



Bulletin

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Policy on prepayment meters

1.0 Scope

This bulletin applies to electricity and gas meters intended for use in prepayment metering applications.

2.0 Purpose

The purpose of this bulletin is to provide interpretation on:

- a) the application of the contractor's obligations for the sale of electricity or gas under section 33 of the *Electricity and Gas Inspection Act (Act)* and the record-keeping requirements prescribed in section 11 of the *Electricity and Gas Inspection Regulations (Regulations)* with regards to electricity and gas meters intended for use in prepayment metering applications; and
- b) the requirements for the design, construction, performance, installation and use of electricity and gas prepayment meters.

3.0 Introduction

In recent months, Measurement Canada has received requests for information from electricity meter approval applicants and contractors regarding the Agency's policies and requirements for prepayment meters. As a result of initiatives being introduced and promoted in certain provincial deregulated electricity markets, there is a growing interest in the use of prepayment applications as a method for managing and conserving energy to meet the rising demand for electricity. In the electricity industry, the use of prepayment applications combined with time-of-use multirate billing functions is being closely reviewed as a viable means for reducing overall demand.

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This evolution in the use of prepayment metering has required Measurement Canada to review the applicable requirements of the Act, Regulations, and meter approval and verification specifications. As a result of this review, Measurement Canada has determined that a policy is needed to clarify the federal requirements and the Agency's position with regard to approval, verification, installation and use of prepayment meters.

To meet the immediate need to service approval applications, Measurement Canada has developed draft approval-of-type specifications, contained in this document, which will be authorized for use under bulletin GEN-06. Pursuant to the policies of bulletin GEN-06, meters which successfully meet the criteria of the authorized draft specifications will receive a conditional approval. A decision to grant full approval will be performed once formal national specifications have been adopted by Measurement Canada and all approval conditions have been met. Measurement Canada will undertake the development of formal national specifications in consultation with electricity and gas industry stakeholders.

4.0 Background and considerations

4.1 What is prepayment metering?

Prepayment metering is the trade measurement of electricity or gas which is required to be purchased by a consumer in advance of the consumption of electricity or gas. Generally, in a prepayment application, a consumer must prepay for electricity or gas in order to activate their load through the meter. The types of prepayment applications for electricity and gas may vary and can range from a simple advance monetary payment for electricity or gas to the repurchase of a fixed quantity of electricity or gas. In principle, under a prepayment application, the consumer may not receive a subsequent bill as payment is made in advance for electricity or gas. The terms and conditions for prepayment are established by the electricity and gas contractors (also referred to in the industry as suppliers or energy providers), and are subject to regulation by the Provinces. The design, construction, performance, installation and usage of meters intended for prepayment applications are subject to federal regulation under Canada's *Electricity and Gas Inspection Act (Act)* and *Electricity and Gas Inspection Regulations (Regulations)*.

In their earliest form, prepayment meters consisted of coin operated mechanical meters. From the late 1980's forward, electronic meter technology combined with card encoding and various telemetering communication techniques have been used in prepayment meter design. In recent years, there has been a growing interest amongst government departments and industry stakeholders to identify new methods for managing and conserving energy to meet rising demand at the residential and commercial/industrial trade levels. In the electricity industry, the use of prepayment applications combined with time-of-use is being closely reviewed as a viable means for reducing overall demand in the electricity marketplace.

4.2 How do prepayment meters work?

In general, it is considered that the electricity or gas prepayment meter measures energy in the same manner as a conventional meter. The main difference with a prepayment meter lies in the intended manner in which the meter is to be operated and used for the sale of electricity or gas.

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In the case of a conventional electricity meter, once a customer's load is energized, energy consumption is measured integrally on a continuous basis and a measurement reading is taken or established by the contractor on a periodic basis for the purpose of establishing a charge for electricity. Payment for electricity is made by the purchaser following the declaration or estimation of consumption of electricity for a certain period of time.

In the case of a prepayment electricity meter, the meter also measures electricity consumption integrally but the measurement is actually started and stopped in conjunction with the activation and deactivation of the load circuit by the prepayment control system. To activate the load circuit, the consumer must prepay for electricity usage or purchase a quantity of electricity (note: a contractor's fixed charges may be included in this purchase). The payment information may be loaded on the meter through a specific peripheral control device (e.g., magnetic card reader or telemetering system). Once activated, the load circuit will run and remain activated until the monetary or equivalent energy information loaded into the prepayment control system has run out, subject to any other conditions established by the contractor.

4.3 What provisions of the *Electricity and Gas Inspection Act (Act)* and Regulations and considerations would apply in the regulation of prepayment electricity or gas meters?

4.3.1 General

All electricity and gas meters used for trade measurement are subject to the approval, verification, installation and use requirements established pursuant to the Act and Regulations. Electricity and gas contractors are also subject to penalty requirements in section 33 of the Act and administrative requirements for meter records in section 11 of the Regulations. The requirements for meter records are deemed essential to support Measurement Canada's marketplace monitoring activities as well as the measurement dispute investigation service provided under section 23 of the Act (which provides the contractor and consumer with the right to request a dispute when dissatisfied with the condition or registration of their meter).

4.3.2 Offences with respect to the amount of electricity or gas supplied

Among the offences identified in the Act, it is important for contractors using conventional billing or prepayment methods to note the provisions prescribed in paragraph 33(k) of the Act.

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Under sub-paragraph 33(k)(i), any contractor selling electricity or gas by unit of measurement, who supplies electricity or gas, subject to prescribed limits of error, that is less than the amount they purport to supply, is subject to an offence. In the case of a conventional electricity meter, once a consumer's load is energized, energy is measured on a continuous basis and a measurement reading is taken or established by the contractor on a periodic basis for the purpose of establishing a charge for electricity. Payment for electricity is made by the consumer following receipt of a bill containing the estimation or declaration of consumption of electricity for a certain period of time. The difference between the two measurement readings obtained and recorded by the contractor for the purpose of sale is taken as the amount of energy "purported" to have been supplied by the contractor for the period between the measurement readings. In the case of a prepayment application, a contractor may not provide a bill to the consumer subsequent to consumption as the energy is prepaid. Where a consumer prepurchases a fixed amount of energy, the prepayment information provided to the consumer at the time of purchase constitutes the amount of energy "purported" to have been supplied. Where a consumer prepurchases energy on the basis of a monetary advance (i.e. advance credit), the prepayment meter becomes the source of information for the transaction of electricity. In this case, the transaction is completed when triggered by an event (further described in 4.3.3). The "purported" amount of electricity supplied by the contractor is determined from the record of transaction kept by the contractor.

Under sub-paragraph 33(k)(ii) of the Act, any contractor who does not supply the amount of electricity or gas which should have been supplied on the basis of the total price charged and the stated price per unit of measurement used to determine the total price is subject to an offence. This requirement implies that a contractor also has the option to sell electricity or gas on the basis of a total purchase price and stated price per unit, however, the amount of electricity or gas represented by these values remains as the deciding parameter in the evaluation of electricity or gas sold by the contractor.

In order to determine the status of a contractor's compliance with the requirements of paragraph 33(k) of the Act, it is important that certain meter records be kept by the contractor as further described in 4.3.3 below.

4.3.3 Meter records

With regard to meter record requirements, paragraph 11(2)(m) of the Regulations is of particular importance for contractors using prepayment metering applications. This provision requires a contractor to keep records for meters which contain, for each billing period, the metering information used by the contractor in establishing a charge for the electricity or gas sold. In the case of prepayment metering, what constitutes the "billing period" is different than that which is understood in the conventional billing application where the supply of electricity or gas is uninterrupted and the payment for consumption is made on a periodic basis following the retrieval of the meter readings. In the case of prepayment metering, the billing period is not based on consumption during a particular calendar period but may instead be completed or commenced on the basis of one of the following events:

- a) in a prepurchase, an energy quantity is purported to be supplied and purchased for an established cost;
- b) new tariff rates take effect (single rate, time-of-use or seasonal rates);

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- c) a contractor needs to reconcile measurement data (e.g. during a meter service or change-out; when a consumer's account is closed; etc.).

The time period during which this prepaid energy is consumed is inconsequential to the transaction. The actual duration will vary depending on the decrement rate of the downloaded energy value, or downloaded purchase price or equivalent energy value (calculated in the meter from the monetary parameters related to the purchase of prepaid electricity or gas, i.e., total purchase price and energy price rate). Therefore, the length or duration of the "billing period" will vary on the basis of the consumer's usage of energy. Consequently, the consumer's "bill" is either pre-established at the time the prepaid electricity or gas is purchased as denoted in (a) above (note here that reconciliation with meter data could be established by the consumer once the prepaid electricity or gas information is downloaded in the meter control system), or when the metering information is reconciled upon an event denoted in (b) or (c). Regardless of the prepayment method used, in order to enable the reconciliation of metering information used in establishing a charge for electricity or gas, contractors are required to keep meter records of the following information as a minimum:

either,

- the amount of energy consumed for each rate; and
- the fixed rate(s), time-of-use, or seasonal rates applied.

or,

- the fixed rate(s), time-of-use, or seasonal rates applied; and
- the total charges applied for energy consumed, for each rate.

4.4 What policies have been applied to prepayment meters and why have changes been proposed?

A review of MC records indicates that the Agency has to date, only approved a few makes and models of prepayment meters. In the electricity sector, the more recent approvals dating back to the early 1990's have involved meters using basic and more advanced electronic/telemetry technology. As electricity prepayment meters can measure electricity like a conventional meter, they were evaluated in accordance with the general and energy measurement specifications contained in the Agency's LMB-EG-07 approval-of-type specifications. In addition, to support the evaluation of the new technology, internal draft specifications were established and used which specified a number of technical requirements for the information which was to be provided by the prepayment meter or peripheral customer display (e.g. initial and remaining monetary values, rate, etc.). With respect to initial verification and reverification of the telemetry component of the prepayment system (e.g. peripheral consumer display/card reader; meter reading transmitter), these are currently subject to a temporary dispensation from initial verification and reverification on the condition that the devices are initially read and compared to the host meter reading following installation, and at one year intervals thereafter (Note: Other telemetry devices which have not been granted a formal temporary dispensation are currently being tested in the same manner for the purposes of verification).

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As a result of the consultation carried out by Measurement Canada with regard to multirate metering (i.e. time-of-use) and telemetering, it has been determined that certain meter characteristics used in contractor rate applications will be deemed as falling outside of the Agency's mandate and, as such, will not be subject to metrological control by Measurement Canada. In the case of prepayment meters, this principle would be considered applicable to the prepurchase information used in the operation and control of the meters where the prepayment method employed is a form of "monetary credit" (i.e. consumer loads a monetary value into the meter which is not specifically sold in combination with a rate. This method of prepayment is recognized as the most common method currently employed by utilities in Canada and in Europe). Consequently, certain technical prescriptions currently contained in earlier draft approval specifications for prepayment meters would not be applicable. The principles outlined in this document will be used to guide the approval evaluation of prepayment meters. It is important to note that where contractors require the meter to provide information needed in support of their meter records, it will be their responsibility to address this need with their meter supplier.

Regarding verification and reverification requirements for telemetering, as a result of the consultation initiative mentioned above, it has been proposed that the telemetering devices which strictly duplicate energy readings already contained in a host meter would be given an exemption from the verification and reverification requirements of the Act. This policy has now been accepted and will be implemented in the coming year. Consequently, the manner in which telemetering devices are used with prepayment meters will be subject to review in due course.

5.0 Policy on prepayment meters

5.1 Introduction

In consideration of the requirements of paragraph 33(k) of the Act and information discussed in subsections 4.3 and 4.4 of this document, electricity or gas prepayment meters could operate such that the meter/load activation and deactivation is based on:

- a) the prepurchase of a fixed amount of energy (represented by either a total purchase price combined with the energy price rate and any fixed factors, or the equivalent energy value derived from these monetary parameters), which is downloaded in the prepayment control system; or
- b) the prepurchase of a fixed amount of energy (represented as an energy quantity, functioning in terms of an energy credit); or
- c) monetary credit (where the amount of energy is not combined with a specific energy price rate at the time of purchase), which is downloaded in the prepayment meter's control system.

For each of the above cases, the following policy principles would apply as specified.

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5.2 Administrative requirements - Legislation: meter records

Pursuant to paragraph 11(2)(m) of the Regulations, contractors are required to keep meter records for each billing period which contain the metering information used by the contractor to establish a charge for electricity or gas. In the case of prepayment metering, the following information shall be recorded as a minimum:

either,

- the amount of energy consumed for each rate; and
- the fixed rate(s), time-of-use, or seasonal rates applied.

or,

- the fixed rate(s), time-of-use, or seasonal rates applied; and
- the total charges applied for energy consumed, for each rate.

5.3 Provisional specifications for approval-of-type

Refer to the document entitled: "Provisional Specifications for the Approval of Prepayment Meters" (PS-EG-01-E).

6.0 Policy for the verification of prepayment meters

Prepayment meters which measure electricity or gas directly shall be verified in accordance with applicable verification requirements issued by MC. The prepayment meter shall be tested for accuracy in the manner in which it was intended to operate.

7.0 Revision

The purpose of this revision is to remove the draft specifications for approval-of-type from section 5.3 of this bulletin. This section now refers to the a separate document entitled: "Provisional Specifications for the Approval of Prepayment Meters" (PS-EG-01-E).