



Specifications

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Specifications for Approval of Physical Sealing Provisions for Electricity and Gas Meters

1.0 Purpose

The purpose of this specification is to amend Measurement Canada's (MC) specifications LMB-EG-07 and LMB-EG-08 to include requirements pertaining to physical provisions for sealing electricity and gas meters.

2.0 Scope

This specification applies to all electricity and gas meters which are intended to be used in revenue metering.

3.0 Authority

This specification is issued under the authority of section 12 of the *Electricity and Gas Inspection Regulations* (EGIR).

4.0 References

4.1 [Electricity and Gas Inspection Act](#) (R.S. 1985, c. E-4), s. 28

4.2 [Electricity and Gas Regulations](#) (SOR/86-131), s. 12

4.3 *Principles of Sealing Meters and Trade Devices*, 1999-07-26 (refer to Appendix)

4.4 *Specifications for the Approval of type of Electricity Meters, Instrument Transformers and Auxiliary Devices* ([LMB-EG-07](#)), section 3-2

4.5 *Specifications for the Approval of type of Gas Meters and Auxiliary Devices* ([LMB-EG-08](#)), sections 3-3, 6-2, 7-2 and 10-2

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5.0 Terminology

Meter Terminal

A wiring connection on an electricity or gas meter which allows for electrical input power and/or for measurement inputs and outputs.

Seal

A physical mechanism that is used to secure access to a meter's metrological adjustments and sealable parameters so that access or changes to metrological adjustments and sealable parameters will be detectable.

Sealable Parameter

Any parameter, component or programming, including calibration and configuration adjustment, which can affect the measurement accuracy of a meter or the measurement data presented by a meter.

Sealing

An action performed in order to secure a device.

Verification Mark

Mark applied at the time of verification, to a device that has been found to be in compliance with the *Electricity and Gas Inspection Act* (EGIA). A verification mark includes any seal, stamp, tag or label which identifies the verifier and the year in which the verification takes place.

6.0 General

The intent of the approval requirements pertaining to meter construction, (established in section 3.2-6 of LMB-EG-07 and section 3.3-3 of LMB-EG-08) are to ensure that approved and verified meters are capable of being sealed in a manner which conforms with MC sealing principles and policies. The requirements contained in this specification supplement the requirements established in LMB-EG-07 and LMB-EG-08, and have been established in accordance with MC's *Sealing Principles* (refer to the Appendix). These requirements for sealing provisions align with international requirements for physical sealing provisions established by the *Organisation Internationale de Métrologie Légale* (OIML).

7.0 Type Approval Requirements - Physical Provisions for Sealing

This section describes the specific requirements applicable for type approval of the physical means provided for sealing meters used for trade measurement.

7.1 Meter Case

In support of clause 3-2.6 of MC Specification LMB-EG-07 for electricity meters and clauses 3-3.3, 6-2.2, and 7-2.2 of MC Specification LMB-EG-08 for gas meters, unless otherwise permitted by the President of MC pursuant to the EGIR, the following requirements shall apply.

7.1.1 Subject to section 7.1.4 below, a meter shall have a case which can be physically sealed by the application of a nylon monofilament line or a metal wire having a minimum diameter of 0.644 mm. This provision is based on MC's conventional method of sealing involving the application of a wire or nylon monofilament line secured with metal roll-up prong-lock tag or crimp-type lead seal.

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7.1.2 Where a meter sealed with this wire/monofilament-based method contains more than one seal point on the meter, the manufacturer shall identify the applicable configuration(s) required to secure the meter.

7.1.3 Once a meter is sealed, any access that may permit tampering for the purpose of deliberate manipulation of internal parts or metrological functions of the meter, shall cause permanent visible evidence of such tampering, or attempted tampering. Evidence of tampering includes but is not limited to damages such as breakage, cracks, scratches, to either the meter case, cover, enclosure, internal parts and components, or the meter seal.

7.1.4 Meters may be constructed in a manner which does not incorporate the sealing provisions outlined in 7.1.1 only where the design of the meter is such that it would not be possible to gain access to the meter's metrological adjustments or working parts without permanently damaging the meter cover or case.

7.1.5 For the purpose of type approval, the meter seal provision shall be evaluated principally, but not exclusively, by means of a visual examination. MC may perform a physical test to determine compliance with the requirements of section 7 of this specification. In any case where it is determined, at the time of or following the granting of type approval, that meter sealing provisions may be subverted in a manner which leaves no discernable evidence of tampering, the meter manufacturer shall be responsible for any and all corrective actions required to ensure that the approved pattern complies with section 7.1.3.

7.1.6 The meter's seal provision and applicable configuration(s) shall form part of the meter's approved pattern which will be documented in the Notice of Approval issued by MC for the meter. It should be noted that information contained in the Notice of Approval regarding the meter's seal provision does not prescribe the type of seal that may be applied during verification.

7.2 Meter Terminals

7.2.1 Electricity Meters

In support of the terminal sealing requirements prescribed in clause 3-2.5.2 of LMB-EG-07, the following requirements shall apply.

7.2.1.1

With the exception of S-base meters and back-connected switchboard meters, a meter shall provide physical means to seal meter terminals by the application of a nylon monofilament line or a metal wire having a minimum diameter of 0.644 mm.

7.2.1.2

Once the meter terminals are sealed with this wire/monofilament-based method, any access to the meter terminals shall cause permanent visible damage to the case or the seal used for the purpose of testing (i.e. disassembly of the case must either break or crack the casing material or break the seal wire).

7.2.1.3

The sealing provisions for meter terminals shall comply with the requirements of clauses 7.1.2, 7.1.5, and 7.1.6.

7.2.2 Gas Meters

In addition to the general sealing requirements of 3-3.3 of LMB-EG-08, the following requirements shall apply.

7.2.2.1

A meter shall provide physical means to seal the terminals by the application of a nylon monofilament line or a metal wire having a minimum diameter of 0.644mm.

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7.2.2.2

Once the meter terminals are sealed with this wire/monofilament-based method, any access to the meter terminals shall cause permanent visible damage to the case or the seal used for the purpose of testing (i.e. disassembly of the case must either break or crack the casing material or break the seal wire).

7.2.2.3

The sealing provision for meter terminals shall comply with the requirements of clauses 7.1.2, 7.1.5, and 7.1.6.

7.3 Communications Ports

Electronic meters equipped with a communications port (such as an optical port or RS-232 connection, etc.) shall be equipped with sealing provisions placed either on the communications port or on a sealable plate which covers a read-write switch, jumper, or other suitable means which provide an equivalent level of protection. The sealing provisions shall facilitate prevention or detection of unauthorized changes from being made via the communications port to any sealable parameters, metrological configuration settings, and/or cumulative meter readings, (eg. energy, volume or mass). The sealing provisions shall employ one of the seal mechanisms established in 7.1.1.

7.4 Batteries (Gas Meters only)

In addition to the general sealing requirements of section 3-3.3 of LMB-EG-08, for electronic gas metering devices which employ one or more batteries as the main power source and/or as a back-up power source, sealing provisions designed to accommodate a conventional or alternative sealing method shall be provided to prevent unauthorized access to the battery or battery compartment.

8.0 Revisions

The purpose of revision 1 was to clarify the existing policy in regard of deliberate manipulation, tampering and manufacturer's responsibility for corrective actions required to ensure that the approved pattern complies with the requirements if a nonconformity is found. Only section 7.1.3 and 7.1.5 have been changed.

9.0 Additional Information

For additional information regarding this specification, please contact the Senior Program Officer responsible for electricity or gas measurement. For more information regarding Measurement Canada and its programs, visit our Web site located at <http://mc.ic.gc.ca>.

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Appendix - Principles for Sealing Meters and Trade Devices

Measurement Canada has established the following general principles of sealing meters and other trade measurement devices. These principles have been established to protect all parties to a trade measurement transaction equally and without bias.

1. The functions of a seal are:
 - (a) to secure a device so that access or changes to metrological adjustments, programming and sealable parameters will be detectable;
 - (b) to identify the date and organization which verified the device. This information is necessary for the administration and enforcement of legislation, for complaint or dispute investigation purposes, and also for seal period expiry date determination and compliance sampling (seal extension) purposes; and
 - (c) to act as a deterrent against unauthorized access or changing of metrologically sensitive adjustments and sealable parameters.

2. A seal is required whenever a meter (defined pursuant to the *Electricity and Gas Inspection Act*), is verified for trade use and it is possible to affect the metrological adjustments or sealable parameters of the device.

3. A seal or verification mark can only be applied by an accredited meter verifier or an inspector designated under the EGIA.

4. A seal is a vital component of a credible measurement system which provides confidence in the integrity and accuracy of measurement in the following manner:
 - (a) an intact seal provides evidence and confidence in the integrity of the meter and the measurement information it contains. This evidence is independent of either of the parties (purchaser or seller) which have a stake in the veracity of the measurement information, which is especially important in regards of a dispute investigation;
 - (b) an intact seal provides a level of assurance that the device complies with metrological criteria established by an independent party (i.e. Measurement Canada) under the general direction of federal legislation;
 - (c) the markings on a seal are used to determine when and by whom the meter was verified, which is one of the key factors in ascertaining whether or not the sealed meter conforms with legislated requirements;
 - (d) seals are an important part of the process in determining the validity of sample meters inspected pursuant to seal-date extension programs.

5. A verification mark does not constitute a seal pursuant to the EGIA, but may be included on a tag used for sealing. A verification mark is a mark which is applied, at the time of verification, to a device that has been found to be in compliance with the applicable legislation (i.e. typically on a seal tag or an adhesive sticker). Its primary purpose is for the benefit of the public to show that the device has been officially examined and verified by a Measurement Canada inspector or an authorized service provider/accredited meter verifier. The use of a verification mark also indicates a Measurement Canada presence in the marketplace, providing confidence in a device's accuracy and integrity. Finally, a verification mark provides a link to the organization which verified the device. This information is valuable in tracing records relating to the verification of the device.