



# Thermal Energy Meter Type Approval in Canada

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Government of Canada

September 20, 2023

# Presentation Outline

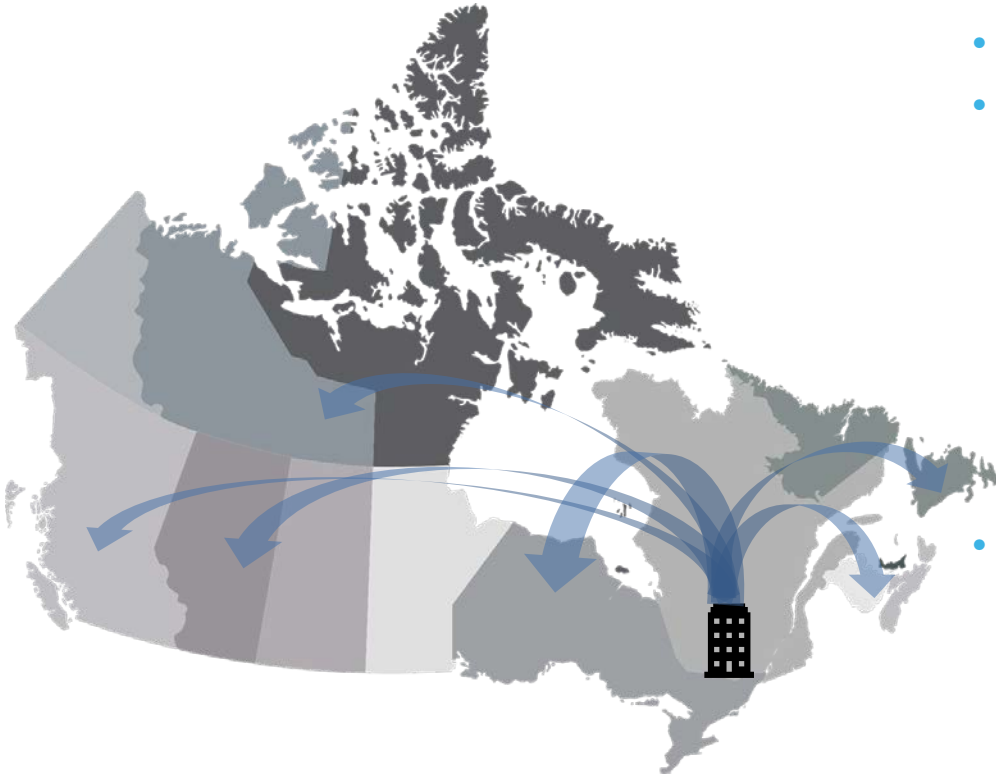
- I. Legal Metrology Framework in Canada
- II. Type Approval Process
- III. Examination Program
- IV. Timeline of TEM Type Approvals
- V. Questions and Answers

# I. Legal Metrology Framework in Canada

# Legal Metrology Framework in Canada

- Measurement Canada (MC) ensure the integrity and accuracy of trade measurement in Canada (**Legal Metrology**)
  - MC operates as an agency of the department of Innovation, Science and Economic Development (ISED) within the Government of Canada (GoC)  
<https://ised-isde.canada.ca/site/measurement-canada/en>
- MC's principal responsibilities include:
  - Developing, maintaining and enforcing the laws for measurement accuracy;
  - Type approval of measuring and metering devices before their use in trade; and
  - Examination and complaint investigation of measuring and metering devices used in trade.
- The National Research Council of Canada (NRC) is officially designated as the **National Metrology Institute (NMI)** for scientific metrology in Canada.

# Legal Metrology Framework in Canada



- MC has over 300 employees across Canada.
- The calibrations and type approval laboratories are located in the nation's capital of Ottawa.
  - Group comprised of around 50 Metrologists, Scientists and Engineers.
  - Disciplines: electricity, gas flow, mass, linear, gas pressure, thermometry and liquid volume.
- The Volume Laboratory team of 7 oversees the type approval of all liquid measuring devices including thermal energy meter (TEM).

# Legal Metrology Framework in Canada

- To support harmonization and the reduction of trade barriers, TEM type approval requirements are aligned with the international legal metrology community.
  - The main differences are in MC's approach to marking and sealing the meters which must meet existing Canadian regulations.
- EN 1434 is adopted as a national standard by the Canadian Standards Association as **CSA C900**.
- MC legislation does not presently allow for adoption of a standard directly as regulations, therefore:
  - Type approval is conditionally granted under Ministerial powers through the Terms and conditions for the approval of thermal energy meters

<https://ised-isde.canada.ca/site/measurement-canada/en/laws-and-requirements/terms-and-conditions-approval-thermal-energy-meters>

# Legal Metrology Framework in Canada

- Canada remains removed from the European Union's Measurement Instrument Directive (MID) with no formal Mutual Recognition Arrangements (MRA) in place.
  - Under MC's mandate and for the protection of Canadian consumers and businesses, we must ensure due diligence of verification and validation of any testing data from external sources.
- Canada is a **utilizer** of the OIML-CS (including for OIML R75), with some conditions:
  - MC does not accept test results or evaluation reports performed or issued by Manufacturers Test Laboratories (MTLs).
  - MC will only accept the OIML-CS type evaluation/test reports as part of the evaluation of a device against national requirements for the issuing of a Notice of Approval.

# Legal Metrology Framework in Canada

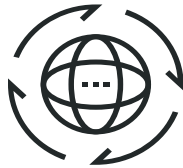
- For measuring devices in general, in order to be legal for trade in the Canadian marketplace it must be:



Evaluated/tested and type approved (Performed by MC)



Initially examined and certified (By MC or Authorized Service Providers)





Re-examined at prescribed frequencies as applicable (By MC or Authorized Service Providers)



# II. Type Approval Process

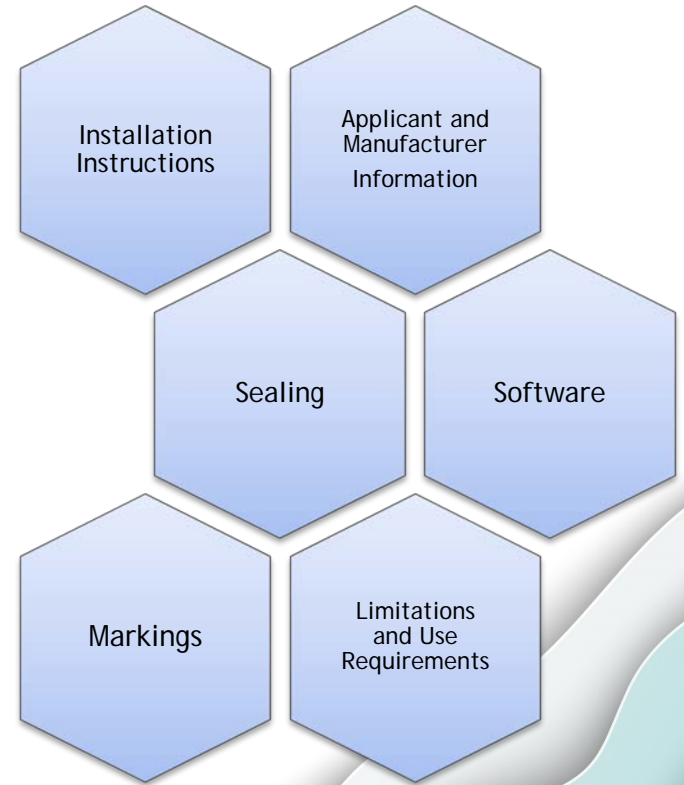
# Type Approval Process

- To be used in trade in Canada, a TEM must have a type approval.
- After being evaluated/tested and found to meet the requirements under the Terms and Conditions (T&C) and applicable regulations, a **Notice of Approval (NoA)** is issued.
- Until the T&C are made into regulations, type approvals remains “Conditional”.
  - GEN-04 Policy on the conditional approval of devices  
<https://ised-isde.canada.ca/site/measurement-canada/en/laws-and-requirements/gen-04-policy-conditional-approval-devices>

 Innovation, Science and Economic Development Canada Innovation, Sciences et Développement économique Canada		APPROVAL No. / N° D'APPROBATION AV- [REDACTED]	
<b>NOTICE OF CONDITIONAL APPROVAL</b>		<b>AVIS D'APPROBATION CONDITIONNELLE</b>	
Issued by statutory authority of the Minister of Industry (styled Innovation, Science and Economic Development) for the following device model(s):		Émis en vertu du pouvoir statutaire du ministre de l'industrie (dénommé Innovation, Sciences et Développement économique) pour le(s) modèle(s) d'instrument suivant(s) :	
<b>TYPE OF DEVICE</b>		<b>TYPE D'APPAREIL</b>	
Thermal Energy Meter		Compteur d'énergie thermique	
<b>APPLICANT</b>	[REDACTED]	<b>REQUÉRANT</b>	
<b>MANUFACTURER</b>	[REDACTED]	<b>FABRICANT</b>	
<b>MODEL(S)   MODÈLE(S)</b>			
Flow sensor :   Capteur de débit :		[REDACTED]	
Calculator :   Calculateur :			
Temperature sensor pair :   Paire de sondes de température :			
		1 of   de 22	Project :   Projet : AP-AV- [REDACTED]

# Type Approval Process

- The NoA must be bilingual (English and French) and contain information relevant to the device and its components.
- It is not meant to be an installation or user manual, but a tool to:
  - Identify the design, composition, construction of the approved meter.
  - Enable inspectors to extract the information required for examination (e.g. software version).



# Type Approval Process

The approval strategy is detailed in Policy Bulletin T-1—Approval of thermal energy meters  
<https://ised-isde.canada.ca/site/measurement-canada/en/bulletin-t-1-approval-thermal-energy-meters>

Step 1. Through preliminary testing, verify that your device can meet Canadian requirements.

Step 2. Gather the required information and documentation as per section 5.0 of bulletin T-1.

Step 3. Submit an approval application.

Terms and conditions for the approval of thermal energy meters

<https://ised-isde.canada.ca/site/measurement-canada/en/laws-and-requirements/terms-and-conditions-approval-thermal-energy-meters>

Apply for a type approval

<https://ised-isde.canada.ca/site/measurement-canada/en/type-approval/apply-type-approval-volumetric-liquid-measuring-devices-or-auxiliary-device>

# Type Approval Process

Step 4. A Metrologist will be assigned to your project and establish contact.

Step 5. The Metrologist will thoroughly review the documentation and a test plan will be developed (as required).

Step 6. Testing (see next slide).

# Type Approval Process

Step 6. If testing is required, any combination of the following options can be used:

- Testing performed at MC facilities.
  - Current scope is limited to influence factor testing (CSA C900 section 7.4 to 7.7).
- A complete set of test results from an evaluating body (e.g. MID)
  - MC does not accept test results from the manufacturer's test facility unless MC witnessed the tests.
- A recognized test facility listed in bulletin T-1 can perform the tests and submit the test results to MC.
- MC can witness the tests at a test facility chosen by the applicant, including the manufacturer's own facility.
  - Only an MC employee can act as witness at this time. There are currently no MRA to allow for other jurisdictions to witness test on MC's behalf.

# Type Approval Process

Step 7. Notice of Approval will be drafted and sent to you for final review

Step 8. NoA will be signed and posted on the Measurement Canada website

Step 9. Any subsequent metrological changes to the TEM may require a revision to the NoA or a Modification Acceptance Letter (MAL)

**GEN-26—Modifications to approved weighing and measuring devices and electricity and gas meters**

<https://ised-isde.canada.ca/site/measurement-canada/en/laws-and-requirements/gen-26-modifications-approved-weighing-and-measuring-devices-and-electricity-and-gas-meters>

# III. Examination Program



# Examination Program

- Now that the TEM is approved, it can be installed, examined and certified accordingly.
  - Bulletin T-2—Implementation of thermal energy meter requirements  
<https://ised-isde.canada.ca/site/measurement-canada/en/bulletin-t-2-implementation-thermal-energy-meter-requirements>
- There is no possibility of sampling, each TEM must be examined and certified.
- An examination consists of:
  - Ensuring the installed TEM corresponds to the NoA; and
  - Verification of the installation as per Manufacturer's and NoA's instructions.
- TEM can only be examined by a MC inspector at this time.

# Examination Program

- Coming into force of TEM program:
  - As of **July 1, 2019**, all newly installed TEM used in trade must be approved, examined and certified.
  - As of **January 1, 2028**, all unapproved and unexamined TEM will no longer be allowed to be used in trade.
    - Some exemptions are possible under special circumstances, see section 4.4 of bulletin T-2.
- TEM are not subject to periodic re-examinations.
- MC is currently developing alternative service delivery programs, including the registration and accreditation of authorized service providers to perform examinations and certifications.

# Examination Program

Current challenges faced by the inspectorate:

- The vast majority of TEM are installed inside Fan Coil Units (FCUs) for submetering within multi-family residential buildings.
- Installations are difficult to access (private dwellings) and require occupant's consent to enter.
- Very large number of devices have been installed in large city centers such as Vancouver, Toronto and Montreal since 2019.



# IV. Timeline of TEM Type Approvals

# Timeline of TEM Type Approvals



- MC consulted with stakeholders to complete the **Thermal Energy Trade Sector Review**, key recommendations included:
  - Type approval for all devices;
  - Harmonize approval requirements with OIML; and
  - Implement recognition program for test results.

# Timeline of TEM Type Approvals



- Senior Program Officer dedicated to Thermal Energy was hired and began work on the policy program.
  - Released TEM T&C;
  - Released Bulletin V-30 - Pilot program for the approval of TEM
    - Approval applications could be submitted as of April 3, 2018 to be part of the pilot program.
- Engineering did a gap analysis of existing test equipment and future needs. Retrofitted water testing system with immersion heater and insulation. Prepared the supporting tools including test procedures, approval guide and spreadsheet.

# Timeline of TEM Type Approvals



- Travelled to Europe to visit NMIs, Notified Bodies and manufacturers to expand MC's TEM knowledge and to develop our own internal expertise;
- Scoped out test facilities to be recognized for accepting results;
- Witnessed testing at manufacturers as part of the pilot project; and
- Requested official funding for procurement of a build-for-purpose TEM test rig.

# Timeline of TEM Type Approvals



- Completion of the TEM pilot project with the simultaneous release of 4 NoAs.
- Release of Bulletin T-1—Approval of TEM outlining the strategy forward, the conditions for recognition of test results and the list of recognized test facilities.
- Secured contract for procurement of TEM test rig.



# Timeline of TEM Type Approvals



- Work continues on TEM type approvals.
  - Testing being performed on-site and staff is building expertise.
  - Releasing more Notices of Approvals (current count is 17 NoAs).
- TEM test rig:
  - Building modifications initiated.
- TEM test rig received after much delays with construction and delivery due to COVID-19. Contractor assembled the test rig and provided lab staff training on its use.

# Timeline of TEM Type Approvals



# Timeline of TEM Type Approvals



- Establish uncertainty budget for newly acquired test rig.
- Adding more recognized test facility in bulletin T-1.
- Actively participate in the revision of OIML R75.
- Establish a service commitment (service standard) for TEM type approvals
  - Currently developmental
- Digitalization: New MC-wide project management software will be released (end of 2023):
  - Client portal for real-time project status updates, easier communication and enhanced document sharing capabilities.
- Legislative renewal/modernization:
  - Incorporation by reference powers to directly refer to standards such as CSA C900.
  - Using sampling framework for the examination of TEM.

# V. Questions and Answers