1.0 Purpose

The purpose of this document is to provide additional information for organizations interested in becoming accredited for the verification of electricity installations and to provide guidance for Measurement Canada auditors.

2.0 Scope

This document applies to all organizations seeking accreditation to perform electricity installation inspections in accordance with the Electricity and Gas Inspection Act and Regulations.

3.0 Background

A national team was established in the fall of 2000 to review all applications for this field of accreditation. The team was directed not to develop specifications or procedures, but rather, to evaluate applications in a consistent manner and document why procedures are deemed acceptable.

This document summarizes the conclusions reached by the team in consultation with several clients who expressed interest in becoming accredited for installation inspections, and with the Canadian Electricity Association. The team would like to thank all who have contributed to this document.

4.0 General

The following are the minimum acceptable criteria to assist clients in developing documented information and to assist Measurement Canada staff in evaluating this information. The definitions in the Electricity and Gas Inspections Act and Regulations and Measurement Canada bulletins apply.

This appendix must be read and applied in conjunction with the requirements of this accreditation standard and the following documents:

- ISO 9001: 2015 Quality management systems—Requirements
- ISO 10012: 2003 Measurement management systems—Requirements for measurement processes and measuring equipment
- Electricity and Gas Inspection Regulations, section 46, Part IX, Limits of Error
- S-E-08—Specifications for the Installation and Use of Electricity Meters—Measurement Canada Standard Drawings for Electricity Metering Installations
5.0 Purpose of an installation inspection

The purpose of an installation inspection is to ensure the systematic integrity of a metering installation. Its purpose is not to verify individual meter accuracy, which is verified with certified measuring apparatus.

The installation inspection helps to ensure accurate measurement by verifying that:

a) approved meters and instrument transformers are used
b) meters are used as per Measurement Canada’s approval of type process
c) meters have been sealed with a valid and effective seal
d) the overall metering system is installed in accordance with all applicable Measurement Canada requirements and any meter manufacturer’s recommendations
e) the inspection has been performed within three months after the electrical service is energized and each time a major component of the installation is changed or added (e.g. meters, transformer, test switch)

6.0 Documentation

As a minimum, quality documentation must:

a) meet the requirements of this accreditation standard
b) include the process for the selection of installations to be inspected
c) include the installation inspection process and records
d) include a process for reporting findings of the tests conducted
e) include a process to resolve customer complaints including notification of corrective actions
f) include a process for initiating a Measurement Canada dispute, ref. GEN-43—Policy for electricity and gas measurement dispute investigations. Findings are to be made using Measurement Canada form ISED- ISDE3122—Record of Installation

Form ISED- ISDE3122 or an equivalent form (i.e. electronic format) is acceptable to Measurement Canada for acceptance.
Canada. Full details of each installation as indicated by the form must be recorded giving the identification and rating of each component.

7.0 Process

As a minimum, the installation inspection process must cover:

a) the verification process to ensure the owner of the metering system is registered with Measurement Canada

b) the process for design and construction of an electricity metering installation (S-E-08—Specifications for the Installation and Use of Electricity Meters—Measurement Canada Standard Drawings for Electricity Metering Installations)

c) the purchase of electricity metering installation equipment requiring approval by Measurement Canada

d) the selection of the installations to be tested

e) the process to decide what installation equipment is to be used

f) the static tests to be performed

g) the dynamic tests to be performed (e.g. cross-phasing check, current transformer ratio, potential transformer ratio)

h) the examination of records (billing multiplier, meter information and field data)

i) the documented actions to be taken in instances where a test result is outside the decision criteria in section 13.0

j) the analysis of results

k) the report of findings

l) the decision criteria

m) the next steps based on results (e.g. customer notification of corrective actions)

n) any additional Measurement Canada requirements

Although not mandatory, it is recommended the following processes be included in quality management system documentation:

i. the purchase of installation equipment that does not require approval by Measurement Canada prior to use

ii. the incoming inspection of installation equipment that does not require approval by Measurement Canada prior to use

iii. the metering equipment assembly

Clients including the above processes will likely benefit from their use.
7.1 Harmonic distortion testing

Measurement Canada does not presently have criteria for the limits of distortion. As a result, where such testing is included in an organization's submission for accreditation, it will not be evaluated by Measurement Canada for technical content.

7.2 Ratio test of current transformers and potential transformers above 750 V

a) Due to safety concerns, it is acceptable not to include potential transformer and current transformer ratio checks for a service voltage above 750 V.

b) In instances where transformer ratio checks cannot be conducted or where test results cannot readily confirm the actual ratio of a transformer, at the time of the test, objective evidence is to be provided that verifies the actual ratio being used for billing purposes. Transformer ratio check results obtained by means of a pre-installation test are acceptable (i.e. results from using a ratio meter).

8.0 Decisions documented and actions based on the results of the installation inspection

The accredited organizations must rate the results as:

a) installation inspected and verified

b) installation inspected and rejected with reasons for the rejection

The accredited organization must then:

c) affix a verification sticker when all the conditions of the inspection have been deemed satisfactory without an adjustment to billing

d) tag, and leave as found, a rejected installation pending a dispute investigation

e) contact Measurement Canada for dispute investigation when required as per section 6.0

9.0 Access to billing information

Accredited clients accessing proprietary billing information, as per sections 20 and 21 of the Electricity and Gas Inspection Act, must commit to treating this information as confidential.

10.0 Acceptability of an accredited client to perform electricity installation inspections across Canada

There are no restrictions to performing electricity installation inspections across Canada.
11.0 Measuring and test equipment

a) The inspection of electrical installations may require the use of several pieces of equipment. What follows is a list of typical equipment that is to be covered by the measuring equipment requirement, for accreditation purposes. The list is not exhaustive and is only intended as a guide:

- circuit analyzers
- voltmeters
- ammeters
- instrument transformers
- multifunction meters (volts, amps, watts)
- pulse counters
- ratio meters

b) Measuring equipment must be traceable to Canadian national standards and must be calibrated at least once per year. Where no traceability to national standards can be provided for a specific type of measuring equipment, a process to ensure the control and periodic checks of the said equipment against a check standard of known error must be established and documented.

c) See guidance under ISO 10012: 2003—Measurement management systems—Requirements for measurement processes and measuring equipment.

12.0 Training

The minimum acceptable qualifications of those performing the work are the following:

a) knowledge of Measurement Canada’s requirements for installation inspections
b) knowledge of documentation that applies to installation inspections (e.g. procedures, forms and records)

The competencies of the individuals involved must be evaluated by Measurement Canada:

- for the work they are to perform
- by means of an individual training record
- by means of certification as applicable to each province

13.0 Decision criteria

The maximum permissible error for electricity installation inspections must be based on the Electricity and Gas Inspection Regulations, section 46, Part IX, Limits of Error.

Where load conditions do not permit the establishment of an error within the applicable tolerances, the best possible error obtained is to be recorded and the reasons (i.e. load conditions) for this error being outside the acceptable tolerances must be documented in the inspection report.