



Legal Metrology

ACCURATE MEASUREMENT, GOOD BUSINESS, FAIR TRADE AND SAFETY

What is legal metrology?

Metrology is the science of measurement. Legal metrology provides regulations for the control of measurements and measuring instruments. Legal metrology also provides protection of public safety, the environment, consumers, traders and is critical to fair trade.

Every day, consumers, traders, government regulators and industry make decisions based on measurement results. These measurements affect economic and personal well being. From a consumer's perspective, for example, a kilogram of rice must be a kilogram and no less.

A well functioning society has confidence in all measurements, with transparency for consumers, businesses and regulators.

The government's role is to give society the means to establish confidence in measurement results so that traders and consumers can make informed decisions. This role is supported and facilitated by a sound Legal Metrology System. The diagram below shows the key parts of such a system:

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How does legal metrology help the economy?

How does legal metrology help society?

Providing confidence and trust for consumers, businesses and Government



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What does legal metrology rely on?

Legal metrology relies on the following activities:

1. establishing the law
2. supervising the law; and
3. providing traceability for measurements and measuring instruments.

Legal metrology compliments scientific and industrial measurement and supports the practical application of measurements within the community.

What does the regulatory control of measurements include?

Regulatory control includes:

- retail, wholesale, domestic, cross-border and international trade
- production of goods: agricultural and industrial
- revenue collection for tax and duties
- fees for services, such as rubbish collection or disposal and taxi metering
- utility metering: water, gas, and electricity
- contracts: tonnes of iron ore, area of land and quantity statements
- health services: temperature, radiotherapy, blood pressure, cholesterol testing, chemical and biological testing of samples
- human safety: speed surveillance and enforcement, breath analyser, toxic measurement, workplace safety
- environmental and pollution control: vehicle exhaust, carbon trading and noise
- resource control and protection: fish, minerals, oil, energy and water.



How does legal metrology help the economy?

Measurement is an important part of all societies and effective trade needs transparency and a balance of information and trust between traders and consumers.

Reducing disputes and transaction costs

Correcting bad measurement practice can be costly and time consuming to both businesses and consumers. Taking legal action against traders who break measurement laws can be equally costly. But when measurement evidence is fully supported by traceable measurements (when the measurement can be traced back to an official source) this reduces the cost and time in court. When all parties are confident that the measurement is correct, it is accepted as true. Measurements made outside the legal metrology framework are often subject to challenge and may incur costs to both industry and consumers.

Supporting trade

Having metrological control lessens any unfair commercial advantage or trade practices. This ensures that trade measuring instruments are fit for their intended purpose and meet international standards. For example, fuel dispensers at petrol stations are of an approved type and verified to make sure they deliver the correct amount of fuel to consumers.



Managing stock control and reducing fraud

Traceable measurements provide a framework for reliable stock control, the reduction of fraud, and efficient stock management systems.

Rice production

The high costs associated with land use in the production of rice have resulted in more farmers disputing the measurements made in relation to wholesaler purchases of their crop.

By using approved, verified and sealed rice moisture meters and weighing instruments, this restores confidence and reduces conflict.

Collecting government revenue

Governments collect revenue through excise and taxes based on measurement. These include excise duties on products produced, sold, imported and exported. Legal metrology ensures a fair payment of tax for both government and business.

The sale by measure of bulk commodities can be a significant component of both export and national income particularly in products such as timber, rice, coffee, palm oil, coal, iron-ore, gold, gems and natural gas.



Reducing technical barriers to trade

A formal legal metrology system which is in accordance with internationally accepted requirements promotes confidence and clarity of measurement. This reduces barriers to trade and can assist developing economies to participate more fully in the global trading system and support their national economic development. Good legal metrology practice can help avoid unnecessary barriers to trade in the preparation, adoption and application of technical regulations, standards and conformity assessment procedures.

Promoting good governance

A range of government regulations cover areas such as environmental management, occupational health and safety, traffic control, and air traffic control. Good legislation includes early consideration of the benefits and use of legal metrology.

How does legal metrology help society?



Reducing deaths and injuries

Legal metrology can significantly reduce accidents by changing peoples' behaviour, providing early warning signals and delivering effective enforcement of safety requirements. Public trust in accurate measurement in road traffic enforcement encourages respect for and compliance with traffic laws.

Reduction of road traffic accidents is a key social goal for all governments. An important part of this is law enforcement agencies being able to accurately measure a vehicle's speed and weight, and/or a driver's alcohol consumption and that the public trust these measurements.

Studies in the European Union found that improving enforcement of current laws could reduce the number of road traffic deaths and serious injuries by an estimated 50%.

Reduction of the economic, social and emotional costs of road deaths and serious injuries is a critical area of concern for both developing and developed economies within the Asia Pacific region.

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Improving health

Legal metrology provides significant economic and social benefits in medicine and health. Accurate calibration of medical instruments supports precise and correct diagnosis of disease. Chemical and biological testing is used to make decision about food quality and medical diagnosis. Through certified reference materials legal metrology provides confidence in these results.



Training

Measurement competence is increased by delivering training programs in:

- calibration
- measurement uncertainty
- analytical method of validation; and
- verification test procedures.

Training programs in new and developing areas of metrology provide opportunities to model best practice in areas such as coordinate measurement machines and nano technologies.

The measurement of a patient's blood pressure using a sphygmomanometer is a routine procedure carried out in most doctors' surgeries and hospitals.

Blood pressure measurement is used as a diagnostic tool, but is subject to considerable inaccuracy. Several studies have shown that the test equipment can be inaccurate and is prone to user variation.

The majority of patients receive the correct treatment but the potential for incorrect diagnosis resulting in mistreatment exists without proper measurement control.

An international study found that for each \$1 spent on regular periodic inspections, \$11.40 of non-complying measurement was corrected. See the Birch report, page 29: http://www.oiml.org/publications/birch_study.html

Protecting the environment

Monitoring the environment is becoming increasingly important. Decisions made by governments affecting the environment require the support of accurate traceable measurement. These decisions impact how we live and include:

- control of fishery resources
- monitoring crowd noise at major events, aircraft noise and industrial noise
- accurate water, air and soil testing for pollutants, heavy metals, poisons and pesticide residues
- identification of poisons in the environment.

Increasing populations within the Asia Pacific region has resulted in the increasing need for staple foods. This has the potential to result in over-use and over-grazing of limited and fragile land resources.

Legal metrology assists governments and communities to maintain soil quality and limit degradation of soil integrity by measuring and controlling the effects associated with agriculture and grazing of livestock.

About APLMF

The Asia-Pacific Legal Metrology Forum (APLMF) is a grouping of legal metrology authorities in the Asia-Pacific Economic Cooperation (APEC) economies and other economies on the Pacific Rim, whose objective is the development of legal metrology and the promotion of free and open trade in the region through the harmonisation and removal of technical or administrative barriers to trade in the field of legal metrology.

For more information on the work of APLMF, visit www.aplmf.org

About APEC

Asia-Pacific Economic Cooperation (APEC) is a forum for 21 Pacific Rim countries or regions to discuss the regional economy, cooperation, trade and investment. The membership is claimed to account for approximately 41% of the world's population, approximately 56% of world GDP and about 49% of world trade.

For more information, visit www.apec.org

Legal metrology in our economy