axis on the device. There shall be a clear indication that tare has been taken.

9.0 Systems with Two or More Measuring Elements

A multiple dimension measuring system with a single indicating or recording element, or a combination indicating-recording element, that is coupled to two or more measuring elements with independent measuring systems, shall be provided with means to prohibit the activation of any measuring element (or elements) not in use, and shall be provided with automatic means to indicate clearly and definitely which measuring element is in use.

10.0 Marking Requirements

Multiple dimension measuring devices, main elements of multiple dimension measuring devices when not contained in a single enclosure for the entire dimension/volume measuring device, and other components shall be marked as specified in Table C.

The required marking information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

Table C: Marking Requirements

To Be Marked With	Multiple Dimension Measuring Equipment			
	Multiple dimension measuring device and indicating element in same housing	Indicating element not permanently attached to multiple dimension measuring element	Multiple dimension measuring element not permanently attached to the indicating element	Other equipment ^A
Manufacturer's ID	x	x	x	x
Model Designation	x	x	x	x
Serial Number and Prefix	x	x	x	x ^B
Minimum and maximum dimensions for each side ^C	x	x	x	
Value of measuring division, d	x	x	x	
Temperature Limits ^D	x	x	x	
Minimum & Maximum speed ^E	x	x	x	
Special Application ^F	x	x	x	
Limitation of Use ^G	x	x	x	

A. Necessary to the dimension and/or volume measuring system, but having no effect on the measuring value, e.g. auxiliary remote display, keyboard, etc.

B. Modules without "intelligence" on a modular system (e.g., printer, keyboard module, etc.) are not required to have serial numbers.

C. The minimum and maximum dimensions can be shown as follows:

Length: min. _____ max. _____

Width: min. _____ max. _____

Height: min. _____ max. _____

D. Required if the range is other than -10 to 40 °C (14 to 104 °F).

E. If the multiple dimension measuring device requires that the object or device be moved relative to one another, the minimum and maximum speeds are marked which enable the device to make measurements that are within the applicable tolerances shall be marked.

F. A device designed for a special application rather than general use shall be conspicuously marked with suitable words visible to the operator and the customer restricting its use to that application.

G. Materials, shapes, structures, or object orientations that are inappropriate for the device or those that are appropriate.

11.0 Field Test Procedures

The device shall be tested using test standards and objects of known and stable dimensions, and all measurements must be within tolerance. The standards and test objects may vary in size from the smallest dimension to the largest dimension marked on the device.

Measurements are made using different positions of the test object and consistent with the manufacturer's specified use for the device.

A disturbance test shall be conducted at a given installation when the presence of disturbances has been verified and characterized if those conditions are considered "usual and customary."

Tolerances apply regardless of the influence factors acting on the device and regardless of the shape, material, or position of the object being measured, unless otherwise marked on the device.

A zero indication change test shall be conducted on all devices which show a digital zero. After the removal of any test object, the zero indication shall not change.

The difference between the measurement registration subjected to a disturbance, such as electromagnetic or electrostatic fields, short time power reduction, voltage spikes, electrostatic discharges or other disturbances, and an undisturbed measurement registration shall not exceed one division "d" or the device shall:

- (a) blank the registration, and prevent the transmission, printing, or storage of measurement results; or
- (b) provide an error message and prevent the transmission, printing, or storage of measurement results; or
- (c) provide a measurement registration, that is so completely unstable that it could not be interpreted, or transmitted into memory or to a printer, until such time as the registration is stable to within +/- one division of the undisturbed registration.

12.0 Tests Conducted Under Controlled Conditions

Devices shall be tested in the manner described in section 11.

Devices shall satisfy the tolerance requirements under the following temperature conditions:

- (a) If not marked on the device, the temperature limits shall be -10 °C to 40 °C (14 °F to 104 °F).
- (b) If temperature limits are specified for the device, the range shall be at least 30 °C or 54 °F.

The zero indication shall not vary by more than one division per 5 °C (9 °F) change in temperature.

Devices shall satisfy the applicable tolerances when subject to power supply voltage variation of -15% to +10% of the voltage rating specified by the manufacturer.

Devices incorporating weighing or other non-dimensional measuring features shall meet the applicable tolerances for any other tests performed for weighing or measuring devices.

Devices shall meet the applicable tolerances for any other tests normally performed for weighing or measuring devices in general.

13.0 Tolerances

The tolerance for a multiple dimension measuring device is a performance requirement independent of the design principle used.

For type evaluations, the tolerance values apply to tests within the influence factor limits of temperature and power supply voltage specified in section 12.

For subsequent verifications, tolerance values apply regardless of the influence factors at the time of the verification.

For multi-interval devices, the tolerance values are based on the value of the device division of the range in use.

The maintenance and acceptance tolerances are $\pm 1 d$. These tolerances apply regardless of the shape, material, or position of the object being measured; otherwise, such limitations shall be clearly marked on the device.

14.0 Installation and Use

Equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to, its maximum capacity, value of the division, minimum capacity, and computing capability.

A device that is portable and is being used on a counter, table, or the floor shall be firmly and securely supported.

The foundations and support of a device installed in a fixed location shall be such as to provide strength, rigidity, and permanence of all components, and clearance shall be provided around all live parts to the extent that no contacts may result when the measuring element is empty, nor throughout the performance range of the device such that the operation or performance of the device is adversely affected.

The indicating and measuring elements of a device shall be adequately protected from environmental factors such as wind, weather, and RFI that may adversely affect the operation or performance of the device.

A device shall not be used to measure objects smaller than the minimum or larger than the maximum dimensions marked on the device.

A multiple dimension measuring device designed and marked for a special application shall not be used for other than its intended purpose.

If a multiple dimension measuring device is equipped with a level-condition indicator, the device shall be maintained in a level condition.

The measuring capabilities of a device shall not be changed from the manufacturer's design unless the modification has been approved by the manufacturer and the weights and measures authority having jurisdiction over the device.

Alan E. Johnston
President
Measurement Canada