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The face of legal metrology in South Africa and its possible influence in Africa supporting the New Program for African Development (NEPAD)

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1 Overview and current situation

1.1 South Africa

Weights and Measures was introduced in South Africa by the Dutch during their occupation in the 1600's. During the British occupation acts were passed in all the colonies and in 1923 a National Department was established in the Department of Mines and Industry. In 1991 the function was transferred to the SABS.

With this transfer, a decision to develop into legal metrology was made. A position plan was drawn up and submitted to Government and two reviews were undertaken to establish the exact position of legal metrology and make any recommendations deemed necessary.

In South Africa the legal metrology arena is presently only regulated in the trade sphere by the Trade Metrology Act and Regulations. The structure at present is as below.

1.1.1 Legal / legislative process

Figure 1 depicts the legislative framework that is used in South Africa; this framework is internationally acceptable. The legislator in South Africa is the Department of Trade and Industry.

Legal metrology obtains its mandate through the SA Constitution, Trade Metrology Act and Regulations and National Measuring Units and Measuring Standards Act. The Regulator is the South African Bureau of

Standards (SABS), which in turn is appointed by the Minister of Trade and Industry as the national responsible body for legal metrology.

1.1.2 Administrative processes

Type Approval

The Type Approval Issuing Authority is the SABS. Type approval testing is also conducted by the SABS in its ISO 17025 accredited test laboratory but test results from competent laboratories are accepted.

Verification

The verification function is undertaken by private companies accredited by the National Accreditation Body to SABS 0378 which relates ISO 17025 to legal metrology. The approval to verify is granted to these laboratories by the Director of Trade Metrology in terms of the Trade Metrology Act after the accreditation certificates are evaluated to establish conformance to legal metrology requirements.

In South Africa we have not only allowed private companies to perform initial verification, but have also allowed them to do subsequent verification which to the best of our knowledge is not common practice internationally.

The SABS also carries out verification, primarily in areas/types of instruments not serviced by the private sector to ensure a holistic and comprehensive service is provided.

Calibration of verification standards

The calibration of verification standards may be done by any accredited laboratory (ISO 17025) with an acceptable best measurement capability.

The SABS has five accredited laboratories for calibration of mass and volume verification standards, situated in Pretoria, Cape Town, Durban, Port Elizabeth and Bloemfontein and there are presently four private laboratories that carry out calibration on verification standards of mass and one for volume, besides the National Metrology Laboratory (NML).

Inspections

Inspection of commodities and measuring instruments is done by the SABS and the inspection function performed by the regional offices is accredited to ISO 17020 by the National Accreditation Body.

International and Regional liaison

This function is undertaken by the regulator on behalf of government. South Africa is at present an OIML Member State and a founder member of SADCMEML.

South Africa is presently actively involved within SADCMEML with the harmonisation of legislation, as required by the SADC Trade Protocol, to enhance cross border trade within the area.

South Africa is also actively involved in the acceptance of OIML Recommendations as South African Technical Regulations to bring us into line with international requirements.

The co-operation will ensure harmonised technical regulations and effective implementation to give effect to the NEPAD aims.

Training

The functional training is presently done in house as there is no institution that offers a course in legal metrology due to the small numbers being recruited at present. We are currently looking at having courses registered with the South African Qualification Authority. The entrance level for verification officers and inspectors is Grade 12 with maths and science and for Type Approval Officers, a National Diploma.

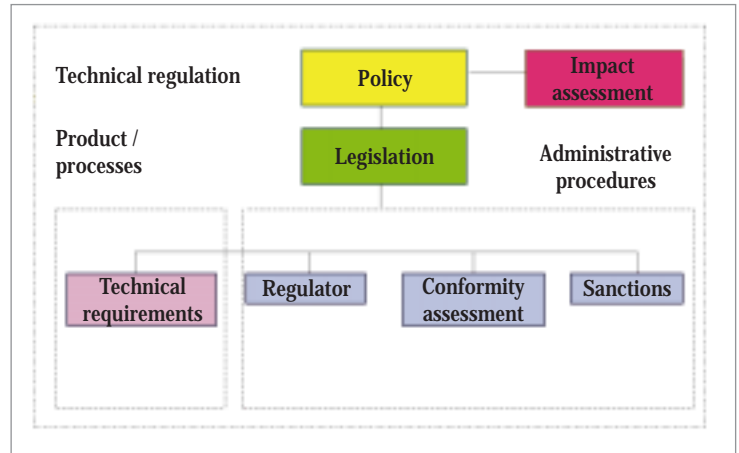


Fig. 1 The legislative framework used in South Africa

Maintenance of legislation

The regulator advises the Minister on any changes that need to be made to legislation after it has consulted with all role players. Technical Regulations are developed in the form of National Standards in line with WTO requirements. Technical Committees are in place to adopt OIML Recommendations wherever possible.

Matrix 1 gives various administrative processes and the institutions responsible for their implementation, and Figure 2 shows the present administrative processes.

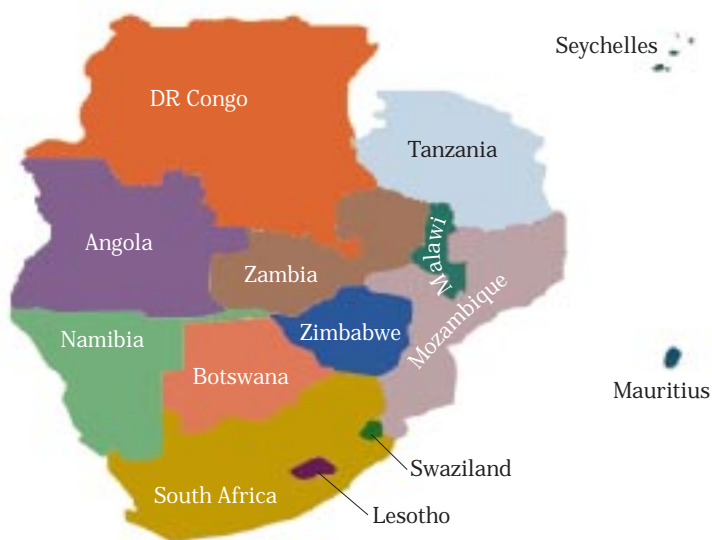
	SABS Regulator	Private verification laboratories accredited to ISO 17025	SABS regional offices ISO 17020 & 17025	SABS calibration laboratories ISO 17025	Private calibration laboratories ISO 17025
Type approval	×				
Verification		×	×		
Inspection			×		
Calibration of verification standards				×	×
International/Regional liaison	×				
Training	×	×	×		

Matrix 1 The various administrative processes

1.1.3 Economic overview

South Africa is regarded as an emerging first world economy and has a developed country infrastructure in the following areas:

- Telecommunications;
- Electricity (lowest industrial electricity rates in the world);
- Roads and ports;
- Railroad;
- Air transport.



Southern African Development Community (SADC) Map

The seven ports handle in the order of 13 000 vessels and 500 million tons of cargo per year.

The value of exports and imports with the EU and SADC are as follows:

- Imports from EU R68 122 million;
- Exports to EU R66 312 million;
- Exports to SADC R14 418 million.

1.2 Situational overview in Southern Africa

A map of the Southern African Development Community (SADC) is shown opposite, and the current status of the structures in each country are indicated in Matrix 2.

Most SADC countries still have the legal metrology system originally entrenched in the colonial era with predominantly Central Government control and no use of accredited inspection, verification or conformity assessment bodies.

2 Drivers for change

The drivers for change that are indicated below will result in South Africa progressing from the present trade metrology infrastructure to a full legal metrology infrastructure which will result in us including things such as:

- Medical measuring equipment;
- Utility meters;
- Environmental measuring instruments;
- Speed measuring device;
- Breath alcohol measuring devices.

A decision to regulate the whole spectrum of legal metrology was made in principle in 1998 and the SQAM review (Standards, Quality Assurance, Accreditation and Metrology) reaffirmed this decision. A draft of the new Legal Metrology Act is to be submitted to government and it is envisaged that it will be promulgated in 2003.

2.1 Standards, Quality Assurance, Accreditation and Metrology (SQAM) Review

The SQAM Review commissioned by the Minister of Trade and Industry was tasked to investigate the status of the four SQAM disciplines and then to make recommendations to the Minister on what interventions need

Present status	Countries
Almost no legal metrology legislation or infrastructure	Angola Lesotho Mozambique
National legislation (not SADC harmonised) and regulatory control of simple/basic instruments for mass, volume, and length and of goods	Botswana DRC Malawi Namibia Seychelles Swaziland Tanzania Zambia
National legislation (not SADC harmonised) and regulatory control (inspection and verification) of more sophisticated instruments for mass, volume and length of goods	Mauritius South Africa

Matrix 2 SADC - Overview

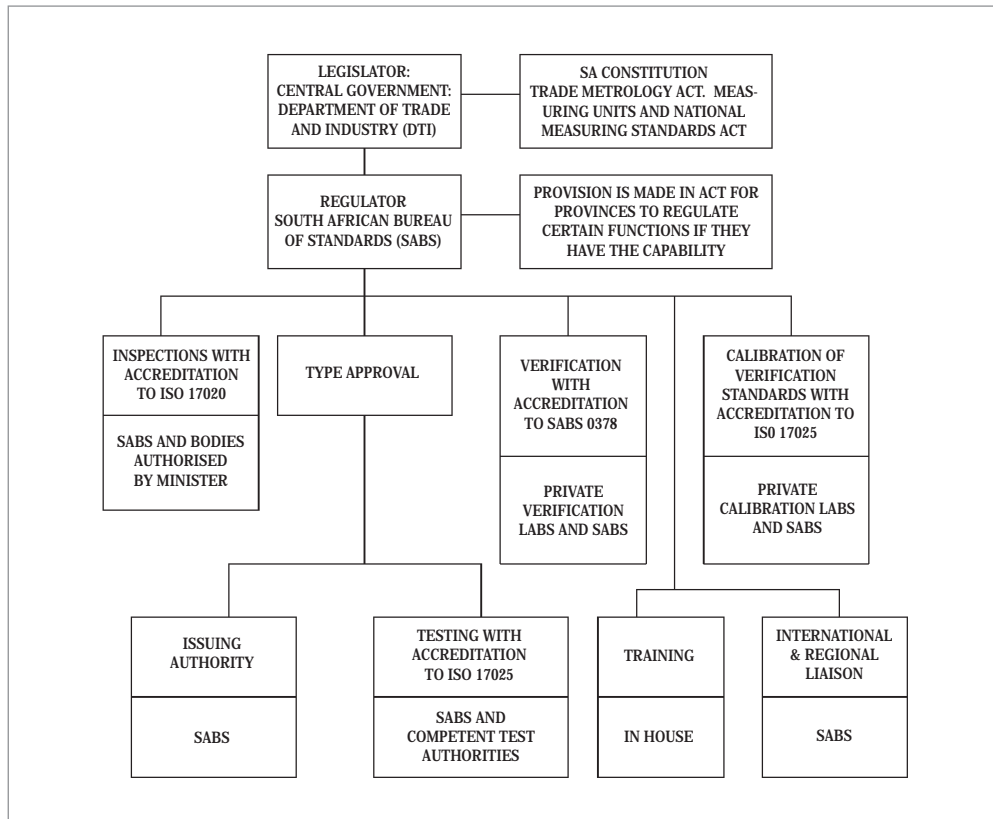


Fig. 2 The present administrative processes in South Africa

to be taken to bring the SQAM structures within South Africa in line with international norms. The review identified areas in need of attention, the most important being the control of the measuring instruments indicated above.

The SQAM Review made far reaching recommendations for legal metrology, namely:

- (i) The creation of an Office for Regulatory Reform. The purpose of this proposed Office is to: (i) review existing approaches for formulation of technical regulations contained in legislation and legislative instruments, and develop a best practice approach for technical regulation formulation; (ii) conduct a comprehensive review of existing technical regulations contained in legislation, including legislation relevant to trade and legal metrology; (iii) require that regulatory impact assessments be compulsory for all future formulation of technical regulations; (iv) establish the principles for any regulatory marks used in South Africa; and (v) monitor any potential abuses of such regulatory marks and conformity assessment marks in both the voluntary and mandatory sectors.
- (ii) A legal metrology framework embodying international practices for control of measurements be established by the proposed Office of Regulatory Reform as part of the general framework of technical regulations.
- (iii) Responsibility for enforcement of trade metrology be returned to national government, and the function not be devolved to provincial governments until such time as they have the necessary resources to address the responsibilities.
- (iv) A Trade Metrology Unit be established within DTI to take responsibility for coordination of the national system of trade metrology, including overall administration of the Trade Metrology System.
- (v) The proposed Office of Regulatory Reform to advise on the necessary legislative changes to implement a re-distribution of trade metrology functions.
- (vi) OIML Recommendations be adopted wherever applicable to satisfy the provisions of legal (including trade) metrology. Specifications from other sources be used only in exceptional cases

where the OIML Recommendations do not cover particular South African requirements.

- (vii) South Africa must continue to participate in the drafting of OIML Recommendations, including attending the international meetings of committees that are drafting Recommendations of direct relevance to South Africa. These national interest activities be funded.
- (viii) The proposed Trade Metrology Unit of the DTI undertake an urgent review of funding requirements to restore trade measurement inspection functions in the Provinces, and sufficient funds immediately be allocated by Government to re-establish this function under centralized control.

2.2 SADC Protocol on Trade

Objectives

- To further liberalise intra-regional trade in goods and services.
- To ensure efficient production within SADC.
- To contribute towards the improvement of the climate for domestic cross-border and foreign investment.
- To enhance the economic development, diversification and industrialization of the Region.
- To establish a Free Trade Arena in the SADC Region.

To achieve the objectives of the SADC protocol the following interventions are needed within the legal metrology arena:

- All technical barriers to trade (TBTs) are to be removed.
- Standards and Technical regulations are to be harmonised.

To ensure that the above is achieved SADC formed a SQAM forum and each discipline formed its own regional organization. The legal metrology cooperation forum SADCMEML was formed in 1996. The other forums are SADMET (NML), SADCSTAN (Standards) and SADCA (Accreditation).

2.2.1 SADCMEML

The aims of SADCMEML are:

- (i) Harmonisation of legal metrology legislation to promote and ensure compatibility with international requirements. Specific areas for harmonisation include:

- Labelling, tolerances and standard pack sizes for prepackages.
- Requirements for instruments and adherence to OIML Recommendations wherever possible.
- Instrument verification and calibration techniques.
- Type approval testing and issuing of approval certificates.

- (ii) Organisation of training programmes.
- (iii) Arranging of inter-comparisons to ensure uniformity.
- (iv) Exchange of metrology related information and assistance where possible.

2.3 WTO/TBT Agreement

The WTO/TBT agreement requires - amongst others - the following:

- (i) Technical regulations be placed on the web for international comment.
- (ii) One stop type approval testing by approved test house (OIML MAA scheme).
- (iii) Use of international standards as technical regulations wherever possible.

2.4 Advance in technology

New techniques require new and expensive test equipment, which may not be economically viable, for each country to purchase. This will involve using management systems to reduce costs to governments and using other countries in the region to perform certain tests for the other SADC members.

2.5 Developments in Africa

- (i) The development of other trading blocks similar to SADC, Comesa and the East African Union which will all need to be linked if NEPAD is to succeed.
- (ii) The dissolving of the OAU and the creation of the African Union.

2.6 New Program for African Development (NEPAD)

The New Program for African Development was developed out of the Millennium Africa Project and is

intended to lift Africa out of its present socio-economic plight and to place countries both individually and collectively on a path to sustainable development and at the same time to participate actively in the world economy. To meet the NEPAD objectives it is also important that the socio-political aspects be considered and that countries practice good governance ensuring a sound base on which to build.

The objectives and outcomes are as follows:

- Objectives:
 - Eradicate poverty.
 - Place countries of Africa both individually and collectively on a path of sustainable growth and development.
 - Halt the marginalisation of Africa in the globalisation process.
- Expected outcomes:
 - Economic growth and development and increased employment.
 - Reduction in poverty.
 - Diversification of productive activities, enhanced international competitiveness and increased exports.
 - Increased African integration.

To achieve the objectives of NEPAD an action plan was devised encompassing the following:

- Ensuring conditions for sustainable development.
- Identification of sectoral priorities.
- Mobilisation of resources.
- Establishment of new global partnership.
- Implementation of the new partnership for Africa's development.

2.6.1 The role of legal metrology in support of SADC/Africa developmental goals (NEPAD)

There are many areas within the NEPAD action plan in which legal metrology will have to play a vital role and they are listed below.

Energy

Legal metrology needs to become involved in the sale of energy domestically as well as within Africa. Examples of this are the proposed gas pipe line from Mozambique to South Africa and Eskom, the South African electricity supplier's expansion into Africa to utilize energy sources such as Cahora Bassa hydroelectric scheme in Mozambique and to improve the electricity network in Africa using all available resources.

Transport

Legal metrology's involvement in this area would be to ensure that legislation is in place to control the overloading of vehicles. These technical regulations, which would require weighbridges used for weighing road vehicles to be approved and verified at regular intervals, will ensure the national road network is not damaged due to the overloading of vehicles which is a problem at present. Breath alcohol and speed measurement instruments will also be covered in the proposed regulations. These regulations give confidence in the measurements made, resulting in a reduction in the number of disputes.

Water and sanitation

The legal metrology involvement in this area will be the instruments used in the sale of water. Domestic water metering is already regulated within South Africa and we will have to concentrate on the pre-pay systems now being developed which include communal standpipes for rural water supply. We foresee this will become the norm in Africa. A standard for electronic pre-pay systems has already been written and these instruments will be approved and verified.

The supply and sale of water in irrigation schemes is also an area which will have to be addressed in a similar manner.

Health

In this area the involvement is the same as elsewhere, namely the creation of technical regulations and the approval and verification of medical instruments.

Agriculture

Ensure that technical regulations are in place to give confidence in the measurement of agricultural products assuring farmers of a fair deal and creating a sound basis for government to collect excise duties reducing the burden on the fiscus. Instruments for quality related measurements such as moisture meters will be included.

Environment

This area is a politically sensitive area at the moment due to the pollution generated by industry and if rebates are to be considered as reward for countries who reduce emissions or sanctions are imposed, then legal metrology needs to be involved in the measurement of such emissions.

Mining

The same applies here as under agriculture.

Manufacturing

The manufacturing arena is most probably the most important.

The aim of NEPAD is to encourage cross border trade, improve competitiveness. Technical regulations need to be in place to ensure that commodities are correctly filled and that measurements are accurate and traceable to National Standards.

By putting in place a Technical Regulation framework which meets international best practice and ensuring a uniform implementation which will in turn ensure an effective trade measurement system, Legal Metrology Departments in Africa will have assisted greatly in creating a solid basis from which NEPAD can grow.

The same can be said for legal metrology's role in fields such as mining, agriculture, the environment, etc.

It is my belief that without the support of an effective legal metrology framework, NEPAD will have difficulty realizing its objectives.

3 The face of legal metrology in South Africa by 2020

With the implementation of the recommendations of the SQAM review, South Africa will have a legal metrology infrastructure that will be able to meet the challenges placed on it by all the different drivers for change mentioned above.

3.1 Legal metrology legislative structure and systems

3.1.1 Legislative structure

The legislative process will have promulgated a Legal Metrology and Consumer Protection Act and the Technical Regulations required to cover all aspects of Legal Metrology by 2020.

The legislative framework will be in accordance with the legislative framework shown in Fig. 1 which will meet the requirements of the WTO and will be in line with international best practice.

3.1.2 Legal metrology system

- In line with the OIML MAA on type approval for certain instruments there will be agreements

amongst countries to accept instruments type approved in countries with the capability to type approve such instruments.

- The proposed OIML "I" mark for prepacked goods will be adopted and implemented to promote cross border trade.
- The accreditation system for verification of measuring instruments will be adopted as a means of reducing government's costs of regulating.

3.1.3 Legal metrology functions (Administrative processes)

3.1.3.1 Type approval

- Testing done once in the world (OIML MAA on acceptance of test results).
- SA to participate in OIML Certificate System for a number of instruments within own capabilities.
- If any member states of the SADC are not OIML Members they will have regional, bilateral or multi-lateral agreements in place to accept results.
- Private laboratories accredited to ISO 17025 or peer reviewed for the applicable tests and approved by the National Regulator will undertake type approval testing.
- The National Regulator will retain the role of issuing authority.
- More use will be made of component approval to allow the mix and match of components to construct instruments according to customer requirements. Compatibility tests and documentation evaluation will be done.

3.1.3.2 Verification

Verification will be privatised within South Africa by means of accreditation by the national accreditation body to SABS 0378 which is a standard based on ISO 17025 or current equivalent and tailored for use in legal metrology.

The privatisation of the verification of instrument function reduces the financial burden on the national regulator by reduction of personnel and equipment.

It is also envisaged that, with this accreditation process being applied uniformly throughout Africa using a common legal metrology standard against which accreditation takes place e.g. SABS 0378 (adopted as an African Union Standard) or current equivalent, verification officers will operate across borders where economically viable.

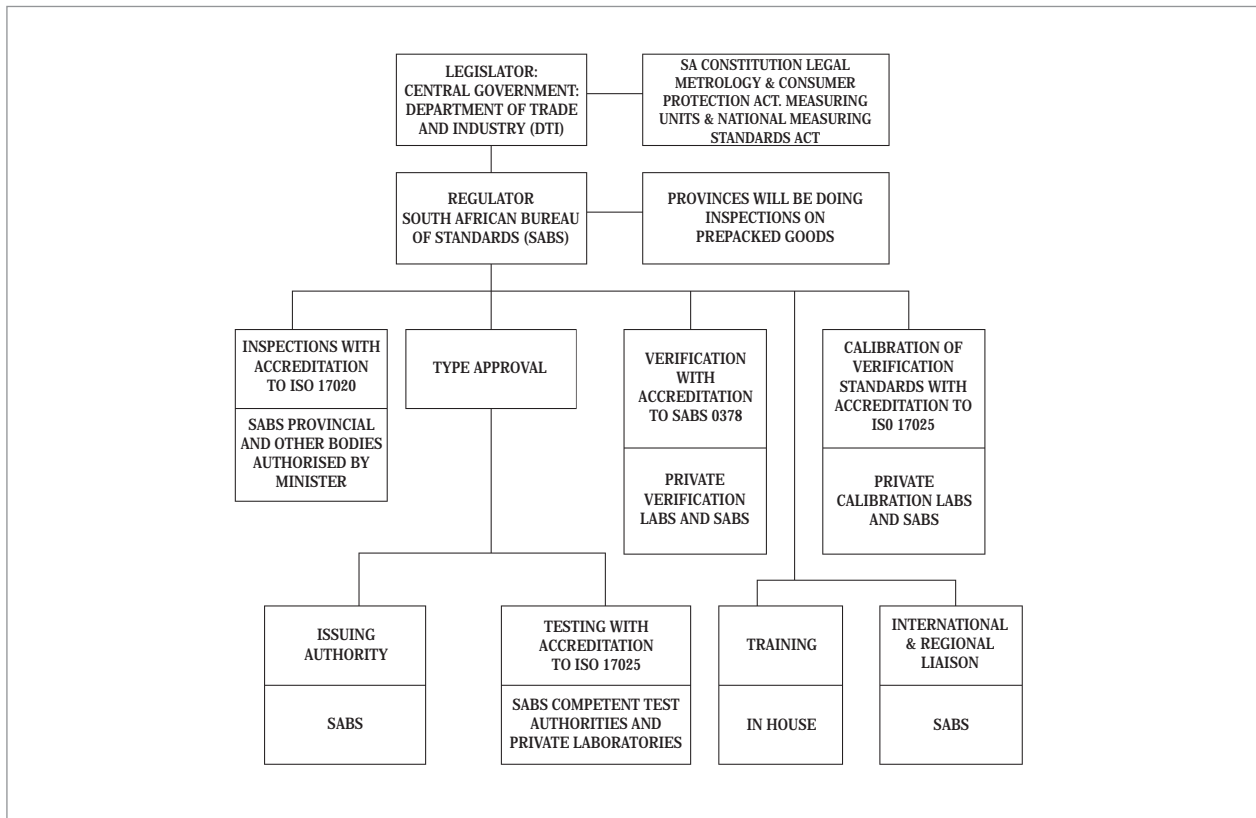


Fig. 3 The future administrative processes in South Africa by 2020

	SABS REGULATOR	PRIVATE VERIFICATION LABORATORIES ACCREDITED TO ISO 17025	SABS REGIONAL OFFICES ISO 17025 & 17025	SABS CALIBRATION LABORATORIES ISO 17025	PRIVATE CALIBRATION LABORATORIES ISO 17025	PROVINCIAL AUTHORITIES
Type approval	(X) √		√	√	√	
Verification		(X) √	(X) √			
Inspection						√
Calibration of Verification Standards				(X) √	(X) √	√
International/ Regional liaison	(X) √					
Training	(X) √	(X) √	(X) √			

(X) = Present
√ = Future

Matrix 3 The present and future situations

3.1.3.3 Inspections

All inspection bodies such as the SABS and Provincial authorities will be accredited to ISO 17020 or current equivalent, using harmonised legislation in the form of Technical Regulations published as Regional Standards based on OIML Recommendations.

An early warning system to alert other countries of nonconforming product or instruments, will be in place.

3.1.3.4 Calibration of verification standards

The calibration of verification standards will be done by laboratories accredited to ISO 17025 and that have an acceptable best measurement capability.

3.1.3.5 Training

South Africa through its process of having courses registered at the South African Qualification Authority (SAQA) will have an established training program in place.

3.1.3.6 International and regional legislation

South Africa will remain an active member of OIML and SADC/MEL.

South Africa will have ensured that the Indian Ocean Legal Metrology Forum (IOLMF) has developed to its full potential and the creation of the South Atlantic Legal Metrology Forum (SALMF) in support of the OIML's aim to have regional organizations in place which will link the whole world.

3.1.4 Management processes

The management processes will be in line with international norms. This will be achieved by using ISO standards in management systems and OIML Recommendations.

3.1.4.1 ISO 17025

Laboratories undertaking the following processes will be accredited to ISO 17025:

- Type approval testing.
- Calibration of verification standards.

3.1.4.2 ISO 17020

The following administrative processes will be accredited to ISO 17020:

- Inspection of prepacked goods.
- Inspection of measuring instruments.

3.1.4.3 SABS 0378

Laboratories undertaking the following processes will be accredited to SABS 0378:

- Verification of measuring instruments.

3.1.4.4 SAQA (South African Qualification Authority)

All training will be registered with the South African Qualification Authority.

3.1.4.5 OIML MAA Scheme

The South African National Responsible Body will partake in the scheme. The SABS Type Approval laboratory and private laboratories will be designated as competent test laboratories.

3.1.5 Harmonisation

All legal metrology technical regulations in South Africa will be harmonised with international standards as is expected of OIML Member States.

4 The possible influence of developments in South Africa on SADC and Africa in 2020

The following can be seen as possible areas of influence of SADC and Africa in 2020:

- Legal metrology legislative structures put in place in South Africa could be accepted by other African Union member states.

- SADC member states have harmonised legislation in place.
- Legal metrology regional organizations such as Euro Mediterranean Legal Metrology Forum (EMLMF), Southern African Legal Metrology Cooperation (SADCMEEL), Indian Ocean Legal Metrology Forum (IOLMF) and any others formed to include countries not affiliated to the above-mentioned should have finalised harmonisation of legislation in all the areas mentioned as vital to NEPAD's success.
- The administrative and management processes put in place in South Africa, which reduce the cost to government, will be accepted as an effective means of ensuring the effective implementation of legal metrology requirements throughout Africa.
- Technical regulations will be published as Regional or African standards in line with OIML Recommendations.
- Type Approval testing be run under the OIML MAA scheme.
- It is envisaged that there will be several training institutions providing courses in legal metrology such as the Tanzania College of Business Education and the SADC Resources Centre for Metrology Education. A uniform curriculum would be in place to ensure the same standard in all countries. It is additionally envisaged that a distance learning project will also be in place.

It is envisaged that the developments mentioned above and the legal metrology structures put in place

will support the ideals of NEPAD in South Africa and could be applied by all members of the African Union.

SADC will have implemented similar structures to ensure harmonisation of legislation as required by the SADC Trade Protocol.

5 Conclusion

South Africa will have an effective trade measurement system underpinned by an internationally acceptable legislative framework. The acceptance of OIML Recommendations as technical regulations and our administrative processes which are managed effectively by the use of ISO management standards will also instil confidence.

It is envisaged that the high ideals of NEPAD which are to ensure that Africa competes as an equal in the global arena will necessitate the African Union member states looking at implementing similar structures.

The advantages to Africa are:

- An international acceptable legal metrology framework.
- Basis for increased export of commodities.
- Confidence in measurements.
- Increased productivity.
- Increased job opportunities. ■



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