

Briefing on Implementation of the Legal Metrology Act

to the Portfolio Committee on Trade and Industry

By the dtic, the National Regulator for Compulsory Specifications (NRCS) and the National Metrology Institute of South Africa (NMISA)

21 October 2020



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Delegation

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Abbreviations

BIPM	-	International Bureau of Weights and Measures
SABS	–	South African Bureau of Standards
NRCS	–	National Regulator for Compulsory Specifications
NMISA	–	National Metrology Institute of South Africa
SADC	–	Southern African Development Community
NLMI	-	National Legal Metrology Institute
NMS	–	National Measurement Standard
OIML	-	International Organization of Legal Metrology
SANS	–	South African National Standard
TI	–	Technical Infrastructure
Verification	-	ensures that measuring instruments performs within tolerable error limits

Overview by the dtic

- In keeping with its strategy of continuously improving the work of the national Technical Infrastructure or Quality Infrastructure System, Government promulgated the Legal Metrology Act, Act 9 in 2014.
- The Act was developed and published at a time when budgets for Government entities were on an upward trend year after year.
- Since then, Government finances have come increasingly under pressure and budgets for the Technical Infrastructure entities have seen regular cuts. In the current financial year, 2020/2021 the NRCS budget has been cut by 11%. NMISA saw a cut of 10%.
- Decreasing budgets require that programmes are run much more efficiently. Therefore the department is considering strengthening, consolidating and merging some of the programmes of the Technical Infrastructure focus area.

Historical Overview

- The Weights and Measures Act of 1922 was the first *national legislation* concerned with weights and measures – quantifying such products as wheat, rice and salt in pounds and measuring land sizes in morgens. The 1922 Act was based on the Imperial systems using English and Dutch units of measurements, e.g. pounds.
- The Trade Metrology Act of 1973 introduced uniformity throughout the country based on the metric system. The focus of the Trade Metrology Act was consumer trade goods including pre-packaged goods, goods sold by mass, volume or length.
- The 1973 Act was administered by the Department of Trade and Industry itself, there were 15 regional offices.
- In 1991 the whole Trade Metrology Department was moved to the SABS.
- In discharging this duty, the SABS was supported by over 125 independent verification laboratories.
- In 2008, the Trade Metrology business unit moved to the newly formed NRCS.
- In 2014 the Trade Metrology act was repealed.
- The replacement Act, the Legal Metrology Act, Act 9 of 2014 substantially expanded the scope beyond consumer goods.

Contextual Overview

- Legal Metrology is that part of metrology that focus on regulatory requirements placed on measurements and measuring instruments. The aim is to provide confidence that instruments and measurement methods used for health, public safety, consumer trading scales and taxation based on quantifying scales are all functioning within their allowed tolerances.
- Metrology is the science of measurement. There are 3 parts to metrology: scientific/technology, industrial and legal metrology. The hallmark of metrology is sophisticated calibration laboratories and technology development. NMISA is the custodian of scientific and industrial metrology in the country. However, even modern day legal metrology requires sophisticated calibration laboratories and advanced (research) scientists to be effective.
- The essence of legal metrology activities is: approving measuring instruments (type approval), calibrations, verifications and market surveillance inspections. The aim of the 2014 Act was that the department on advise of the NRCS will develop legal metrology technical regulations that the Minister gazettes in areas including health, transport and environment provided a need exist. Due to budgetary and other constraints there has not been any new legal metrology technical regulations since 2014.
- The NRCS will explain their legal metrology work, then followed by NMISA.

NATIONAL REGULATOR FOR COMPULSORY SPECIFICATIONS (NRCS)



NRCS
National Regulatory Commission
for Compulsory Specifications

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(He-2016 National Council of Chiefs, 2017-2021)

(He-2016 National Council of Chiefs, 2017-2021)

Mandate of NRCS

The National Regulator for Compulsory Specifications (NRCS) administers 3 Acts:

The National Regulator for Compulsory Specifications Act, 2008 (Act No. 5 of 2008), - established the NRCS to promote public health and safety, environmental protection and fair trade through the administration, maintenance and enforcement of Technical Regulations and Compulsory Specifications.

Role: to develop Compulsory Specifications and Technical Regulations and enforce compliance of regulated products that fall within these categories: Chemicals, Materials and Mechanical, Electro-technical, Food and Associated Industry, and Automotive Industry.

The Legal Metrology Act, 2014 (Act No. 9 of 2014), - strengthens enforcement of metrology, protects consumers against short measure.

National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977), - its purpose is to: promote uniformity in the law relating to the erection of buildings, for the prescribing of building standards, require that building be approved by local authorities prior to erection, require local authorities to employ building control officers, establishes an appeal mechanism against decisions of local authorities.

Contents

- ❑ Legal Metrology Function
- ❑ Progress in the Implementation of the Legal Metrology Act
- ❑ Future Plans
- ❑ Challenges and Recommendations

Legal Metrology Function

- ❑ Legal Metrology involves the legislated use of metrology (through Technical Regulations) to ensure that fair weights and measures are applied in both national as well as import and export trade.
- ❑ Before 2014, the unit primarily dealt with trade metrology. Now also responsible for metrology in areas of health, safety and the environment.
- ❑ Typical activities in this field include the type approval of measuring instruments used in trade (e.g. retail scales, fuel pumps), and their ongoing verification, the inspection of measuring instruments and prepackages and the application of sanctions in cases of non-compliance with legislation as well as the calibration of measurement standards used by the regulator and industry.
- ❑ Model regulations for measuring instruments and prepackages used in legal metrology are developed by the International Organisation of Legal Metrology (OIML) and are adopted nationally, usually through the national standards body (SABS).

Regulatory Process of the Legal Metrology

OIML

- Intergovernmental Treaty Organisation
- Legal Metrology harmonisation that underpin and facilitate trade

NRCS

- Legal Metrology Act, Act 9 of 2014
- Promote fair trade and to protect public health and safety and the environment

NRCS & SABS

- Development of South African Standards
- Development of Technical Regulations

Manufacturers Importers Consumers

- Approved measuring instruments (MI)
- Ongoing verification of MI
- Control of persons responsible for repair of MI
- Control of pre-packages
- Application of Sanctions in cases of non-compliance
- Calibration of verification standards

Maintain Legal Metrology technical regulations

Weighbridges used by Road Traffic Law Enforcement (Safety)

- Interim requirements approved and being implemented;
- NRCS in process to approve all existing instruments;
- Designation for repair and verification body is available in this area.

Automatic Instruments for Weighing Road Vehicles in motion. In motion weighbridges (Safety and Trade)

- Draft interim requirements comments received from industry on August 2018;
- NRCS in process of addressing comments;
- The international technical document is also under OIML revision and NRCS will consider the new requirements in the development of interim requirements for these instruments in SA.

Electric Meters (Trade)

- Interim requirements circulated internally on 23 July 2020 for comments.

Gas Meters (Trade)

- Interim requirements approved and being implemented.
- NRCS to implement approval process as well as requirements for designation of repair and verification bodies.

Administer Legal Metrology technical regulations

Open Road Tolling (e tolls) (Trade)

- Interim requirements approved and being implemented;
- Approval process for these instrument in place;
- Designated repair and verification bodies are available in this area.

Evidential Breath Analyzers (Safety)

- Interim requirements approved;
- NRCS implementing the interim requirements;
- MOU in progress with NMISA to verify these instruments;
- Interim requirements approved and being implemented.

Average Speed Over Distance (Safety)

- NRCS ready to receive applications for approval.
- NRCS to develop modalities for repair and verification laboratories in co-operation with SANAS.

Speed Measuring Devices (Safety)

- NRCS in the process of developing interim requirements in process.
- First working draft circulated in December 2019.

Administer Legal Metrology technical regulations

**Multidimensional
Measuring Instrument**
(used to measure
volume of boxes for
courier purposes)
(Trade)

- Interim requirements approved and being implemented.
- NRCS to implement approval process as well as requirements for designation of repair and verification bodies.

**Evidential Breath
Analyzers**
(Safety)

- Interim requirements approved and being implemented;
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**Average Speed Over
Distance - Speed**
(Safety)

- Interim requirements approved and being implemented;
- NRCS ready to receive applications for approval;
- NRCS to develop modalities for repair and verification laboratories in co-operation with SANAS.

**Speed Measuring
Devices (Safety)**

- NRCS in the process of developing interim requirements.
- Draft interim requirements circulated to members of the working group in December 2019 for comments.

Implementation of the Legal Metrology Act

- ❑ **Control the repair/ verification of measuring instruments**
 - ❑ Laboratories that conduct repair and verification work on behalf of NRCS Legal Metrology has been designated in line with the requirements of Legal Metrology Act and Regulations.
 - ❑ The designation took all government imperatives into consideration
 - ❑ BBBEE, Tax Certificate, Letter of Good Standing, etc.
 - ❑ Applications received from 98 verification bodies and 87 repair bodies.
 - ❑ Names of designated bodies are published on NRCS website.
- ❑ Co-ordinate, interact and manage the international, regional and bilateral interactions with other institutes responsible for legal metrology.

Future Plans – Technical Regulations

- ☐ Registration of manufacturers and importers.
- ☐ Interim Requirements for infrared thermometers.
- ☐ Environmental measurements -
 - ☐ Ionising radiation measurements/ dosimetry;
 - ☐ Collaboration with National Nuclear Regulator; and
 - ☐ Pollution measurements.
- ☐ Development of national standards by SABS based on OIML model regulations/ SADCMEEL requirements.



Challenges and Recommendations

☐ **Funding to support implementation of the extended scope**

- ☐ The NRCS developed a three year implementation plan with budget requirements in support of the implementation of the Legal Metrology Act and Regulations.
- ☐ Request for funding submitted to thedtic and no additional funding has been allocated.
- ☐ The NRCS to use retained surplus to gradually capacitate Legal Metrology.

☐ **Technical Regulations development timeframes between thedtic, NRCS and Industries**

- ☐ Technical Regulations taking long to be finalised hampering the implementation.

☐ **Legal Metrology Laboratories**

☐ **Identified areas of concern**

- Vibrations hampering measurements even with the use of anti-vibrating tables.
- Environmental conditioning of laboratory $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$ that cannot be realised.
- Air drafts > leading to unstable measuring instruments.

• **Improvements made to date**

- Installation of back-up generators where the laboratories are situated.
- To be completed in two months.
- Refurbishment of NRCS offices in Pretoria to be done during the next 18 months.

NATIONAL METROLOGY INSTITUTE OF SOUTH AFRICA (NMISA)



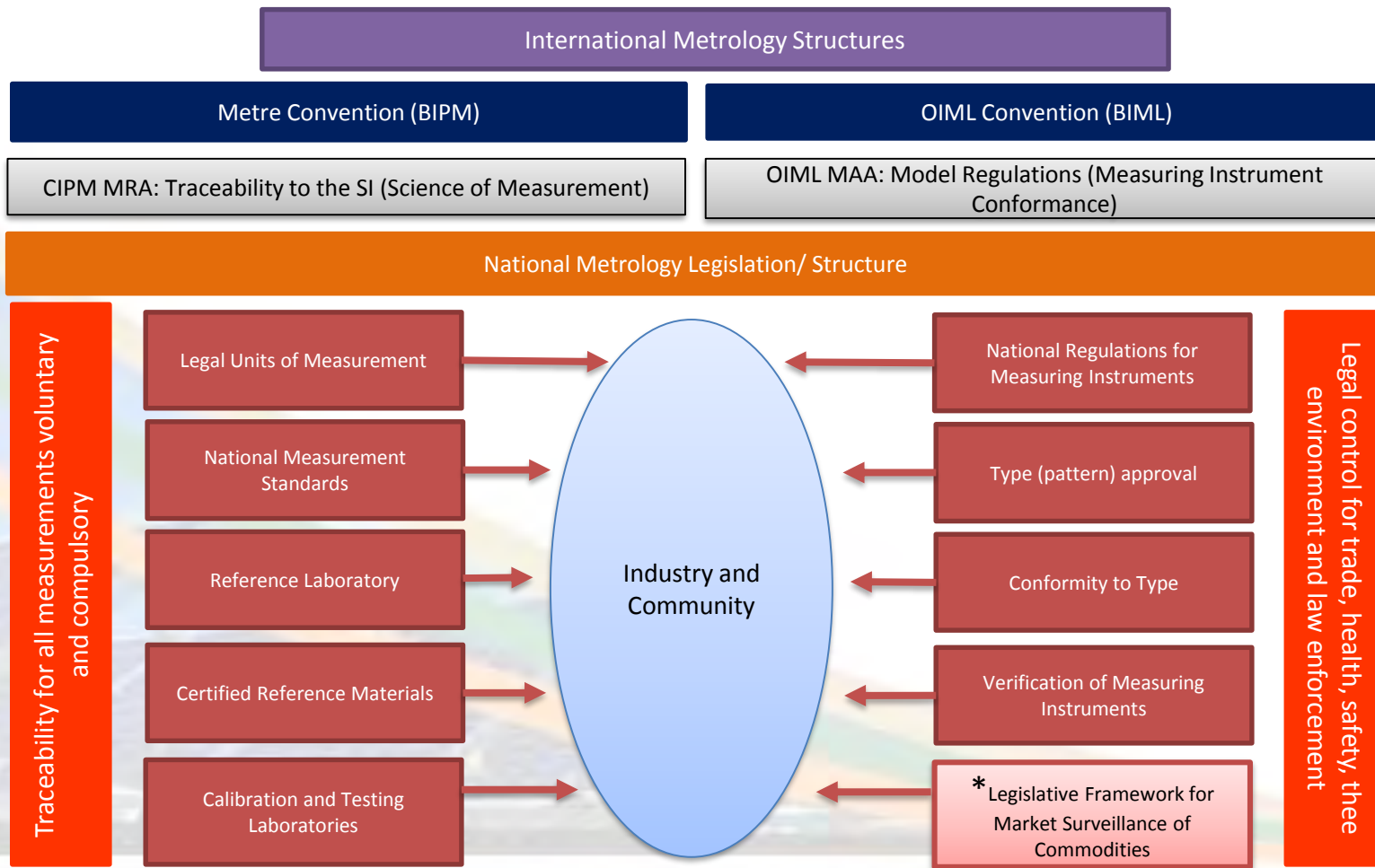
Let's work together, growing the economy
(He-aba tsamane le-Congos, ehlol' iNtshona)
(He-aba tsamane le-Congos, ehlol' iNtshona)

Mandate of NMISA

National Metrology Institute of South Africa (NMISA)

Mandate: NMISA was established by the Measurement Units and Measurement Standards Act, 2006 (Act No. 18 of 2006), to provide for the use of measurement units of the International System of Units (SI) and to designate other measurement units for use; to provide for the designation of the national measurement standards (NMS) and to provide for the keeping and maintenance of the NMS.

Role: of NMISA is to ensure that measurements performed nationally in science, industry or for legal purposes are accurate and internationally acceptable as NMISA is the national custodian of the SI.



*Market Surveillance activities are the role of National Regulators (SAHPRA, NRCS, etc.)

Functions of Legal Metrology Institute

- The primary function of a NLMi is to ensure measurements made for regulatory purposes are fit-for-purpose.
- More recently, NLMIs are responsible for controls over a broader range of regulatory measurements (including traffic, health and environmental measurements) and for ensuring that appropriate legislation is in place for legal traceability of measurements to facilitate the conversion of measurement data into evidence acceptable in a court of law.

Importance of Metrology Capabilities

- Compliance to legislation cannot be achieved by the creation of an Act and Technical Regulations only.
- To ensure compliance to legislation, the required infrastructure, expertise, knowledge and research needs to be in place, to ensure a suitable legal framework for reliable, consistent and internationally recognised measurements.
- NMISA does have the required infrastructure (laboratories, equipment, standards etc.), expertise (human resources), knowledge (scientific experience and know-how), and research capability (scientist trained in the field of metrology).
- NMISA already provides calibration in the Legal Metrology domain, as will be demonstrated in the slides to follow.

Health and Safety (Calibration)

- Biomedical Devices
- Sound Level Devices
- Vibrometers
- Artificial Ears for hearing loss tests
- Thermometers and temperature scanning devices
- UV-C Light sources for disinfection
- Sphygmomanometers (blood pressure meters)
- Production and Supply of Medical reference gases

Due to the high demand during COVID-19, NMISA, together with SANAS and other relevant stakeholders, NMISA has developed guidelines for use of thermometers



Health and Safety (radiation protection)



NMISA maintains measurement capabilities in radiation protection, which are core in strengthening of legal metrology in the country as a measure of protecting people and the environment.

NMISA supports the National Nuclear Regulator (NNR) by providing independent measurements for environmental samples submitted by license holder.

This support assists the NNR in regulating and thus protecting the environment and people of South Africa from any possible radiation in the environment.

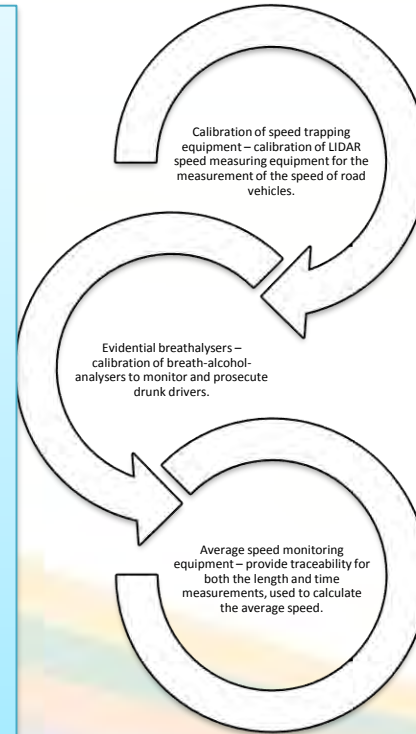
NMISA established an independent external **quality radiation dose audit** in 2018/19, a method of checking that the quality and accuracy of activities in individual radiotherapy hospitals are suitable for achieving the required objectives of cancer care.



NMISA established the diagnostic radiology traceability in 2014/15 to ensure that the country provides the service which to help improve the accuracy in measuring radiation doses during imaging studies and protecting patients against inaccurate measurements.

Law Enforcement

- Equipment that complies with regulations in terms of the National Road Traffic Act must be used and all equipment must be calibrated by a laboratory accredited to ISO/IEC 17025:2017.
- NMISA has been proactively involved with the Road Traffic Management Cooperation (RTMC)/ Department of Transport to ensure that the EBAT machines are calibrated and traceable to the International System of Units.
- NMISA is the national custodian of traceability for law enforcement through the calibration of the evidential breath analysers.
- NMISA's Gas Analysis laboratory the only facility accredited for the calibration of evidential breath analysers in South Africa, with full compliance to SANS 1793:2013 regulations.
- Calibration is performed using NMISA's ethanol certified reference materials.



Law Enforcement

Reduction of road traffic accidents is a key social goal of the government. 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%. South Africa has one of the world's worst injury in road traffic statistics in the world, with 5% increase in death during the 2016/2017 holiday season. South Africans Against Drunk Driving (SADD) has reported a 20% increase in death in the past two years due to drunk driving.



Law Enforcement (Illicit Drugs)

NMISA has been approached to act as The Reference Laboratory for drug analysis by the South African Police Services Department Forensic Services (SAPS DFS).

- NMISA is currently building capacity to meet this requirement for all drug related analyses.

The use of NMISA ethanol and sodium fluoride CRMs provides the critical measurement traceability to the national measurement standards required for forensic blood-alcohol analysis. The CRM certificates are accepted in South Africa as prima facie evidence.

- NMISA offers a proficiency test scheme, since 2006, that provides additional proof of maintained competency for blood-alcohol analysis.

Environmental Monitoring & Energy Efficiency

Monitoring the environment is becoming increasingly important.

Decisions made by the government 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.

**LED lighting
measurements:**

NMISA established an
LED measurement
facility to support the
energy efficiency drive
by the Department of
Energy.



Air Pollution Monitoring

The South African Air Quality Act 39 of 2004 is the principle driver behind the need for environmental and climate change monitoring.

Primary reference gas mixtures are critical components in safeguarding the environment we live in, NMISA continuously develop and improve these gases in support of various sectors such as, ambient air quality monitoring and climate change monitoring industry.



Activities

Disseminate traceability to the air pollution industry through the provision of a suite of primary reference as mixtures.

Calibration of ozone photometers for accurate monitoring of ambient level ozone measurements.

Calibration of air pollution monitoring instruments including ozone photometers.

DEPARTMENT OF TRADE INDUSTRY AND COMPETITION



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(He-aba bukhuluwe kanye no-tyala, sikhululeke)



Conclusions

- Over the past 100 years, as the legal metrology work became more and more sophisticated, it was moved around.
- Modern day legal metrology is now a highly sophisticated technical field requiring state of the art laboratories and advanced scientific expertise.
- Budgets, skills and laboratory needs suggest that the time is right for metrology to become a single programme of the department.
- The department is working on a proposal to merge the two metrology programmes. We are aiming to have a proposal ready by financial year end.



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