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## Economy Report - 2021

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### *Canada*

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## SECTION 1 – Organization and structure for metrology

### Legislative frameworks

The main federal statutes governing legal metrology are the:

- *Weights and Measures Act (R.S.C. 1985)*;
- *Electricity and Gas Inspection Act (R.S.C. 1985)*; and
- *Consumer Packaging and Labelling Act (R.S.C. 1985)*.

The government bodies responsible for the application of these acts (all part of the federal department of Innovation, Science and Economic Development Canada) update and publish the following regulations that have legal force:

- *Weights and Measures Regulations (1974)*;
- *Electricity and Gas Inspection Regulations (1986)*; and
- *Consumer Packaging and Labelling Regulations (1985)*.

Measurement Canada, an agency of Innovation, Science and Economic Development Canada, has national responsibility and authority for legal metrology activities in Canada.

### Organization structure

The agency is composed of several directorates, including the Legislative Policy and Regulatory Affairs Directorate, Program Development Directorate, Engineering and Laboratory Services Directorate and Innovative Services Directorate.

The **Legislative Policy and Regulatory Affairs Directorate** is responsible for managing legislative and regulatory policy within Measurement Canada. This includes modernizing the current Acts and their Regulations, preparing regulatory updates to be published in the *Canada Gazette*, researching, analyzing and developing policy at the organization level and managing public engagement and consultation processes for the agency.

The **Program Development Directorate** is composed of two divisions: the Weighing and Measuring Division and the Utility Metering Division. The Directorate is responsible for developing requirements, specifications and programs and establishing approaches for monitoring the marketplace in order to minimize inaccurate measurement and inequity in the trade of goods and services on the basis of measurement. It also establishes metrological policies and procedures for the approval, verification, reverification, installation and use of measuring devices, and establishes enforcement policies and marketplace monitoring programs.

The **Engineering and Laboratory Services Directorate** assists in the development of specifications and procedures, and is responsible for the approval of prototype weighing and measuring machines, as well as prototype electricity and gas meters and metering devices used in trade. It is also responsible for the calibration and certification of local measurement standards used by government and authorized service providers.

The **Innovative Services Directorate** is responsible for the development, implementation and review of alternative service delivery mechanisms. This includes the development of mutual recognition agreements with the United States (National Conference on Weights and Measures) which allows for the acceptance of test data to reduce the required testing of certain prototype devices. It is also responsible for industry accreditation and registration programs that delegate specified mandated

inspection activities to organizations (commonly known as authorized service providers) that meet Measurement Canada's requirements.

Measurement Canada fulfils its mandate through the following activities:

- implementation of a field inspection program carried out by inspection staff located in its three regions and ten districts across Canada;
- certification of measuring and test equipment;
- verification of the accuracy and appropriate usage of weighing and measuring devices used in trade;
- verification of the net quantity of commodities sold on the basis of measure;
- investigation of trade measurement complaints involving weighing and measuring devices;
- investigation of measurement disputes between buyers and sellers of electricity and natural gas;
- inspection and verification of electricity and gas meter performance;
- periodic reverification of electricity and gas meter performance; and
- on-site verifications of measuring systems.

The regions are also responsible for administering the accreditation and registration programs, including monitoring of authorized service providers.

Finally, the **Digital and Data Directorate**: Measurement Canada is moving forward with a multi-year project to update and modernize outdated systems to better support clients and internal business processes. Focussing on the Government of Canada's digital standards (e.g. client-centric and agile solution development), its systems will be upgraded and replaced with new technologies to increase the efficiency of its service delivery and to support enhanced client relations management and client services. This includes improvements in the accessibility of forms used for service enrolment, better access to information on services and regulatory requirements as well as enhanced ease of interaction with Measurement Canada's service providers.

## Use of alternate service delivery mechanisms

Alternative service delivery mechanisms are used for many inspection and certification activities that were once performed by Measurement Canada. These are described below.

### Accreditation and registration programs

Measurement Canada manages two programs that permit organizations to inspect and certify measuring devices under the authority of the *Weights and Measures Act* or the *Electricity and Gas Inspection Act*. Both these programs are available to organizations in Canada, the United States and Mexico.

The [Accreditation Program](#) was launched in 1986 for electricity and gas organizations and was expanded in 1995 to include weights and measures organizations. An accredited organization must document, establish and maintain a quality management system that meets the requirements of Measurement Canada's accreditation standard [S-A-01:2017—Criteria for the Accreditation of Organizations to Perform Inspections Pursuant to the \*Electricity and Gas Inspection Act\* and the \*Weights and Measures Act\*](#). These requirements are modelled after the ISO 9001 standard. In addition, technicians in weights and measures employed by accredited organizations must pass mandatory theoretical and practical evaluations.

Organizations accredited by Measurement Canada can carry out device inspections in most trade sectors. An accredited organization can certify any device under the scope of its accreditation, regardless of the trade sector in which the device is used. To ensure compliance with program requirements, the quality management system established by an accredited organization is subject to periodic surveillance and product audits by Measurement Canada. Surveillance audits of accredited organizations may be conducted either remotely or on site.

In 2020, Measurement Canada began assessing the level of risk of each accredited organization. When comparing the level of risk of all accredited organizations, those organizations presenting a higher level of risk are monitored more frequently than those with a lower level of risk. In 2021, Measurement Canada also began assessing the risk level for all technicians in weights and measures accredited organizations, and the technicians presenting a higher level of risk are subject to more monitoring than those with a lower level of risk.

In April 2004, the [Registration Program](#) was launched for weights and measures organizations. It authorizes organizations to inspect and certify measuring devices under the authority of the *Weights and Measures Act*. The Registration Program was initially developed and implemented at the request of stakeholders in the wholesale petroleum sector; however, it has since been expanded to include other sectors of the economy following a consensus of the stakeholders in a given trade sector. The program scope is limited to the inspection of measurement equipment used in the trade sectors identified in the Registration Program Terms and Conditions, which also stipulate the requirements to be met by organizations seeking registration. In addition, all potential recognized technicians must pass mandatory theoretical and practical evaluations by Measurement Canada prior to becoming recognized. To ensure compliance with program requirements, each registered organization is subject to periodic conformity assessment and follow-up inspections by Measurement Canada. These conformity assessments may be conducted either remotely or on site.

In 2020, Measurement Canada began assessing the level of risk of each registered organization. When comparing the level of risk of all registered organizations, those presenting a higher level of risk are monitored more frequently than those with a lower level of risk. In 2021, Measurement Canada also began assessing the risk level for all technicians in weights and measures registered organizations, and the technicians presenting a higher level of risk are subject to more monitoring than those with a lower level of risk.

### **Delegation of authority program**

In May 2003, Measurement Canada launched a [delegation of authority program](#) permitting organizations to calibrate certain measuring apparatus and test equipment used under the *Electricity and Gas Inspection Act*. The present scope of this program applies to the calibration and recertification of electricity meter calibration consoles and the calibration and certification of pressure, temperature and dimensional standards used in the natural gas sector. Program requirements are established in the document C-D-01:2017—Conditions for the Delegation of Authority for the Calibration and Certification of Measuring Apparatus and Test Equipment Pursuant to the *Electricity and Gas Inspection Act*.

### **Recognition of ISO 17025 accredited laboratories and test facilities:**

Measurement Canada offers two programs for the recognition of ISO 17025 accredited laboratories and test facilities:

- **Standards calibrations:** Document RC-01—Conditions and Administrative Requirements for the Recognition Program of Calibration Results from CLAS Laboratories sets out the conditions and requirements to be met by ISO 17025 CLAS (Calibration Laboratory Assessment Service) laboratories to have their calibration results for mass and temperature

standards recognized by Measurement Canada in order to be certified pursuant to the *Weights and Measures Act*. A CLAS laboratory is one that is certified by the National Research Council of Canada and accredited by the Standards Council of Canada.

- **Device approvals:** Document RT-01—Conditions and Administrative Requirements for the Recognition of Test Results from ISO 17025 Accredited Test Facilities sets out the conditions and requirements for the recognition by Measurement Canada of test results from facilities accredited under ISO 17025 for the testing of previously approved electricity meters, which have been modified and are being resubmitted for approval.

## International arrangements and engagement

### OIML Certification System (OIML-CS)

Measurement Canada is a signatory of the OIML-CS and currently uses the following recommendations:

Recommendation	Measuring Instrument Category	Scheme
R 60:2000	Metrological regulation for load cells	A and MAA
R 75:2002	Heat meters	A
R 76:2006	Non-automatic weighing instruments	A and MAA

Test results from acceptable issuing participants collected under these recommendations are regarded as equivalent to those that would be obtained through testing carried out by Measurement Canada. Acceptance of these test results improves the timeliness of the introduction of new measurement technologies in the Canadian marketplace and helps to reduce costs. Measurement Canada plans to explore using other recommendations to ensure that Canadian requirements are in line with international practices.

### United States/Canada Mutual Recognition Arrangement

In April 2021, Measurement Canada renewed the [United States/Canada Mutual Recognition Arrangement \(MRA\)](#) with the National Conference on Weights and Measures (NCWM). Under the MRA, a measuring device manufacturer can have a device tested by one of the countries and receive type approval under both jurisdictions. The following measuring devices are included in the MRA:

- gasoline dispensers<sup>1</sup>
- high-speed dispensers<sup>1</sup>
- electronic registers for dispensers<sup>1</sup>
- electronic computing and non-computing bench and floor scales with a capacity up to 1000 kg (2000 lb)
- weighing and load receiving elements with a capacity of up to 1000 kg (2000 lb)
- mechanical scales with a capacity of up to 10 000 kg (20 000 lb)
- electronic indicators for scales (except those that are software based)

<sup>1</sup>Must be tested in Canada.

## SECTION 2 – Key activities of 2020-21

### Regulatory modernization

As part of a government-wide initiative to modernize its regulatory regime, Measurement Canada began in 2019 to update its legislative and regulatory framework. Although this framework has served the agency and Canadians well for many years, it must be reviewed and renewed to respond to the current and future needs of Canadian industry and consumers. The Legislative Policy and Regulatory Affairs Directorate is initiating a comprehensive review of the *Weights and Measures Act* and its regulations and the *Electricity and Gas Inspection Act* and its regulations. Measurement Canada is taking a multifaceted approach which includes an internal regulatory review as well as participation in government-wide initiatives. Changes will be recommended to improve the response time for introducing new technologies and encourage innovation and progress, while maintaining a fair and competitive marketplace.

### Restructuring of service fees and service standards

Following the introduction of the [Service Fees Act](#) in 2017, Measurement Canada revised its [service standards](#) for device approvals, standards calibrations, inspections and alternative service delivery services. In keeping with the requirements of the Act, Measurement Canada must remit fees in proportion to the extent that the agency does not meet its service standards. Measurement Canada is also required to adjust its fees each year in accordance with changes in the Canadian consumer price index (CPI). Measurement Canada's service fee adjustments for 2019, 2020 and 2021 were +2.2%, +2.0% and -0.2% respectively.

### Maintenance of mandatory inspection and marketplace monitoring programs

In the past year, approximately 165,550 inspections were conducted through Measurement Canada's marketplace monitoring activities as well as mandatory inspection program in eight trade sectors: retail petroleum, retail food, dairy, wholesale petroleum, fishing, forestry, and grain and field crops. Approximately 90% of these inspections were completed by authorized service providers.

Measurement Canada's priority is to maintain the mandatory inspection program and ensure that measuring device owners are educated regarding their legal obligation to have their devices regularly inspected. This contributes to a fair, efficient and competitive marketplace by detecting and correcting measurement issues on a regular basis.

### Authorized service providers for device inspections

Measurement Canada relies heavily on the use of alternative service delivery in order to fulfill its mandate concerning measuring device inspections. As of March 31, 2021, there were 229 organizations authorized by Measurement Canada to perform inspections of mass, volume, electricity and natural gas measuring devices.

The majority of these organizations are located across Canada, but nine are located in the United States and Mexico. They are all subject to audits, conformity assessments and follow-up inspections to ensure they continue to meet the required competencies and testing protocols.

## Thermal energy meters

Measurement Canada has begun regulating the use of thermal energy meters in trade. Eight devices have been approved in the past year, mostly through an informal acceptance of test results performed to the European standard EN 1434. Measurement Canada's laboratory is building capacity to do performance testing of low flow residential meters. This equipment will also serve for reverification and complaint investigations. The number of test facilities from which Measurement Canada will accept test results is also expanding as we interact with more labs.

Inspection procedures have been written by adapting those found in standard EN 1434, even though Canada is not an official participant in the European system. Training has been developed and delivered and some inspection work has taken place, but progress has been hampered by the pandemic. An alternative service delivery mechanism is currently being developed. There are an estimated hundreds of thousands of devices in Canada, and having an alternative service delivery mechanism will be critical for proper oversight of these devices.

## Risk-based approach for establishing the frequency of ASP audits

In 2020, Measurement Canada began assessing the level of risk of each accredited and registered organization. When comparing the level of risk of all accredited and registered organizations, those organizations presenting a higher level of risk are monitored more frequently than those with a lower level of risk. In 2021, Measurement Canada also began assessing the risk level for all technicians in weights and measures of accredited and registered organizations and those technicians presenting a higher level of risk are subject to more monitoring than those with a lower level of risk.

## Learning strategy

In 2020-2021, in response to travel limitations and an increase in remote work resulting from government imposed public health measures to reduce the spread of COVID-19, Measurement Canada shifted its learning model to virtual delivery, using a Learning Management System (Moodle) to streamline and standardize its learning offerings and update existing training content. The new virtual and eLearning format is a continuation of Measurement Canada's efforts to provide legal metrologists, inspectors and authorized service providers with the skills and knowledge needed to test and certify increasingly complex and diverse measurement technologies. Measurement Canada also began the development of a Knowledge Hub, a digital, comprehensive resource to increase inspectors' access to policies, procedures, requirements and guidance when they are performing inspections in the field.

## OIML-related activities

### Electricity meters (OIML TC 12, R 46)

Measurement Canada is in the process of updating the existing specifications for electricity meter approvals, in part to adopt R 46 requirements, but also to address various other legal metrology issues pertaining to the Canadian electricity marketplace. This includes investigating the impact of harmonic content on measured values.

Harmonic content is becoming increasingly prevalent with the use of consumer electronics and power-saving appliances, and this is having an increasingly significant impact on accuracy and equity in electricity trade measurement. Traditionally, meters in Canada (and much of the world) have been assessed at sinusoidal conditions and consequently, differing meter designs and methodologies all produced similar measurement values. However, in conditions that include harmonic content, different meter designs may produce different measurement values.

TC 12 will determine how to best address this issue in a possible revision to R 46. Measurement Canada is leading the international working group developing the recommendations.

Simultaneously to OIML efforts, Measurement Canada is developing its own national requirements to provide standardization and traceability for fundamental measurement quantities and handling of processed legal units of measurement (PLUM) in modern electricity metering devices. An innovative strategy for gradual deployment based on an early voluntary adoption phase in conjunction with a flexible regulatory environmental space will allow for gathering much needed information to demonstrate full benefits for Canadian grid operators and energy consumers.

#### **Requirements for software controlled measuring instruments (OIML TC 5, D 31)**

Measurement Canada is reviewing its requirements related to software controlled measuring devices. The OIML TC 5/SC 2 Secretariat is currently revising the D 31 requirements. OIML D 31 is used as the basis for all OIML recommendation documents pertaining to the securing of software used in legal for trade measuring devices. Canada is participating in this revision process in order to ensure that Canadian requirements are in line with international practices. The focus of the current revision is the software requirements when installed on universal devices.

### **Flexibilities introduced during the COVID-19 pandemic**

#### **Risk Management Framework (RMF)**

In March 2020, as part of its efforts to modify service delivery to reduce the potential for the spread of COVID-19 and the impacts on our clients and stakeholders, Measurement Canada temporarily suspended the requirements for electricity and natural gas meter replacement and reverification. Utilities and other electricity and natural gas meter owners with meters due for replacement or reverification were encouraged to suspend the removal of meters at residences and other public places while COVID-19 reduction efforts are in place. Measurement Canada and its industry partners worked collaboratively to develop and implement a risk management framework to facilitate the replacement and reverification of meters that are more likely to create energy consumption errors for consumers, while taking into account public health measures and restrictions. As public health and safety is a top priority for Measurement Canada, meters that show a lower risk of measuring inaccurately can stay in operation rather than be subject to the usual mandatory reverification or replacement plan. However, meters that are more likely to create measurement inaccuracies or have shown signs of unreliable measurement may be subject to replacement and reverification.

The RMF was successfully used by 54 utilities across Canada to effectively prioritize their work, certify the compliance of hundreds of thousands of energy meters and helped to ensure consumer confidence in the accuracy of electricity or natural gas supplied to them.

#### **Ask me anything sessions and Micro-missions**

Inspection activities were significantly reduced for months in 2020 when Measurement Canada inspection staff were asked to work remotely as a means to support government imposed public health measures to reduce the spread of COVID-19. Virtual interactive sessions with subject matter experts in all measurement and regulatory activities were organized on a weekly basis which consisted of informal discussions on a variety of subjects and answers to any questions from participants. These sessions rapidly gained popularity, allowing staff to expand their knowledge and establish new professional networks outside of their traditional area of work. To supplement productivity, staff also participated in a series of time limited projects through micro-missions to gather information to help inform a number of existing and newer initiatives that would support Measurement Canada's modernization and risk-based efforts.



**Test console and measuring apparatus certificate extension and remote witnessing certification**

In 2020, Measurement Canada temporarily suspended enforcement of mandatory recertification requirements and has allowed electricity meter test console and gas measuring apparatus certification to be extended by requiring more frequent monitoring. When new apparatus needed to be certified, remote witnessing was used to generate certification data.

**Blanket extension of standard calibration certificates**

In 2020, Measurement Canada temporarily suspended enforcement of mandatory recertification requirements and implemented a blanket extension for many types of standards, while the extension of other standards was being assessed on a case-by-case basis until the laboratory could resume operations.

**Remote audits and conformity assessments of authorized service providers**

In 2020, Measurement Canada began conducting remote audits of accredited organizations and remote conformity assessments of registered organizations. This approach may continue for some organizations when warranted and feasible, based on risk.

## SECTION 3 – Future focus

### New initiatives planned for the next one to two years

#### LED street luminaires with adaptive control technology

Historically, street light energy usage in Canada has been estimated and cost recovery achieved through use of flat rates based on power ratings and hours of darkness (unmetered loads). Adaptive controls now allow street lighting to “adjust” to varying lighting conditions in real time thus resulting in significant energy savings for the end users. To fully benefit from both environmental and financial savings, it becomes necessary to measure the energy consumption of such luminaires. Adaptive controls incorporate embedded metrology designed to record electrical energy measurement data and to transmit data to a central management system (CMS) for the purposes of establishing a charge. The typical design of these integrated metrology devices would generally not comply with existing technical specifications. As such, Measurement Canada decided to exercise authorities delegated pursuant to the *Electricity and Gas Inspection Act* that would allow these devices to be installed and used without requiring approval, verification or sealing pursuant to Measurement Canada specified requirements. Policies will come into effect by the end of 2021.

#### Electric vehicle charging supply equipment

Measurement Canada is actively pursuing the development of technical standards to allow electric vehicle (EV) charging station operators to bill customers based on the amount of electricity consumed during the charging process. The requirements will be performance-based with a view to minimizing costs and regulatory burden for EV charging station operators, while ensuring that consumers receive accurate and reliable measurement and protection against unfair practices. The standards will also be informed by requirements developed internationally and advances and innovations in EV charging technologies. Measurement Canada is consulting with EV charging station operators, equipment manufacturers and consumers as part of the development of these technical standards.

#### Water meter consultation

Currently under the *Weights and Measures Regulations*, water meters are exempt from approval and initial inspection before they are used to determine a customer's water consumption (unlike scales, gas pumps and other measuring devices used in trade). To help the Canada achieve its climate change goals and sustain the water supply for future generations, Measurement Canada is looking into possible areas where it could help manufacturers, utilities and end users (e.g. residential home owners) support and promote water conservation through increased accurate measurement of water. Measurement Canada has launched a consultation with water meter manufacturers, water distribution utilities and water meter end users to obtain data on current water measurement approaches and water meter billing practices in the Canadian marketplace. Our goal is to ensure that water distribution utilities can use measurement to quickly identify and correct water loss in their systems, and that consumers receive accurate and reliable measurement.

#### Hydrogen as a clean fuel alternative

The Government of Canada has introduced initiatives and programs to reduce greenhouse gas emissions and to support the development and adoption of low-carbon technologies. The recently introduced Hydrogen Strategy for Canada aims to further the adoption and use of hydrogen through a number of pathways, including blending hydrogen with natural gas or using hydrogen as a gaseous energy source in industry and transportation. The blending of hydrogen with natural gas will play an important role in achieving the Government's objectives on carbon reduction. Similarly, replacing fossil fuels with hydrogen in light-duty and heavy-duty transportation plays an important role in achieving the Government's objectives. Measurement Canada is mandated to address the approval

and verification of meters and measurement technology for use in blended natural gas systems and hydrogen fuel-cell vehicle refuelling. This is a key area of concern in promoting the increased adoption of hydrogen in the Canadian marketplace. Starting now and in the coming years, Measurement Canada will be developing effective and sound programs and policies to support accurate hydrogen measurement and increased use of hydrogen.