Provisional Specifications

Category: **ELECTRICITY**	Provisional Specification: **PS-E-13 (rev. 1)**	Page: **1 of 7**
Document(s):	Issue Date: **2007-06-25**	Effective Date: **2007-06-25**
	Supersedes: **PS-E-13**	

Provisional Specifications for the Approval of Electronic Current Transformers

1.0 Scope

This specification applies to electronic current transformers which are intended to be used in revenue metering.

2.0 Authority

This specification is issued pursuant to subsection 12 (1) of the *Electricity and Gas Inspection Regulations*.

3.0 References

Electricity and Gas Inspection Act (R.S. 1985, c. E-4), ss. 9(4).

Electricity and Gas Inspection Regulations (SOR/86-13), ss. 12(1).

Measurement Canada, LMB-EG-07: Specifications for the Approval of Type of Electricity Meters, Instrument Transformers, and Auxiliary Devices.

International Electrotechnical Commission, 60044-8.

CAN-CSA 60044-1, Instrument Transformers Part 1: Current Transformers

CAN-CSA 60044-8, Instrument Transformers Part 8: Electronic Current Transformers

4.0 Terminology

The following terminology is in addition to definitions established in LMB-EG-07:

Electronic Instrument Transformer (EIT)
An arrangement consisting of one or more current or voltage sensor(s) which may be connected to transmitting systems and secondary converters, all intended to transmit a measuring quantity in a proportional quantity to supply measuring instruments, metering devices.

Electronic Current Transformer (ECT)
An EIT in which the secondary current in normal conditions of use is substantially proportional to the primary current and differs in phase from it by a known angle for an appropriate direction of the connections.

Note: The terms “measuring current transformer” and “metering current transformer” are equivalent.

5.0 General Requirements

Electronic current transformers shall comply with all applicable requirements established in section 3 of LMB-EG-07 in addition to the requirements specified in this document.

6.0 Ratings

6.1 Rated primary current

Ratings shall be those established in section 14-3.4 of LMB-EG-07.

6.2 Rated secondary outputs

Analog Output
The preferred value of rated secondary low output is 4 V for both phase-to-phase and phase-to-ground measurement systems. ECT having a high energy analog output with 5A or 1A output standard shall do so in accordance with tables A and B.

Digital Output
The digital output of the ECT shall be in accordance to clause 5.3 of IEC 60044-8.

6.3 Rated Burden

The value of rated burden is a resistive burden of 5kΩ in parallel with 5 nF for secondary output of 4 V. The value of rated burden in table A shall be applicable for secondary current of 5 A. For ECT having secondary output of 1 A, the burden specified in table B shall be applicable.

Table A

Burdens for Current Transformers with 5 A Rated Secondary Output

Standard Burden Designation	Characteristics		Characteristics for 60 Hz and 5 A Secondary Current		
	Resistance Ω	Inductance, mH	Impedance Ω	V●A	Power Factor
E-0.04	0.04	0	0.04	1	1.0
E-0.2	0.02	0	0.2	5	1.0
B0.1	0.09	0.116	0.1	2.5	0.9
B0.2	0.18	0.232	0.2	5.0	0.9
B0.5	0.45	0.580	0.5	12.5	0.9
B0.9	0.81	1.044	0.9	22.5	0.9
B1.8	1.62	2.088	1.8	45.0	0.9

Table B

Burdens for Current Transformers with 1 A Rated Secondary Output

Standard Burden Designation	Characteristics		Characteristics for 60 Hz and 1 A Secondary Current		
	Resistance Ω	Inductance, mH	Impedance Ω	V●A	Power Factor
E-0.01	0.25	0.0	0.25	0.25	1.0
E-0.04	1	0.0	1.0	1	1.0
E-0.2	5	0.0	5.0	5	1.0
B0.1	2.25	2.9	2.5	2.5	0.9
B0.2	4.5	5.8	5.0	5.0	0.9
B0.5	11.25	14.5	12.5	12.5	0.9
B0.9	20.25	26.1	22.5	22.5	0.9
B1.8	40.5	52.2	45.0	45.0	0.9

Note: Standard “E” burdens are for use with electronic meters

7.0 Electrical Requirements

ECT shall meet the insulation requirements established in section 14-3.2.1 of LMB-EG-07. The rated insulation level of a primary winding of a current transformer shall be based on its highest voltage for equipment U_m. For a current transformer without primary winding and without primary insulation of its own, the value U_m = 0,72 kV is assumed.

ECT shall meet the requirements of clause 6.1.2 of IEC 60044-8 for limits of temperature rise.

8.0 Marking Requirements

8.1 Terminals

The terminals shall be identified as established in section 14-3.3.1 of LMB-EG-07.

8.2 Relative polarities

All terminals marked H1, X1, Y1 shall have the same polarity at the same instant.

8.3 Nameplate

Nameplates shall include all applicable information as established in section 14-3.3.2 of LMB-EG-07. Nameplates shall be positioned as stated in section 14-3.3.2.1 of LMB-EG-07.

9.0 Metrological Requirements

9.1 Basic Accuracy

The ECT shall comply with the accuracy requirements established in Table C and Figures 1 and 2 for the accuracy class in which it is designated.

9.2 Accuracy versus Temperature

The ECT shall comply with its accuracy designation in Table C and Figures 1 and 2 when tested according to clause 8.9.3 of IEC 60044-8.

9.3 Accuracy versus Frequency

The ECT shall comply with its accuracy designation in Table C and Figures 1 and 2 when tested according to clause 8.9.4 of IEC 60044-8.

9.4 Accuracy versus Auxiliary Voltage Variation

The ECT shall comply with its accuracy designation in Table C and Figures 1 and 2 when its auxiliary voltage is varied ±10% from the nominal AC auxiliary voltage; and when varied ±20% from the nominal DC auxiliary voltage.

10.0 Sealing Requirements

10.1 Programming security

The basic operating/metering constants and the algorithm used in processing the measured quantities shall be stored within the ECT in such manner that they cannot be altered by any external device, communication signal, power outage or any other means which does not require breaking the device's physical seal (Clause 3.2.6 - LMB-EG-07).

11.0 Accuracy Class Limits of Error

Table C

Accuracy Classes and Corresponding Limits of Transformer Correction Factors for Measuring Current Transformers (see Figures 1 and 2)

Measuring Accuracy Classes	Limits of Transformer Correction Factor						Limits of Power Factor (Lag) of Metered Power Load
	100% Rated Current (see note)		10% Rated Current		5% Rated Current		
0.15	0.9985	1.0015	N/A	N/A	0.997	1.003	0.6-1
0.3	0.997	1.003	0.994	1.006	N/A	N/A	0.6-1
0.6	0.994	1.006	0.988	1.012	N/A	N/A	0.6-1

Note: These limits also apply at the maximum continuous current rating factor (RF)

12.0 Revision

The purpose of revision 1 is to correct the information in Tables A & B of the original Provisional Specification that was effective 2006-02-06.

Figure 1 - Limits of the 0.3 and 0.6 Accuracy Classes for Measuring Current Transformers

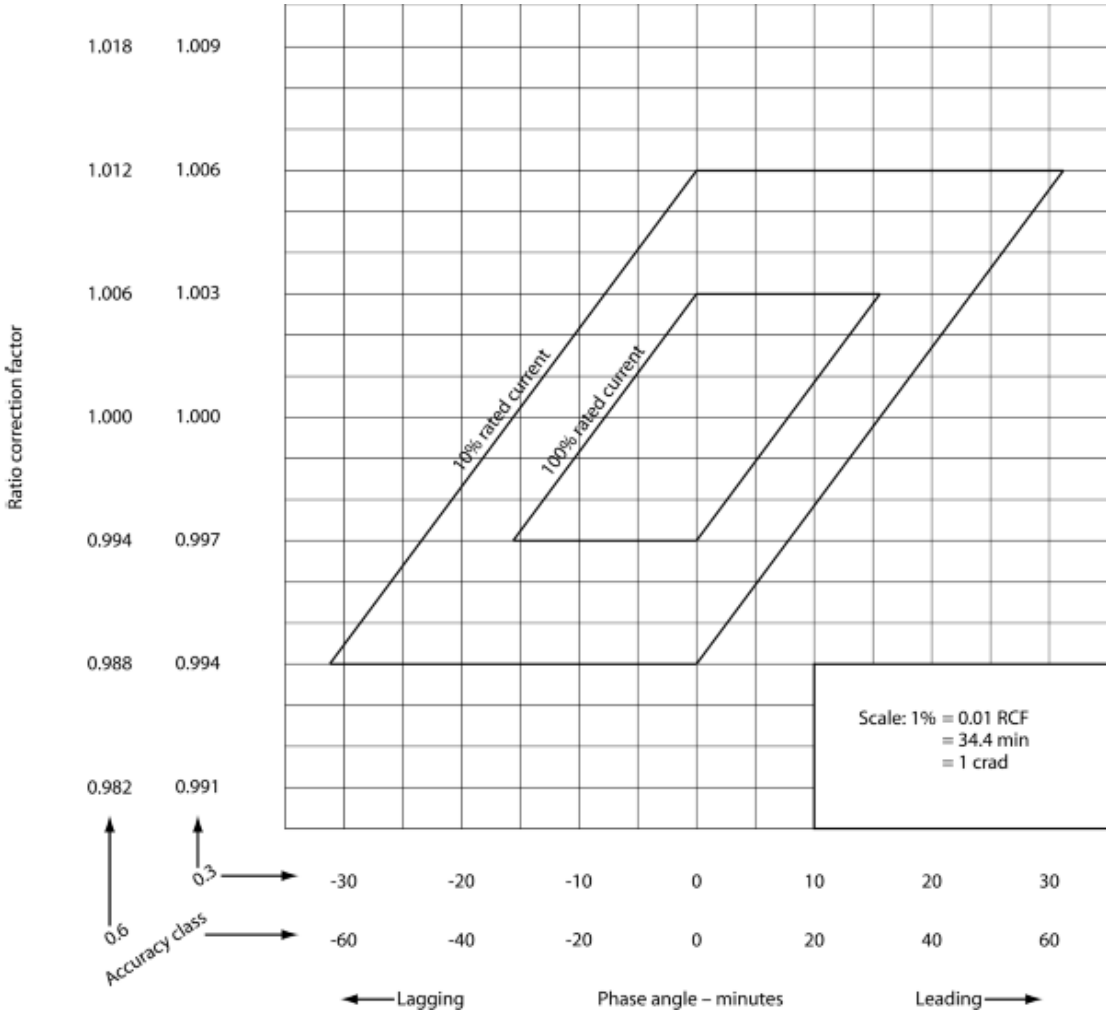

Figure 2 - Limits of the 0.15 Accuracy Class for Measuring Current Transformers