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Master meter used for the verification of bottom loading road tankers in Naples

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JEAN-FRANÇOIS MAGAÑA

DIRECTOR, BIML

Linear progression

As with recent editions, this issue of the Bulletin again contains a number of meeting reports and a wide diversity of accounts giving detailed information on how the OIML is reaching out to its stakeholders and continuing to make new inroads in many aspects.

Activities involving Developing Countries are on the increase, mainly thanks to the work of the newly appointed Facilitator, Dr. Eberhard Seiler. Several articles have already been published in the Bulletin, and a number of Developing Countries have undertaken legal metrology work both in liaison with the OIML and in Regional Legal Metrology Organizations.

Membership of the OIML is again expected to increase very shortly; one major country is expected to become a Member State by the end of 2009 and it is foreseen that others will follow suit.

Liaisons with other Organizations are increasing both in substance and in intensity. In particular, World Metrology Day (20 May) was organized by the BIPM in close liaison with the OIML and a joint leaflet was produced.

Many contacts with potential new members and the representation of the OIML and the BIPM in international events have been carried out jointly by the two Organizations. The OIML has continued to work actively with its principal liaison organizations, and in particular enjoys constructive contacts with Organizations such as CODEX Alimentarius and the UN-ECE.

The MAA is also progressing well, the number of registered MAA Certificates is increasing and it will be proposed to the CIML in October to launch Declarations of Mutual Confidence for two new categories of instruments.

The project of an OIML Quantity Marking on prepackages is also making progress, and a number of governments and prepackers have expressed a significant degree of interest in this future system, which will be a major development over the years to come.

Technical activities are being streamlined, and as part of the process a second training session for the Secretariats of the Technical Committees and Subcommittees was held in Northern France in May. A number of guidance documents and templates have been or are being developed, and recently an ad-hoc meeting was held to discuss the Directives for the Technical Work. To speed up the process and make the most of current IT technology, Technical Committees and Subcommittees have each been provided with an interactive workgroup; these are now increasingly being used to communicate documents faster and more efficiently across the world.

Lastly, the strive to continually keep stakeholders informed via our web site is ongoing: it is becoming increasingly interactive - for example, data updated by OIML Members can now be found concerning their national regulations and their compatibility with OIML Recommendations. Other developments on the OIML web site are also underway and priority is given to developing these resources in the BIML. ■

ROAD TANKERS

A survey on the test methods used in Italy to verify road tankers

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Introduction

In Italy, a recently adopted regulation [1] provides for the simplification of the legal procedures intended to establish conformity to the essential metrological requirements for road tankers.

Although the relevant OIML Recommendation [2] provides for the type approval, initial and periodic verification of road tankers, currently the Italian legal provisions in force allow for the curtailment of the conformity assessment procedure by eliminating the obligation for manufacturers to submit to the Central Metrology Authority (Ministero dello Sviluppo Economico – Direzione Generale per l'Armonizzazione del Mercato e la Tutela dei Consumatori – Ufficio D3: Strumenti di Misura) prototype designs in order to have the type approval procedure carried out.

This simplification process caused the devolution to the local Metrology Authorities (Uffici Metrici delle Camere di Commercio) of the task to perform certain tests in order to assess the conformity to the essential metrological requirements laid down by the new regulation.

The essential requirements

The essential requirements are derived substantially from the relevant OIML Recommendation [2]. They are listed in an Annex to the Regulation; below and on the following pages are cross-reference tables between the clauses of the Italian Regulation and those of the relevant OIML Recommendation.

General requirements			
Clause description	Italian Regulation *(DPR 58/2003)*	OIML R 80	Remarks
Tank classification	Annex 1.1	2.1.1	In Italy only classification by nominal values in S.I. units is allowed
Tank mounting methods	Annex 1.2	2.1.1.1	In Italy verification is only allowed with tanks mounted on the vehicle
Tank system description	Annex 1.3	From 2.1.2 to 2.1.3	
Ancillary installations	Annex 1.4	2.1.3.2	
Tank full draining	Annex 1.5	2.1.3.1	
Discharge devices	Annex 1.6	2.1.3.3	
Access ancillary devices	Annex 1.7	2.1.3.4	

Technical and metrological characteristics			
Clause description	Italian Regulation *(DPR 58/2003)*	OIML R 80	Remarks
Tank stability	Annex 2.1	4.1.1.4	
Air entrapment	Annex 2.2	4.1.1.5	
Remaining water volumes after delivery	Annex 2.3	4.1.1.5	
Tank compartment integrity after test	Annex 2.4	4.1.1.7	In Italy a sound method to preserve the integrity of tank compartments after test (sealed grid or equivalent) is required

Dome and level gauging device			
Clause description	Italian Regulation (*DPR 58/2003*)	OIML R 80	Remarks
Level gauging device	3.1	4.1.2.3	
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Verification of road tankers by means of top loading transfer methods – An uncertainty analysis

In the case of top loading tanks, the usual method for verifying them is generally the volume transfer method via the top loading dome from calibrated test measures to the tank under test.

Due to the environmental conditions in which the verification is usually carried out (typically outdoor use of tap water), it is not possible to perform any kind of control over the temperatures of the test liquid at the relevant place in the test circuit, nor to accurately measure them in order to make corrections.

When calculating the relative tank error, use of the following expression is made:

$$e = \frac{V_{T15} - V_{p15}}{V_{p15}} \qquad (1)$$

where e is the relative tank error, V_{T15} is the volume reading on the tank level gauge (corrected to the reference temperature of 15 °C) and V_{p15} is the volume reading of the prover (calibrated measure) sight glass gauge.

It is possible to relate the volumes V_{T15} and V_{p15} to the actual volumes at the temperatures t_T and t_p provided that the tank and prover expansion coefficients are known along with the test liquid expansion coefficient:

$$\begin{aligned} V_{p15} &= V_p\left[1+(\beta_p-\alpha)(t_p-15)\right] = V_p\left[1+\gamma_p(t_p-15)\right] \\ V_{T15} &= V_T\left[1+(\beta_T-\alpha)(t_T-15)\right] = V_T\left[1+\gamma_T(t_T-15)\right] \end{aligned} \qquad (2)$$

By substituting equations (2) in equation (1) we have:

$$\begin{aligned} e &= \frac{V_{T15}}{V_{p15}} - 1 = \frac{V_T\left[1+\gamma_T(t_T-15)\right]}{V_p\left[1+\gamma_p(t_p-15)\right]} - 1 = \\ &= \frac{V_T}{V_p}\left[1+\gamma_T(t_T-15)\right]\left[1-\gamma_p(t_p-15)\right] - 1 = \\ &= \frac{V_T}{V_p} - 1 + \left[\gamma_T(t_T-15) - \gamma_p(t_p-15)\right] \end{aligned} \qquad (3)$$

In equation (3), amongst other things, the simplification

$$\frac{V_T}{V_p} = 1$$

has been made because the difference between V_T and V_p is negligible when evaluating the expansion terms. The relevant OIML Recommendation [2] sets up, for the evaluation of the relative error in verification, the two following constraints:

$$\begin{aligned} &|t_T - t_p| < 2\,°C \\ &|t_p - 15\,°C| < 10\,°C \end{aligned} \qquad (4)$$

These two constraints are such that the verification uncertainty is bound to an upper value whose magnitude is in the order of 0.1 %. Let the following equalities be:

$$\begin{cases} \gamma_T - \gamma_p = \Delta\gamma \\ \dfrac{\gamma_T + \gamma_p}{2} = \bar{\gamma} \end{cases} \qquad (5)$$

From equation (5) we have:

$$\gamma_T = \bar{\gamma} + \frac{1}{2}\Delta\gamma = \left(\frac{\beta_T + \beta_p}{2}\right) - \alpha + \frac{\beta_T - \beta_p}{2} = \left(\bar{\beta} - \alpha\right) + \frac{\Delta\beta}{2}$$

$$\gamma_p = \bar{\gamma} - \frac{1}{2}\Delta\gamma = \left(\frac{\beta_T + \beta_p}{2}\right) - \alpha - \frac{\beta_T - \beta_p}{2} = \left(\bar{\beta} - \alpha\right) - \frac{\Delta\beta}{2} \qquad (6)$$

Since equations (6) holds, the relative error can be written as:

$$e = \frac{V_T}{V_p} - 1 + \left(\bar{\beta} - \alpha\right)\left(t_T - t_p\right) + \Delta\beta\left(\bar{t} - 15\right) \qquad (7)$$

Defining the following:

$$\delta t = t_T - t_p$$

$$\Delta t = \bar{t} - 15$$

Equation (7) becomes:

$$e = \frac{V_T}{V_p} - 1 + \left(\bar{\beta} - \alpha\right)\delta t + \Delta\beta \bullet \Delta t \qquad (7')$$

Using equations (7') as the model for the uncertainty evaluation, the following can be written:

$$u^2(e) = \left(\frac{\partial e}{\partial V_T}\right)^2 u^2(V_T) + \left(\frac{\partial e}{\partial V_p}\right)^2 u^2(V_p) + \left(\frac{\partial e}{\partial \delta t}\right)^2 u^2(\delta t) + \left(\frac{\partial e}{\partial \Delta t}\right)^2 u^2(\Delta t) \qquad (8)$$

The sensitivity coefficients as well as the standard uncertainties are resumed in the table below, along with the statistical hypothesis for each "type B" uncertainty evaluation [4].

Relative standard uncertainty:

$$u_T(V_T) = \sqrt{\left(2.89\times10^{-4}\right)^2 + \left(2.89\times10^{-4}\right)^2 + \left(1.89\times10^{-4}\right)^2 + \left(5.77\times10^{-5}\right)} = 4.54\times10^{-4}$$

Relative expanded uncertainty:

$$U_T(V_T) = 2u_T(V_T) = 9.1\times10^{-4} = 0.091\,\%$$

Verification of bottom-loading road tankers by means of a master meter method – An uncertainty analysis

In the case of bottom-loading of road tankers, it is impractical to use the top loading transfer method for the verification, because the tank domes are sealed from the initial calibration and conceived in such a way that their removal is difficult. In some instances, the volume indicating gauge is physically joined to the dome, thus, even in the case of dome removal, the verification process can not be carried out without introducing supplementary uncertainty sources due to the test liquid detection after the dome replacement (imperfect dome replacement introducing a level detection error when reading the gauge); moreover this process is very expensive in terms of time and work needed for its correct implementation.

In the case of bottom-loading tankers, use is made of the master method described below. The method is derived from that described in the relevant document of the French Metrology Service [3] and the main operations in the verification process are the following:

	Input measured value x_i	Sensitivity coefficient	Input standard uncertainty $u(x_i)$	Statistical distribution	Standard uncertainty $u_i(x_i)$
B.1	Volume reading on the tank gauge (Tank gauge resolution) V_T (d_T = volume interval on the tank gauge)	$\frac{1}{V_T}$	$u(V_T) = \frac{d_T}{2\sqrt{3}}$	rectangular	$\frac{d_T}{2V_T\sqrt{3}} = \frac{10^{-3}}{2\sqrt{3}} = 2.89\times10^{-4}$ (*)
B.2	Prover accuracy V_p	$\frac{1}{V_p}$	$u(V_p) = \frac{emt}{\sqrt{3}} = \frac{5\times10^{-4}}{\sqrt{3}}$	rectangular	$\frac{5\times10^{-4}}{\sqrt{3}} = 2.89\times10^{-4}$
B.3	Temperature difference $\delta t = t_T - t_p$	$\bar{\beta} - \alpha = 3.6\times10^{-5} - 0.00020$	$u(\delta t) = \delta t_{max}/\sqrt{3} = \frac{2}{\sqrt{3}}$	rectangular	1.89×10^{-4}
B.4	Difference between operating temperature and reference temperature	$\Delta\beta = 10^{-5}$ °C^{-1}	$u(\Delta t) = \frac{10}{\sqrt{3}}$	rectangular	5.77×10^{-5}

(*) Note: Usually the ratio $\frac{d_T}{V_T}$ is not greater than 10^{-3} (e.g. d_T = division gauge = 1 L, V_T = nominal tank value = 1 000 L)

Discharge devices			
Clause argument	Italian Regulation (*DPR 58/2003)*	OIML R 80	Remarks
Devices efficiency and location	4.1	4.1.3	
Tank inlet and outlet	4.2	4.1.3.1	The Italian Regulation does not provide for tanks of special construction with separate drain pipe conceived in order to collect and drain out water and impurities
Discharge pipe	4.3	4.1.3.2	The Italian Regulation only prescribes that the discharge pipe must be as short as possible. The OIML Recommendation sets up the minimum slope (2°) toward the stop valve such that it assures the correct emptying of the tank. (This requirement is taken by Italian manufacturers as a Best Construction Practice)
Supplementary safety stop valves	4.4 4..5	4.1.3.3	According to the Italian Regulation, if tanks are equipped with supplementary stop valves, they must not influence, when actuated, the volume values read on the scale gauge. Furthermore they shall have in the highest point a sight glass to allow ascertaining of the complete filling of the pipe from the stop valve to the tank foot valve
Independent discharge pipes	4.6	4.1.3.4	The Italian Regulation does not allow for discharge manifold at all
Discharge valve identification number and valve opening recognition	4.7		The Italian Regulation provides for the tank number to be unambiguously put on the corresponding discharge valve

Maximum permissible errors and identification plate			
Clause argument	Italian Regulation *(DPR 58/2003)*	OIML R 80	Remarks
Tank nominal capacity definition	5.1	4.1.6.1	The Italian Regulation does not allow for fitting bottom manifolds to be used as tank discharge collecting devices
Maximum permissible errors	5.2 5.3	4.1.6.2 4.1.6.3	MPEs in the Italian Regulation: - 0.2 % in initial verification (calibration) of the nominal value; - 0.5 % in in-service (subsequent) verification other than calibration after repair (including errors of calibration, liquid level determination, etc.)
Tank identification number and plate	6.1	4.1.7	
Subsequent verification sticker	6.4		According to the Italian Regulation a 50 mm × 50 mm area must be left on the identification plate to permit the application of subsequent verification stickers

- calibration of the master meter by means of a traceable prover (Meter Factor – MF – determination);
- verification of not more than 10 road tankers by pumping the test liquid into the tanker inlet through the calibrated meter;
- new master method calibration in order to ascertain whether a drift for the MF is present.

1. Master meter calibration

The Meter Factor (MF) is given by the expression:

$$MF = \frac{V_p\left[1+\beta\left(t_p - t_0\right)\right]}{V_m} \qquad (9)$$

where:

V_p is the volume reading on the prover gauge

β is the prover expansion coefficient

t_p and t_0 are respectively the temperature in the prover and the reference temperature of the traceable prover

V_m is the indicated volume by the Master Meter

The error E (at the reference temperature – set to 15 °C) which can be attributed to the tank under test is:

$$E = V_T\left[1-\beta_T\left(t_T - 15\right)\right] - MF \bullet V_m\left[1-\alpha\left(t_m - 15\right)\right] \qquad (10)$$

In order to make an uncertainty estimate, equation 10, by neglecting the expansion factors, can be rewritten as follows:

$$E = V_T - MF \bullet V_m \qquad (10')$$

From equation 10' it can be seen that the verification error uncertainty basically depends on the input uncertainty sources given in the table below.

Input quantity	Uncertainty sources
V_T	- resolution of the volume gauge of the tank under test
MF	- master meter repeatability (during master meter calibration) - prover calibration uncertainty - master meter drift - master meter reading resolution (during master meter calibration)
V_m	- master meter repeatability - master meter reading resolution

	Input measured value	Sensitivity coefficient	Input standard uncertainty	Statistical distribution	Standard uncertainty $u_i(x_i)$
B.1	Volume reading on the tank under test gauge	$\frac{\partial E}{\partial V_T} = 1$	$u(V_T) = \frac{d_T}{2\sqrt{3}}$	rectangular	$\frac{d_T}{2\sqrt{3}}$
B.2	Meter factor	$\frac{\partial E}{\partial MF} = -V_m$	$u(MF)$	rectangular	$\text{-V}_\text{m} \bullet \text{u}(\text{MF})$
B.3	Volume meter measurement	$\frac{\partial E}{\partial V_m} = MF = 1$	$u(V_m)$	rectangular	$u(V_m)$

From equation 10', the standard uncertainty of the error E can be obtained from the following:

$$u^2(E) = \left(\frac{\partial E}{\partial V_T}\right)^2 u^2(V_T) + \left(\frac{\partial E}{\partial MF}\right)^2 u^2(MF) + \left(\frac{\partial E}{\partial V_m}\right)^2 u^2(V_m) \qquad (11)$$

By means of equation 11, the uncertainty budget can be written [4] as in the table at the top of this page.

According to the table, equation (11) can be rewritten as:

$$u^2(E) = \frac{d^2{}_T}{12} + V_m^2 \bullet u^2(MF) + u^2(V_m) \qquad (12)$$

From the Meter Factor definition in equation (9), assuming the temperature correction factor equal to unity, and taking in account possible drifts in the meter factor, the following can be written:

$$u^2(MF) = \left(\frac{\partial MF}{\partial V_p}\right)^2 u^2(V_p) + \left(\frac{\partial MF}{\partial V_m}\right)^2 u^2(V_m) + \left(\frac{MF_2 - \text{MF}_1}{\sqrt{3}}\right)^2 =$$
$$= \frac{1}{V_m^2} u^2(V_p) + \frac{V_p^2}{V_m^4} u^2(V_m) + \left(\frac{MF_2 - \text{MF}_1}{\sqrt{3}}\right)^2 = \frac{1}{V_m^2}\left[u^2(V_p) + u^2(V_m)\right] + \left(\frac{MF_2 - \text{MF}_1}{\sqrt{3}}\right)^2 \qquad (13)$$

where the last term in equation (13) is the drift term uncertainty estimated on the basis of the average Meter Factor MF_2 after a series of tank verifications and the meter factor MF_1 taken at the beginning of the verification session. By substituting equation (13) in equation (12), the error variance becomes:

$$u^2(E) = \frac{d^2{}_T}{12} + \left[u^2(V_p) + u^2(V_m)\right] + u^2(V_m) \bullet \left(\frac{MF_2 - \text{MF}_1}{\sqrt{3}}\right)^2 + u^2(V_m)$$

The error standard uncertainty can be written as:

$$u(E) = \sqrt{\frac{d_T^2}{12} + u^2(V_p) + 2u^2(V_m) + V_m^2 \bullet \frac{(MF_2 - \text{MF}_1)^2}{3}}$$

Considering V_p as being almost equal to V_m, the relative expanded uncertainty can be written as follows:

$$\frac{u(E)}{V_m} = 2\sqrt{\frac{d_T^2}{12V_T^2} + \frac{u^2(V_p)}{V_p^2} + 2\frac{u_m^2(V_m)}{V_m^2} + \frac{(MF_2 - \text{MF}_1)^2}{3}} \qquad (14)$$

As can be seen from equation 14, the expanded uncertainty depends on the meter performances (repeatability relative standard uncertainty:

$$\frac{u(V_m)}{V_m}$$

and drift relative standard uncertainty):

$$\frac{MF_2 - \text{MF}_2}{\sqrt{3}}$$

In order to achieve a maximum estimate of the verification uncertainty not depending on the actual master meter performance (the so-called *verification uncertainty* or *verification capability*), the values in the table at the top of the next page can be reasonably attributed to the terms in equation 14; from this table the relative maximum verification uncertainty is:

$$\frac{U(E)}{V_m} = 2\sqrt{\frac{(10^{-3})^2}{12} + \left(\frac{5 \times 10^{-4}}{\sqrt{3}}\right)^2 + \left(\frac{10^{-3}}{\sqrt{3}}\right)^2} = 1.83 \times 10^{-3} = 0.18\,\%$$

In this case, the Test Uncertainty Ratio is:

$TUR = \frac{0.18\%}{0.5\%} = 0.36$ which is slightly greater than $\frac{1}{3}$.

It can be deemed that when evaluating the verification uncertainty in the actual conditions, some uncertainty sources such as, for example, the master meter repeatability, could contribute in a lesser way (as, in fact, it generally does) to the total verification uncertainty. Thus the verification process can be deemed, also in this case, to be less than 1/3.

Terms in input side of eq.14	Value	Distribution	Remarks
$\frac{1}{12}(\frac{d_T}{V_T})^2$	$\frac{(10^{-3})^2}{12}$	rectangular	The scale volume gauge is at least in the ratio 1:1 000 in respect of the tank volume
$\frac{u^2(V_p)}{V_p^2}$	$(\frac{5\times10^{-4}}{\sqrt{3}})^2$	rectangular	The extent of the rectangular distribution is the tolerance for the prover [OIML R 120], in case of reading the prover volume without correction
$2\frac{u^2(V_m)}{V_m^2}$	$2\frac{(2\bullet10^{-3})^2}{(2\sqrt{3})^2}=2\bullet\frac{(10^{-3})^2}{(\sqrt{3})^2}$	rectangular	The extent of the rectangular distribution is the maximum allowable range in the repeatability test (0.2 % of the maximum permissible error)
$\frac{(MF_2-\mathrm{MF}_1)^2}{3}$	0	rectangular	No drift at all

Conclusions

From the uncertainty analysis performed, it can be seen that the achievable uncertainties do not assure the general criterion of the TUR less than the one third when evaluating the conformity requirement of accuracy in initial verification, where the maximum permissible relative error is 0.2 %. In the case of initial verification by means of one of the two methods described it shall be necessary to consider the verification capability and correspondingly reduce the tolerance applicable to the tank under test, or, alternatively, to perform a calibration to zero error and consider the uncertainty as the error which affects the calibration process.

In subsequent verification both methods fit the purpose.

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MASS MEASUREMENT

Guideline for selecting a suitable class of weights for balance calibration

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Abstract

This paper presents the following concise guideline to assist balance users in selecting a suitable class of weights to calibrate their balances:

Calculate n = capacity/scale division

When n = 10 000 or smaller, use class M_1 weights
When n > 10 000 to 30 000, use class F_2 weights
When n > 30 000 to 100 000, use class F_1 weights
When n > 100 000 to 300 000, use class E_2 weights
When n > 300 000 or above, use class E_1 weights

The way in which this guideline was established will also be presented.

Keywords: balance, calibration, weights, measurement uncertainty.

1 Introduction

Mass measurement is the most common measurement in trade, since most goods, from valuable items such as gold to low cost items such as fruit and vegetables, are mainly priced according to their mass.

Besides trading, mass measurement is also widely used in other areas such as manufacturing, testing and research. Mass measurement is normally performed with a balance. To cope for various usages, balances are available in a myriad of options with different ranges and scale divisions. The choice of balance depends on the application and on the accuracy requirement, and in this regard a balance with a particular range is available with different scale divisions. To calibrate a balance, standard weights are used.

Weights are classified according to OIML R 111-1:2004 [1]. Each class is associated with different magnitudes of measurement uncertainty. To calibrate balances of a particular range but with different scale divisions, weights of different classes may be needed. In this regard, the balance owner is usually puzzled by the selection of a suitable class of weights to calibrate the balance.

Consequently, the question regarding the choice of a suitable class of weights for a particular balance is frequently posed to our Laboratory, which has attempted to develop a guideline to assist users in different industries to select a suitable class of weights to calibrate their balances.

2 Criteria for the guideline

There are already many good guidelines available for the selection of a suitable class of weights for balance calibration, such as the table presented in the UKAS publication LAB 14 (Calibration of Weighing Machines). In this paper, I attempt to develop a very simple and concise guideline which is easily memorized and therefore easily applied.

3 Basis of the guideline

The rule of thumb for selecting a measurement standard to perform an instrument calibration is that the measurement uncertainty[1] of the standard should not contribute significantly to the resulting measurement uncertainty of calibration. Otherwise, it will affect the decision as to whether the instrument will meet its specification and/or increase the measurement uncertainty of using the instrument under calibration afterwards.

For the first case, the measurement uncertainty of the standard used should be much smaller than the maximum permissible error of the instrument under test. For the latter case, the measurement uncertainty of the measurement standard should be much smaller than the perceived accuracy of using the instrument under calibration.

In this regard, for balance calibration, the total measurement uncertainty of the standard weight/weights[2] should not be greater than the scale division of the balance under calibration, since generally the measurement uncertainty of using the balance will not be better than its scale division. To take this matter

[1] The uncertainty quoted in this paper is the expanded measurement uncertainty at 95 % confidence level.

[2] According to OIML R 111-1, if a combination of weights is used and their covariances are not known, a correlation coefficient of 1 can be assumed. This will lead to a linear summation of measurement uncertainties.

forward, the question is how much smaller the measurement uncertainty of the standard weight/weights should be than the balance scale division. The widely adopted principle, the rule of ten to one, can be applied. This rule states that the measurement uncertainty of the weight/weights should be about 10 % of the scale division of the balance under calibration. Nevertheless, sometimes the rule of ten to one cannot be applied.

The reasons are mainly twofold:

- The first is due to financial constraints, since the cost of a standard usually increases exponentially with increased accuracy of the standard. A standard slightly less than the designated standard may entail a much lower cost and it makes economical sense to use the less accurate standard instead. Moreover, it may not be affordable to own the designated standard.
- Secondly it may be due to technical limitations that a standard having an uncertainty ten times less than the accuracy of the instrument under calibration is not available in the market or does not exist. Hence sometimes a compromise has to be made; for example, some publications for balance calibration set a lower requirement that the balance scale division should be more than two times the measurement uncertainty of the standard. In this paper, the basis is that the balance scale division should be about five to seven times the measurement uncertainty of the standard weight/weights, or the measurement uncertainty of the weight/weights is about 14–20 % of the balance scale division.

4 Development of the guideline

With reference to Table 1 of OIML R 111-1, the relative maximum permissible errors (MPEs) for weights of nominal values of 100 g and above[3] are as follows (Classes lower than class M_1 are not considered in this paper, as they are not appropriate for most laboratory applications):

Relative MPE of class E_1 weight = 0.5×10^{-6}
Relative MPE of class E_2 weight = 1.6×10^{-6}
Relative MPE of class F_1 weight = 5×10^{-6}
Relative MPE of class F_2 weight = 16×10^{-6}
Relative MPE of class M_1 weight = 50×10^{-6}

[3] For weights of nominal values smaller than 100 g, the relative MPEs are usually greater. However, consideration for nominal value of 100 g and above in this work is usually adequate since the capacities of most commercial balance are greater than 100 g.

With reference to 5.2 of OIML R 111-1, the expanded measurement uncertainty of the conventional mass for k = 2 shall be less than or equal to one-third of its MPE. In this regard, the relative measurement uncertainty of each class will be as follows:

Relative measurement uncertainty of class E_1 weight, $U_{E1} \leq 0.16 \times 10^{-6}$
Relative measurement uncertainty of class E_2 weight, $U_{E2} \leq 0.53 \times 10^{-6}$
Relative measurement uncertainty of class F_1 weight, $U_{F1} \leq 1.6 \times 10^{-6}$
Relative measurement uncertainty of class F_2 weight, $U_{F2} \leq 5.3 \times 10^{-6}$
Relative measurement uncertainty of class M_1 weight, $U_{M1} \leq 16 \times 10^{-6}$

At this juncture, a particular balance attribute, n, which is equal to the ratio of the balance capacity to the scale division, is defined, i.e. n = capacity/scale division. The reciprocal of n is the relative smallest division pertaining to the balance, r. Consequently the guideline is devised with reference to r and the relative measurement uncertainty of each class of weight, such that a particular r is five to seven times the relative measurement uncertainty of a particular class of weight. Subsequent to a number of trials, the following scenario arises:

r (1/n)	Multiplier	Relative uncertainty
1 / 1 000 000 (1×10^{-6})	← $U_{E1} \times 6.3$	$U_{E1} \leq 0.16 \times 10^{-6}$
1 / 330 000 (3×10^{-6})	← $U_{E2} \times 5.7$	$U_{E2} \leq 0.53 \times 10^{-6}$
1 / 100 000 (10×10^{-6})	← $U_{F1} \times 6.3$	$U_{F1} \leq 1.6 \times 10^{-6}$
1 / 33 000 (30×10^{-6})	← $U_{F2} \times 5.7$	$U_{F2} \leq 5.3 \times 10^{-6}$
1 / 10 000 (100×10^{-6})	← $U_{M1} \times 6.3$	$U_{M1} \leq 16 \times 10^{-6}$

With reference to the above, the following guideline can be formulated:

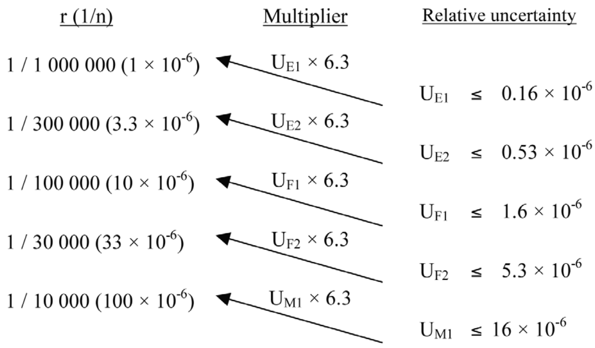
n = capacity/scale division

When n = 10 000 or smaller, use class M_1 weights
When n > 10 000 to 33 000, use class F_2 weights
When n > 33 000 to 100 000, use class F_1 weights
When n > 100 000 to 330 000, use class E_2 weights
When n > 330 000 or above, use class E_1 weights

After unifying the multiplier and rounding n for easier memorization, the proposed guideline was developed as follows:

n = capacity/scale division

When n = 10 000 or smaller, use class M_1 weights
When n > 10 000 to 30 000, use class F_2 weights
When n > 30 000 to 100 000, use class F_1 weights
When n > 100 000 to 300 000, use class E_2 weights
When n > 300 000 or above, use class E_1 weights



The following two examples are presented to show how to put the above guideline into use:

(i) For a balance with 6.1 kg capacity and 0.1 g scale division, n = 61 000. With reference to the guideline, class F_1 weights will be used to calibrate this balance.

(ii) For a balance with 1.6 kg capacity and 0.1 g scale division, n = 16 000. With reference to the guideline, class F_2 weights will be used to calibrate this balance.

For the first case, three class F_1 weights with nominal values 5 kg, 1 kg and 100 g will be used to calibrate the balance at its maximum capacity at 6.1 kg; the sum of the measurement uncertainties of these three weights will be 10.1 mg (25 mg/3 + 5 mg/3 + 0.5 mg/3) which is about 10 % of the balance scale division. For the second case, three class F_2 weights of 1 kg, 500 g and 100 g will be used to calibrate the balance at its maximum capacity at 1.6 kg; the sum of the measurement uncertainties of these three weights will be 8.5 mg (16 mg/3 + 8 mg/3 + 1.6 mg/3), which is less than 10 % of the balance scale division.

5 Conclusion

A concise, easily memorized and user-friendly guideline for selecting a suitable class of weights for balance calibration has been developed.

As shown in the examples in the final part of section 4, although the guideline was devised on the basis that the measurement uncertainty of the weight/weights is about 14–20 % of the balance scale division, the choice of weights according to this guideline may satisfy the rule of ten to one.

This is also augmented by the fact that the devise of the guideline assumes that the measurement uncertainty of the standard weight is one-third of the specified maximum permissible error, but in some cases it will be possible to obtain lower measurement uncertainties than this, and it may therefore sometimes be possible to use weights pertaining to a lower class.

Anyway, one of the purposes of this guideline is to provide food for thought. In any case, it is not an ultimate or optimum solution. Anyone can modify this guideline to suit different uses, for example, using the basis of measurement uncertainty of weights equivalent to 50 % of the balance scale division. It may also be refined using mathematical or computing techniques.

6 References

[1] OIML International Recommendation R 111-1:2004 *Weights of classes E_1, E_2, F_1, F_2, M_1, M_{1-2}, M_2, M_{2-3}, Part 1: Metrological and technical requirements*

[2] UKAS LAB 14, Edition 2006 - Calibration of Weighing Machines

OIML TECHNICAL WORK

OIML TC/SC Secretariat Training

Second session 5-8 May 2009

Douai, France

RÉGINE GAUCHER
PROJECT LEADER, BIML

Because of its proximity to Paris and CDG Airport, the accommodation and meeting room facilities, and also the very reasonable organization costs, the second session was again this year held at the Ecole des Mines in Douai, Northern France. Thirteen participants attended, meaning that in total, 26 OIML TC/SC Secretariats out of 54 have now been trained.

Two coordinators of OIML technical work in their countries also attended and two countries have already anticipated the participation of future Secretariats. This is definitely a key point in increasing the efficiency of the OIML technical work.

As envisaged when the initial proposal was submitted to the Presidential Council, these Training Seminars will be organized on a periodic basis; every three years seems to be appropriate. Consequently, the next session will likely be scheduled for 2011 and it is expected that the next session will also serve as a maintenance session to present the revision of the Directives for the OIML Technical Work.

1 Background

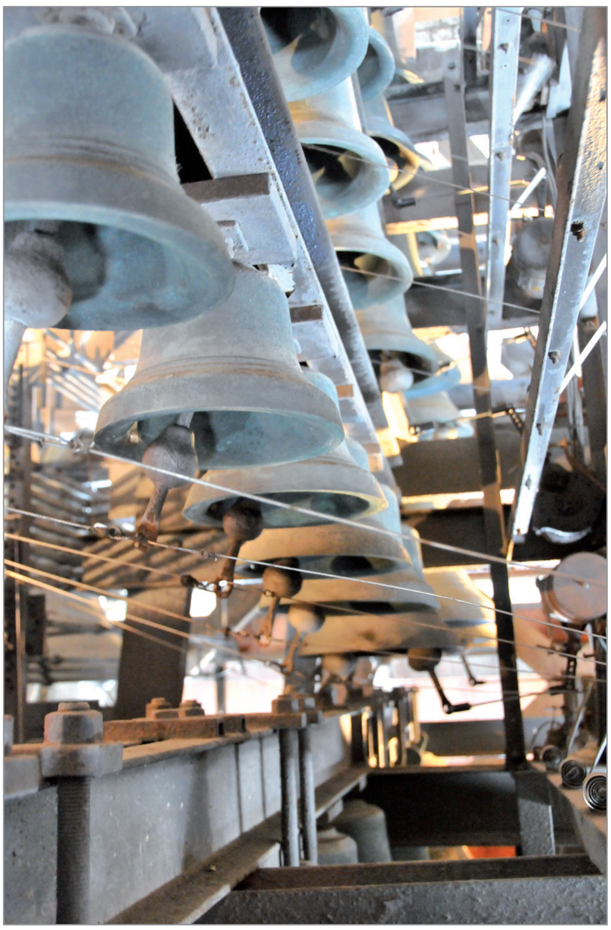
On the basis of Resolution no. 23 of the 43rd CIML Meeting, the BIML organized the second session of the Training Seminar for the Secretariats of OIML Technical Committees and Subcommittees over a four-day period in May 2009.

2 Reminder of the training goals

The Training Seminar program was established on the basis of the following goals:

- Reminder of OIML technical work and associated procedures (notably the Directives);

Delegates visited the Douai Belfry and were given a demonstration of bell-ringing



- Presentation of the changes to be implemented in OIML procedures to facilitate and speed up the technical work;
- Presentation of tools to assist TC/SC Secretariats in drawing up OIML Publications, in particular OIML Recommendations;
- OIML Documents to assist in developing requirements and tests in OIML Recommendations (e.g. OIML D 11, OIML D 31);
- Templates (e.g. Foreword format, Recommendation format, TC/SC voting form format); and
- Interactive workgroups for TCs/SCs to be managed by the TC/SC Secretariats.

Again this year, the session related to practical exercises was highly appreciated. Small groups were established, each being requested to draw up a certain section of a new (fictitious) OIML Recommendation on "coin counters". Participants had been given an information file on the instrument prior to the Seminar.

As suggested by participants in the first session, more time was devoted this year to the practical exercises (1.5 days). This unfortunately meant that presentations by liaisons on the last day were cancelled but, as requested by the BIML, liaisons still updated their presentations and these were made available on the CD handed to each participant at the end of the Seminar.

The Draft Recommendation Format, developed last year for the first session, was updated before the second session; it is available to all TC/SC Secretariats on the interactive TC/SC pages on the OIML web site (http://tcsc.oiml.org) under the heading "General Templates" and comprises two documents:

- Part 1: Metrological and technical requirements combined with Part 2: Metrological controls and performance tests; and
- Part 3: Report format for type evaluation.

Those TC/SC Secretariats that are starting to develop new OIML Recommendations should use these documents and send any appropriate comments to the BIML to provide inputs to the Working Group being set up.

The development of such a Format is linked to the revision of Part 2 of the Directives for the OIML Technical Work. Consequently, the BIML is setting up a Working Group to officially pursue the work on the Format and CIML Members should hopefully be informed of its composition at the 44th CIML Meeting.

3 Feedback from participants in the second session

At the end of the Training Seminar, each participant was again requested to fill in a Seminar Satisfaction Inquiry which focused on the following aspects:

- General organization;
- Training content;
- Training duration;
- Use of such training;
- Any training sections to be extended; and
- Any training sections to be withdrawn.

The results of this inquiry are summarized in the graphs.

In addition to this inquiry, the following additional comments from participants are of note:

- Efficiency of the work in small groups for practical exercises;

- Ideal opportunity for TC/SC Secretariats to meet each other and to exchange information, which allows teaching and sharing of experience to be combined;
- Development of a dedicated item in the Training Seminar for Secretariats to practice on the TC/SC Workgroups web sites;
- Organization of a shorter Training Seminar for all TC/SC Members (P-Members, O-Members, Liaisons);
- Organization of Technical Training Sessions based on OIML Recommendations as soon as an OIML Recommendation is published;
- OIML Recommendation Format to be made official as soon as possible;
- Organization of a specific Training Seminar on D 31; and
- Suggestion to have the training courses available on the OIML web site on video.

4 Next step

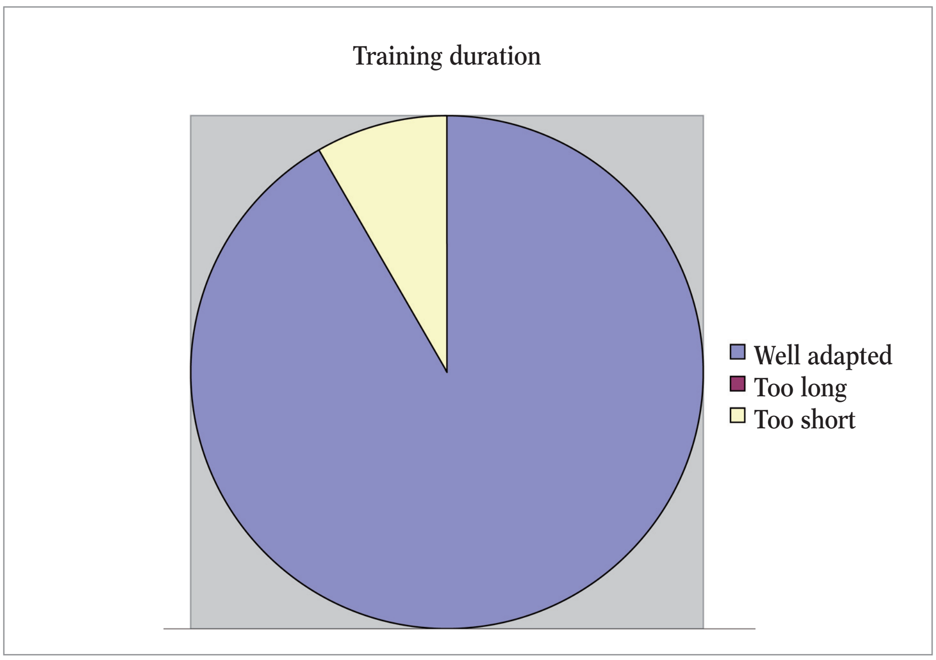
Taking the feedback from participants into consideration, the next session could be modified on the basis of the following suggestions:

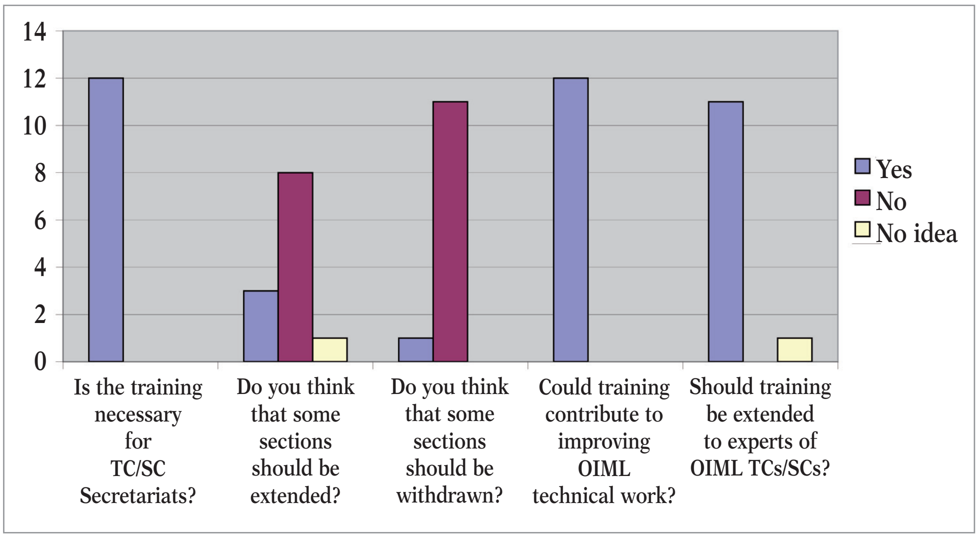
- Identification of several modules in the program to facilitate adaptation of the training to all TC/SC Members;
- Presentation of the Ecole Supérieure de Métrologie to be combined with the general presentation of the Ecole des Mines;
- Adding a practical module on the use of the TC/SC Workgroups which should also be presented by BIML Contacts when attending TC/SC meetings;
- Adding a presentation on conformity to type issues.

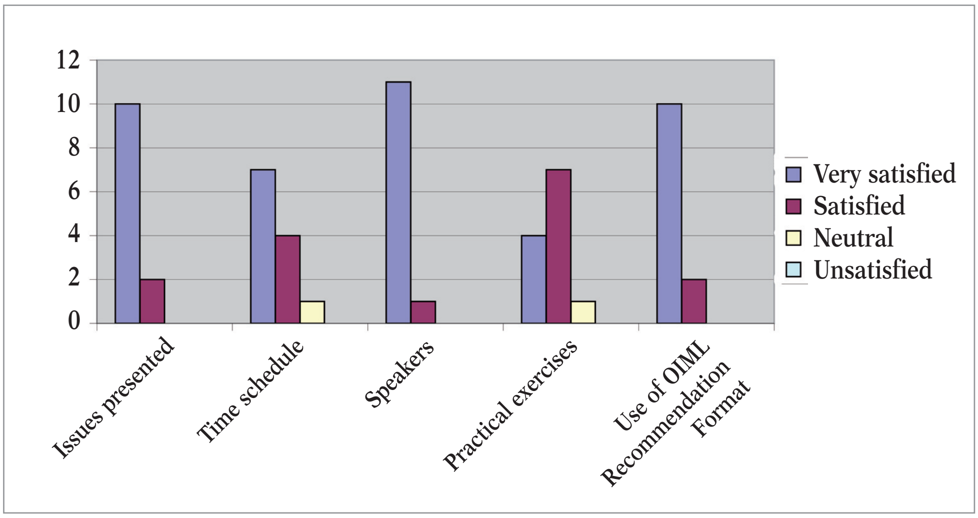
5 Associated proposals:

- CIML Resolution at the 44th CIML Meeting to remind CIML Members of TC/SC Secretariats' responsibilities and availability of the periodic Training Seminars, in particular for newly appointed Secretariats; and
- Development of an OIML Guide for TC/SC Secretariats (similar to the existing *Guide for CIML Members*) as soon as Part 1 of the Directives for the OIML Technical Work has been revised.

Summary of the feedback received from the participants




14
12
10
8
6
4
2
0
Is the training necessary for TC/SC Secretariats?
Do you think that some sections should be extended?
Do you think that some sections should be withdrawn?
Could training contribute to improving OIML technical work?
Should training be extended to experts of OIML TCs/SCs?
Yes
No
No idea


12
10
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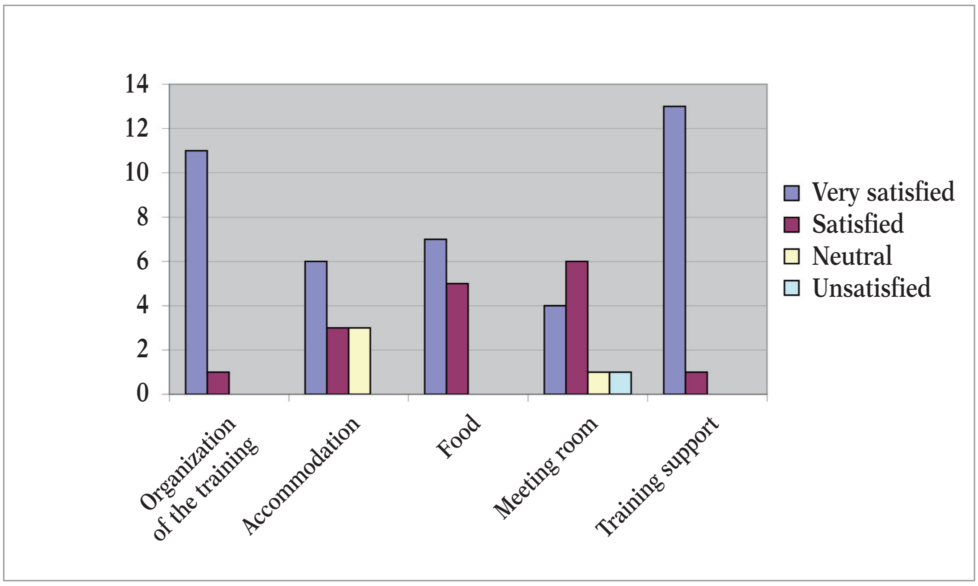
Issues presented
Time schedule
Speakers
Practical exercises
Use of OIML Recommendation Format
Very satisfied
Satisfied
Neutral
Unsatisfied


14
12
10
8
6
4
2
0
Organization of the training
Accommodation
Food
Meeting room
Training support
Very satisfied
Satisfied
Neutral
Unsatisfied

TC/SC NEWS

OIML TC 6 Meeting

17–20 March 2009

National Regulator for Compulsory Specifications, Pretoria, South-Africa

WILLEM KOOL, Assistant Director, BIML

A meeting of OIML TC 6 *Prepackaged products* was hosted by the Legal Metrology Department of the NRCS, the South African National Regulator for Compulsory Specifications, formerly part of SABS, the South African Bureau of Standards.

Stuart Carstens, Head of NRCS' Legal Metrology Department, CIML Member for South Africa and, as such, responsible for OIML TC 6, chaired the meeting. There were 18 participants representing 9 P-Members of TC 6 and the BIML. The main items on the agenda were:

- the OIML Certification System for Prepackages (IQ-mark system),
- requirements for the "minimum principle",
- the revision of OIML R 79 *Labeling requirements for prepackaged products*, and
- the requirements for MCBs (measuring container bottles).

OIML Certification System for Prepackages (IQ-mark system)

The meeting agreed on the principles of the Certification System. The scope of the system covers:

- prepackages in compliance with OIML R 87 *Quantity of product in prepackages* and R 79 *Labeling requirements for prepackaged products*,
- prepackages belonging to a category of product for which recognized procedures are available in OIML normative publications for carrying out tests to determine compliance with OIML R 87 requirements.

Participation will be voluntary for certification bodies and packers. Certification bodies will be designated by a CIML Member and may be private or public entities, depending on national legislation. Acceptance of certificates by authorities is also voluntary. The system will be managed by a Management Committee, with representation from each CIML Member that has designated participants in the system.

The objectives of the certification system are:

- to provide confidence in the declaration of the nominal quantity in prepackages,
- to promote the uniform declaration of the nominal quantity in prepackages,
- to facilitate trade in prepackaged products, and
- to increase the efficiency of the control of prepackages by authorities.

In the system, certification bodies are designated by a CIML Member after assessment and approval of their application by the Management Committee. The Management Committee consists of the CIML Members that have designated certification bodies, or an expert they have designated to represent them in the Committee. The BIML will act as the secretariat for the Management Committee.

The designation of a certification body is notified to the BIML for registration purposes. The BIML will maintain a list of designated certification bodies on its web site. The designated certification bodies may then certify packers producing prepackages within the scope of the certification system and specified in the packer's certificate. Certificates (or at least their references and scope) will be published by the certification bodies on their respective web sites. Packages covered by a certificate shall bear a marking (tentatively named the IQ-mark) which will enable inspectors to trace the certificate's validity.

The Secretariat of TC 6 will now prepare a next draft for the "Framework for a certification system for prepackages" which will be circulated by the end of July 2009 as the First Committee Draft (1CD) to CIML Members, OIML Corresponding Members and Liaison Organizations for comment.

Minimum principle

The current scope of OIML R 87 covers prepackages filled to the so called "average principle", which means that a production lot of prepackages on average contains at least the nominal quantity[1]. However, there are still countries that require prepackages to be filled according to the so called "minimum principle", which means that each prepackage contains at least the nominal quantity.

1 The 'nominal quantity' is the quantity of product in a prepackage declared on the label by the packer (OIML R 87:2004, 2.8).

To facilitate the use of the OIML IQ-system for prepackages made up according to the minimum principle, TC 6 decided that the next revision of OIML R 87 shall include requirements for such prepackages.

Revision of OIML R 79

The meeting discussed the comments received on the first working draft on a revision of OIML R 79. The meeting felt that the concept of "Principal Display Panel" as the location where important information about the prepackaged product has to be displayed should be maintained.

Another subject of discussion was the use of units of measurement for specific products, such as yogurt, ice cream and aerosols and other viscous and semi-solid products for which there is no apparent international consensus as to whether they should be declared in units of mass or volume.

An ad-hoc group has been established to examine the existing requirements in various countries and to make a proposal for a list of products and their required units of measurement.

The meeting noted that in some instances there is an overlap between OIML R 79 and other international standards, for instance the food standards published by Codex Alimentarius.

As a general rule, OIML R 79 should only contain requirements for labeling and presentation of information that relates to the nominal quantity of prepackages and to the enforcement of the requirements on the quantity of product in the prepackage.

Measuring container bottles

The meeting decided to establish an ad-hoc group to investigate and report on the apparent incompatibility of the maximum permissible errors for MCBs (measuring container bottles) and those for prepackaged products in R 87. The ad-hoc group, led by South Africa, will formulate a work plan and report at the next TC 6 meeting.

Drained weight

In order for the OIML Certification System for prepackages to work properly, there has to be consensus on the procedures for determining the quantity of product in a prepackage. OIML R 87:2004 contains informative annexes outlining a general examination procedure, a tare procedure, a procedure for the quantity of product packed in a liquid medium ("drained weight") and procedures to determine the actual quantity of frozen products.

The meeting felt that these procedures should be the subject of a separate normative document and requested the Secretariat to initiate a new work item for TC 6, to be approved by the CIML.

Considering that WELMEC (the European Cooperation in Legal Metrology) has published a guidance document on the same subjects (WELMEC 6.8) and that the European Commission may ask WELMEC or the European Standardization Organizations to develop a European standard from the WELMEC document, TC 6 resolved to seek collaboration with these European organizations in developing such a normative document.

Next meeting

It was decided that the next meeting of TC 6 should take place in the first quarter of 2010. Several options for the venue are still open, as a number of. Several countries have offered to host one of the future meetings: Japan, USA, New Zealand and Germany. However, depending on the resources available, the Secretariat will make a decision to convene the next meeting in South Africa or elsewhere and decide on the dates. ■

TC/SC NEWS

OIML TC 8/SC 5 ISO/TC 30/SC 7 CEN/TC 92

Joint ISO/OIML Working Group Meeting

12–15 May 2009 Ottawa, Canada

MORAYO AWOSOLA, TC 8/SC 5 Secretariat

The third meeting of the international Joint Working Group (JWG) for the harmonization of the water meter standards of OIML/TC 8/SC 5 (Water meters), ISO/TC 30/SC 7 (Volume methods including water meters), and CEN/TC 92 (Water meters) was held at Measurement Canada, Ottawa on 12–15 May 2009 courtesy of Mr. James Welsh from Measurement Canada and Mr. Alan E. Johnston, President of Measurement Canada and CIML President.

The meeting was chaired by Dr. Michael Reader-Harris, chairman of OIML TC 8/SC 5 from the National Engineering Laboratory (NEL) and consisted of legal metrology experts and manufacturers' representatives from the United States, United Kingdom, France, Germany, South Africa, Romania, Australia, Switzerland, Brazil and Canada.

Participants in the meeting discussed the working draft documents developed by the JWG and the wider consultation comments on the documents received for:

- Water meters intended for the metering of cold potable water and hot water - Part 1: Metrological and technical requirements, and
- Water meters intended for the metering of cold potable water and hot water - Part 2: Test methods.

During the discussions three crucial topics were raised for future considerations in the harmonization work:

- Requirements for irrigation meters;
- Requirements for software controlled water meters; and
- Flexibility to enable manufactures to specify flowrate limits for the required accuracy.

Proposals for improvements to the standards were agreed with the aim of submitting the First Committee Drafts of all Parts of the standard to the JWG by December 2009; the OIML TC 8/SC 5 Secretariat will then circulate them to OIML TC 8/SC 5 for a wider consultation.

In addition to the JWG meeting, separate meetings of OIML TC 8/SC 5, ISO TC 23/SC 8 and CEN TC 92 committees were held.

The OIML TC 8/SC 5 meeting, chaired by the SC 5 Secretariat Mr. Morayo Awosola, agreed to work with ISO TC 30/SC 7 on the development and maintenance of jointly developed documents which will, in the future, be maintained in parallel by the OIML TC 8/SC 5 and ISO TC 30/SC 7 Subcommittees.

The revision of OIML D 7 *The evaluation of flow standards and facilities used for testing water meters* was discussed during the OIML TC 8/SC 5 meeting. It was agreed that the OIML TC 8/SC 5 Secretariat will request a formal vote from TC 8/SC 5 P-Members on whether to revise, confirm, or withdraw OIML D 7. The request for a formal vote will be accompanied by an investigative report on OIML D 7 from James Welsh (OIML D 7 revision chairman).

The JWG meeting discussed irrigation water meter standards and explored possibilities of working with ISO TC 23/SC 8 *Irrigation and drainage equipment and systems*. It was agreed to invite a representative from ISO TC 23/SC 8 to give a presentation on irrigation water meter standards to the JWG. There was also a presentation from Mr. Adriano Fernandes de Oliveira of Acatris/Itron, Brazil on *Proposal for local solutions: Profile consumption and endurance test*.

During the CEN/TC 92 meeting, a presentation was given by Mrs. Gudrun Wendt from the PTB, Germany on *Practical experience based on LDA flow profile measurements to verify ideal liquid flow conditions*. There was also a presentation from Mr. Grabel van der Burg, The Netherlands, on the *Smart meter coordination group* focusing on Mandate No. M441 from the EU Commission to CEN, CENELEC and ETSI for the development of an open architecture for utility meters involving communication protocols enabling interoperability. The main requirements of this Mandate are:

- Has to be performance based;
- Enable remote meter reading;
- Advanced information and management of information services;
- No conflict with the Measuring Instruments Directive (MID); and
- Take into account International standards.

OIML TC 8/SC 5 decided to hold the next meeting in conjunction with the next joint ISO/CEN/OIML water meter meeting in the week 19–23 April, 2010 in Paris.

Background of the ISO/TC 30/SC 7, OIML TC 8/SC 5, CEN/TC 92 Joint Working Group

Four years ago three sets of water meter standards with very similar technical requirements were published:

- ISO 4064:2005 - Measurement of water flow in fully charged closed conduits - Meters for cold potable water and hot water;
- OIML R 49:2006 - Water meters intended for the metering of cold potable water and hot water;
- EN 14154:2007 - Water meters.

Because of the close technical requirements in the three standards the various Technical Committees got together and agreed to harmonize the three documents with the following objectives:

- To harmonize the requirements in the water meter standards/regulations to ensure consistency and simplicity when updating the standards; and
- From an EU point of view, to ensure uniformity of EN 14154 and OIML R 49 when meeting the requirements of the Measuring Instruments Directive (MID).

Morayo Awosola,
TC 8/SC 5 Secretariat
NMO, United Kingdom

SEMINAR REPORT

OIML Seminar on Smart Meters

Brijuni, Croatia 2-5 June 2009

WILLEM KOOL, Assistant Director, BIML

Introduction

An OIML seminar on smart meters was organized to bring together relevant stakeholders in the legal metrological aspects of smart metering: manufacturers, users (utilities and consumers), authorities (regulators, inspectorates), and conformity assessment bodies, together with the Secretariats of the relevant OIML Technical Committees and Subcommittees.

The seminar was hosted by the Croatian State Office for Metrology, and its purpose was to take note of recent developments in smart metering (technologies and regulations, experiences and lessons learned) and to investigate the impact on the international harmonization of legal requirements for utility meters.

Fifty experts from 23 countries participated, representing national authorities, the European Commission, industry, standardization bodies, OIML Technical Committees and Subcommittees, and the BIML.

In many economies over the past ten years or so, utility companies and the authorities have considered the introduction of so-called "smart meters". In a number of cases trials have been set up and decisions have been made to roll-out smart meters in whole networks and sometimes even nationwide.

Such decisions vary from stakeholder to stakeholder: the authorities are under the obligation to ensure that energy consumption is reduced, and utility companies are constantly looking for ways to improve efficiency, reduce costs and increase their competitiveness.

Business cases underpinning the decisions to roll-out smart meters take account of costs and benefits for both the utility companies and the consumers, and generally mention issues such as the price of new meters, the cost of replacing existing meters, the benefits of employing new technologies, etc.

The authorities are trying to deal with these developments by implementing regulations that take into account the additional functionalities offered by such new technologies.

In many countries, utility meters are traditionally under legal metrological control. The OIML has published Recommendations for water meters, heat meters, gas meters and electricity meters that serve as international standards (model regulations) for national legislation. The OIML has also published a horizontal Document *"General requirements for software controlled measuring instruments"* (OIML D 31:2008).

As well as offering a very diversified series of presentations, the Seminar also aimed to produce:

- draft terms and definitions relevant to smart meters and smart metering, for use in legal metrology;
- a list of additional functionalities that should be subject to harmonized legal requirements;
- suggestions for the inclusion of new requirements in existing or new OIML publications; and
- a draft action plan for the relevant OIML Technical Committees and Subcommittees.

The participants in the Seminar were given background information prior to the event (documents and links on a web site specially published for the occasion); the conclusions and presentations have also been published and a selection of these will be adapted into articles for the OIML Bulletin.

Round Tables

On Thursday, 4 June 2009 from 14.00 to 17.30 a first **Round Table** was held, chaired and moderated by Mr. Samuel Just (BIML) and entitled ***Definitions for 'smart meter', 'smart metering', 'additional functionalities', etc.***

The discussion started by reviewing some 'additional' functions, and by considering under which conditions these would be subject to legal metrological control, for instance those in the table at the top of page 26.

Having considered the many functions that may be added to utility meters when new technologies, such as power line communication, wireless communication and associated software are used, the participants in the

— PROGRAM —

Session I: Tuesday, 2 June 2009, 11.00–17.30
Chair / moderator: Mr. Tuomo Valkeapää, TUKES, Finland

Speakers:

Ms. Lucia Palmegiani, DG-ENTR, European Commission.
European Legal Framework for smart meters – Commission mandate for European harmonized standards

Mr. Michael Abraham, Measurement Canada, Canada
Implementation of smart meters in the Canadian electricity sector

Mr. Jos Dehaeseleer, ORES (Gas and electricity network operator), Belgium
MARCOGAZ / FACOGAZ position on gas smart metering systems

Mr. Györö Kmethy, DLMS User Association, Switzerland
Smart metering: The OPEN meter European project

Mr. William Hardy, PhD, UTILIMETRICS, USA
Smart Metering in North America

Session II: Wednesday, 3 June 2009, 09.00–15.30
Chair / moderator: Dr. Graham Harvey, NMI, Australia

Speakers:

Mr. Willem Kool, BIML Assistant Director
Coordination of smart metering standardization in Europe

Mr. Jim Sibley, GL Industrial Services, UK
Smart Metering - Is there a need for standards?

Mr. George Teunisse, Verispect, the Netherlands
Smart meters and Powerline Communication Systems – Requirements and tests in harmonized documents

Dr. Rainer Kramer, PTB, Germany
Traceability of results used for billing purposes – possible approaches

Dr. Jos van der Grinten, NMi, the Netherlands
Applying Monte Carlo Methods during verification of measuring instruments

Dr. Ulrich Grottker, PTB, Germany
Application of OIML Document D 31 for smart meters

Session III: Thursday, 4 June 2009, 09.00–12.30
Chair / moderator: Mr. Jean-François Magaña, BIML Director

Speakers:

Dr. Jos van der Grinten, NMi, the Netherlands
Smart Metrology: The way to test smart meters

Mr. Michael Reader-Harris, TÜV NEL Ltd, UK
Water meters: OIML, ISO and CEN harmonization

Dr. Thomas Schaub, Landis+Gyr, Switzerland
Smart metering – towards a European standard fulfilling the market and regulatory requirements

Mr. Adrian Rudd, NMO, UK
Smart meters in competitive energy markets – Where does legal metrology fit?

Mr. Martin Vesper, Yellowstrom GmbH, Germany
Customer driven smart metering

Additional functionalities	Device	Functionality under legal metrological control
Time interval measurement	Clock	**YES**: - if used for billing, or - if it has influence on the metrological characteristics of the meter, or - when the customer cannot verify himself in situ
Tariff register (& changes)	Ripple control receiver (for electricity meters)	**YES**: - if used for billing, or - if it has influence on the metrological characteristics of the meter, or -when the customer cannot verify himself in situ
Remote index reading - One way (secured) communication system		**YES**: - if used for billing, and - when the customer cannot verify himself in situ
Two way (secured) communication system	...	...
Demand metering	...	...
Excess power measurement	...	...
...	...	...

round table discussion agreed that it would not be practicable for the OIML to try to define what a 'smart' meter is and what an 'additional' function would be.

Rather, there was consensus amongst the participants that it would be appropriate to define what the scope of legal metrology should be for the utility meters in design independent terms. Subsequently, it would be possible to determine for each utility meter, or metering system the functions and devices that should be subject to legal metrological control.

In the case of utility meters, the scope of legal metrology would be:

- the correctness of the quantity measurements, i.e. that the measurement results comply with the maximum permissible errors under stated conditions;
- the measurement results provided by the meter or metering system that form the basis for billing and that allow the consumer to verify the correctness of the invoice;
- to verify that any function or device that is connected to the meter or metering system under legal metrological control does not adversely affect the measurement results.

The second bullet point above is crucial for deciding which devices and functions are considered part of the meter or metering system and should, therefore, be subject to legal metrological control. Other functions and devices that are connected to the meter or metering system, such as those that repeat the measurement results, would not be under legal metrological control.

As a result of the discussions the participants agreed on the following 'resolution':

"It is the opinion of the participants in this seminar that metrological control extends to the point where the consumer can verify that the measurement results used for billing are consistent with the reading of the meter."

A second **Round Table** was held on Friday, 5 June from 09.00 to 12.30, chaired and moderated by Mr. Willem Kool (BIML). The theme was the ***Draft action plan for OIML TCs/SCs to deal with smart meters and additional functionalities.***

Following the discussions about the scope of legal metrology in the case of utility meters, the participants discussed possible additional requirements and tests that should be considered for inclusion in OIML Recommendations for the various categories of utility meters.

Most of the issues discussed are reflected in the presentations that had been prepared by Rainer Kramer, Jos van der Grinten and George Teunisse and were extended during the discussions.

The participants agreed that, as a follow up to this seminar, it would be appropriate for the OIML to develop some kind of guidance paper for OIML Technical Committees and Subcommittees dealing with utility meters with suggestions for the application of OIML Documents D 11:2004 *General requirements for electronic measuring instruments* and D 31:2008 *General requirements for software controlled measuring instruments* to utility meters and for additional requirements and (immunity) tests to be considered.

It was suggested that the task of developing such a guidance paper could be performed by an ad-hoc working group. Considering the time pressure and the limited purpose and 'shelf life' of such a guidance paper, it was considered inefficient to allocate this task to an existing OIML TC/SC as a new work item. The guidance paper could be published as an OIML Expert Report.

The BIML undertook to set up such an ad-hoc working group, draft the terms of reference and invite experts to participate on a personal basis. An official circular will be sent to CIML Members, inviting them to nominate further experts. ■

LIAISON ACTIVITIES

ASEAN Seminar on the development of MRAs/MAAs in legal metrology

Bali, Indonesia

24 March 2009

RÉGINE GAUCHER, Project Leader, BIML

Information on ASEAN

ASEAN is the *Association of Southeast Asian Nations* and was established in 1967. Today, ASEAN is composed of the following ten countries:

- Indonesia (OIML Member State)
- Malaysia (OIML Corresponding Member)
- Philippines
- Singapore (OIML Corresponding Member)
- Thailand (OIML Corresponding Member)
- Brunei Darussalam
- Viet Nam (OIML Member State)
- Lao PDR
- Myanmar
- Cambodia (OIML Corresponding Member)

The aim of the Association – as defined in the ASEAN Declaration – is to accelerate economic growth,

social progress and cultural development in the region and to promote regional peace and stability in particular through adherence to the principles of the United Nations Charter.

The ASEAN Community comprises three pillars:

- the ASEAN Political-Security Community (APSC);
- the ASEAN Economic Community (AEC); and
- the ASEAN Socio-Cultural Community (ASCC).

Legal metrology in ASEAN

The Seminar was organized together with the 11th Meeting of the ASEAN Consultative Commitee for Standard and Quality Working Group on Legal Metrology (ACCSQ WG3).

The issue of mutual recognition in the region was highlighted by stakeholders in individual countries and in the ASEAN region who would be able to provide competitive products which would fulfill the needs of the global market.

ASEAN is considering two complementary ways to assist stakeholders:

- development of mutual recognition within ASEAN countries; and
- participation of OIML Member States and Corresponding Members of ASEAN in the OIML MAA.

Such developments are part of the ASEAN Trade In Good Agreement (ATIGA) signed by the trade ministers of all the ASEAN countries and in particular its chapter 7 related to standards, technical regulations and conformity assessment procedures. It addresses:

- the use of international standards in particular when developing technical regulations;
- conformity assessment procedures;
- development of sectorial mutual acceptance arrangements;
- cooperation with national accreditation bodies and national metrology institutes (legal metrology is explicitly mentioned); and
- post market surveillance.

Seminar

The aim of the Seminar was for ASEAN to be able to provide comprehensive information on the OIML for representatives of States, laboratories, legal metrology bodies, manufacturers and users.

Approximately 50 participants from all the ASEAN countries attended; among them were several individuals from Indonesia who had studied at the *Ecole Supérieure de Métrologie* (French engineers school) in the 1980s.

Participants showed great interest in the presentation on the OIML MAA and raised a number of questions. Additional information was given by the BIML Representative in particular concerning mechanisms used to maintain the OIML Systems.

Several countries suggested that considering the current economic context and the price of petroleum products, the OIML Certificate System and the MAA should be extended to flow computers and liquid meters. Information was given on progress of work in OIML TC 8/SC 3 and in particular the development of OIML R 117-2 and R 117-3. The possibility was also brought up of issuing OIML Certificates (either Basic or MAA) for parts of a global measuring system; this would be addressed by the OIML.

A number of countries indicated great interest in prepackage issues and raised questions about the OIML's position concerning the use of the minimum quantity or the mean value; work within OIML TC 6 was briefly presented and delegates were encouraged to contact the Secretariat or the BIML Contact Person for this SC for further information.

Lao PDR mentioned the fact that it was not very easy to find or even attend appropriate training courses, mainly due to financial constraints. Questions were raised about OIML activities in favor of developing countries and about the possibility to provide assistance to these countries, in particular for training courses even for developing countries that are not (or not yet) OIML Members. Information was given on future developments and cooperation with UNIDO and the new position of *Facilitator on Developing Country Matters* – Eberhard Seiler – was mentioned; Lao DPR was invited to contact him directly.

Considering the high level of interest shown by ASEAN and their new developments, it was agreed to invite ASEAN to be represented at the next OIML workshop on regional organizations having activities in the field of legal metrology. Such an invitation could also provide an opportunity to those countries that are not OIML Members to promote their development in the field of legal metrology. ■

WELCOME ADDRESS

Subagyo

Director General of Directorate General of Domestic Trade
Ministry of Trade, Republic of Indonesia

Honorable guests, Ladies and Gentlemen,

It is a pleasure and an honor for me to open this Seminar on the Development of MRAs/MAAs in Legal Metrology, hosted by the Directorate of Metrology, Ministry of Trade.

I would first like to express my deep gratitude to you for your participation, and for gathering here to develop your knowledge of the principles of mutual recognition agreements (MRAs) and mutual acceptance arrangements (MAAs) in legal metrology.

I want you to know that I fully support this event and I hope that we will be able to arrange a similar event in the future; the principle of mutual recognition agreements and arrangements in legal metrology is a relatively new area that is not yet completely understood by legal metrology stakeholders both nationally and in the ASEAN Region, and hence it is very important.

In this era of globalization, every economy wants its own products to be accepted globally. This can happen providing that the products meet the requirements that have been set by the global market – achieving this is the challenge facing industry, which must remain creative in providing high quality, competitive products. This does not exclude the measuring instrument manufacturers themselves, whose quality procedures should be a priority in order to meet the metrological and technical requirements to ensure that issues concerning security, safety, health, and the environment are fully covered.

In the field of legal metrology, the OIML Mutual Acceptance Arrangement is a System developed by the OIML in order to build up mutual confidence among participating OIML Members for type evaluation testing, whereby the measuring instruments tested meet the requirements of the relevant OIML International Recommendation. It aims to promote the global harmonization, uniform interpretation and application of metrological requirements for measuring instruments

For industry, one of the primary objectives of the OIML MAA is to reduce the time and cost involved in obtaining type evaluation and type approval of measuring instruments submitted to legal metrological control. Industry draws benefits from the effectiveness and the efficiency of the procedures required for type approval through the one-stop testing concept. This matter, of course, also provides valuable support in facilitating the trade of measuring instruments.

There are currently two OIML certification schemes: the OIML Certificate System and the Mutual Acceptance Arrangement:

- The OIML Certificate System for Measuring Instruments was introduced in 1991 and aims to facilitate administration procedures by reducing costs associated with the international trade of measuring instruments requiring type approval. This System gives the possibility for manufacturers to obtain OIML certification for a type of measuring instrument which is deemed to meet the requirements of the relevant OIML International Recommendation(s).
- The second scheme is the MAA, which is an additional system developed by the OIML. Its aim is to further extend mutual confidence and mutual recognition of type evaluation testing among OIML Members by providing ways for national responsible legal metrology bodies to directly have confidence in test results and laboratory accreditation internationally. The MAA scheme is strategic and may be applied not only by OIML Member States but also by OIML Corresponding Members and measuring instrument manufacturers. The MAA was implemented in January 2005 and now covers three categories: load cells, non-automatic weighing instruments, and water meters. The objective is that the type evaluation testing report, validated by OIML certification, can be accepted and used by MAA Participants as a document on which to base type approval.

This Seminar can hopefully provide comprehensive information about how the OIML is developing its Certificate System and MAA, not only for the benefit of OIML Members but also for other economies outside the direct scope of the OIML's membership.

It can also hopefully provide information for legal metrology stakeholders in ASEAN member states as to how MAA and MRA schemes work, and how the principle of mutual acceptance for measuring instru-

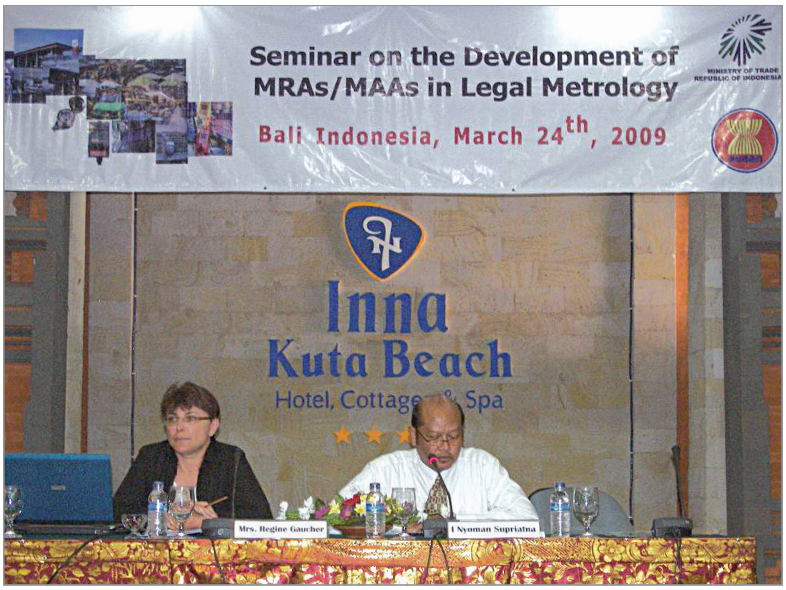
Subagyo
Director General of Directorate General of Domestic Trade,
Ministry of Trade, Republic of Indonesia

ments can be applied globally especially in the ASEAN Region. Of course this scheme might support the ASEAN vision to become the ASEAN Economic Community, where one of the expected goals is the free flow of goods. This is described in the ASEAN Trade in Good Agreement (ATIGA) document.

And for the domestic industrial sector, it is expected that this Seminar may be used as a reference to develop and improve the quality of domestic products (especially measuring instruments) so that they become more competitive in the global market.

Finally, I would like to thank Mrs. Régine Gaucher from the International Bureau of Legal Metrology who will make a presentation about the development of MRAs/MAAs in legal metrology. I hope that it will provide useful information for participants to develop mutual acceptance, mutual recognition, and mutual confidence of type evaluation test reports for measuring instruments, so that we can continue to support the establishment of the ASEAN Economic Community.

Thank you for participating in the Seminar, and may I wish you every success. ■



OIML SYSTEMS

The OIML Mutual Acceptance Arrangement (MAA)

Régine Gaucher, Project Leader, BIML

This presentation was given at Milestones III in Rotterdam (May 2009), and also at the 14th International Metrology Congress in Paris (June 2009)

Abstract

The Mutual Acceptance Arrangement (MAA) is a system developed by the International Organization of Legal Metrology (OIML) which proposes a service to industry.

Its objective is to facilitate the certification of measuring instruments that are subject to legal metrological control in the various countries.

In this way, the MAA facilitates matters for manufacturers and importers of measuring instruments in a context of global exchange.

The MAA also provides support to the metrological departments of those countries that do not have their own testing equipment.

And lastly, although it is based on the recognition of tests in application of OIML Recommendations, the MAA can also take into account additional tests that may be required by the national regulations of participating countries.

Introduction

The Mutual Acceptance Arrangement (MAA) was set up by the OIML in 2003.

It should be considered as a complementary tool to the OIML Certificate System [1] [2], which was set up in 1991 and which today covers 46 categories of measuring instruments.

The OIML Certificate System is a voluntary system, the objective of which is to facilitate, accelerate and harmonize the work of the various national and regional legal metrology bodies. Its efficiency no longer needs to be proved, as some 2000 Certificates have been issued since 1991 for about 500 manufacturers and importers.

In a context of internationalization and globalization of trade, since the outset the OIML has strived to reinforce confidence in the System, and to allow specific national or regional aspects to be taken into account in cases where the regulations are not fully aligned with the requirements of the relevant OIML Recommendations.

An MAA Certificate and its associated evaluation report therefore offer added value compared to a so-called *Basic* Certificate and report. They can be identified by the special MAA logo on the first page.

Obtaining an MAA Certificate

For which categories of measuring instrument?

Following the publication in 2004 of OIML B 10 [3] [4] governing the setting up of the MAA, the OIML decided to launch the MAA for the two categories of measuring instruments which had hitherto generated the highest number of Certificates.

It was therefore in 2006 that the first two Declarations of Mutual Confidence (DoMC) were signed:

- The R 60 DoMC concerning load cells, based on the requirements and tests in OIML Recommendation R 60 [5], and
- The R 76 DoMC concerning non-automatic weighing instruments, based on the requirements and tests in OIML Recommendation R 76 [6] [7].
- A third DoMC was signed in 2007 concerning water meters, based on the requirements and tests in OIML Recommendation R 49 [8] [9] [10].

Whom to contact?

MAA Certificates may be issued by Issuing Participants, identified as such in the respective Declarations of Mutual Confidence.

These participants are OIML Issuing Authorities which have been designated by the Member of the International Committee of Legal Metrology (CIML) in their country. Thus, an Issuing Participant is an Issuing Authority in one of the 58 OIML Member States.

	R 49 DoMC Water meters	R 60 DoMC Load cells	R 76 DoMC Non-automatic weighing instruments
Signature	30 November 2007	29 September 2006	29 September 2006
Participants (Issuing and Utilizing)	7	17	18
Issuing Participants	2	7	9

Who are the Issuing Participants?

Issuing Participants are therefore considered as certification bodies, and the ongoing revision of OIML B 3 [1] will recommend that their competency be demonstrated at the time of their designation on the basis, for example, of the requirements of ISO/IEC Guide 65 [11].

Furthermore, when these participants directly carry out evaluation tests on measuring instruments in the context of the MAA – and/or their subcontractors when some or all of the tests are carried out by third-party laboratories – they are evaluated on the basis of the requirements of the ISO/IEC 17025 Standard and on the basis of OIML Document D 30 [13], which specifies the scope of application of this Standard to testing laboratories in the field of legal metrology.

The competence of testing laboratories and the degree to which they conform to the provisions of the Standard can be demonstrated as follows:

- either by an accreditation issued by a national accreditation body which is a signatory to the ILAC Mutual Recognition Agreement (Interlaboratory Accreditation Cooperation),
- or by peer assessments organized by the OIML in cooperation with ILAC and the national or regional accreditation bodies.

It is appropriate to underline the fact that in the context of these evaluations, cooperation between ILAC and the OIML has progressed considerably. In view of this, in November 2006 the two organizations signed a Memorandum of Understanding which has since been extended to also include the IAF (International Accreditation Forum).

Today, joint collaborative efforts in the context of this cooperation have resulted in guarantees of equivalency between the two evaluation methods, since the evaluation teams are both constituted identically:

- a laboratory quality system evaluator from a national accreditation body,
- a technical evaluator whose competency is recognized by the OIML.

The evaluation reports, regardless of whichever of the two methods above was used to compile them, are examined by an OIML Committee on Participation Review (called a CPR) which follows the progress of the Declarations of Mutual Confidence. One CPR is established per DoMC and comprises one member per country that participates in the DoMC. It also comprises representatives of the OIML Technical Committee(s) in charge of the field concerned, and additionally representatives from the BIML.

Utilizing Participants

Utilizing Participants are mainly national metrology bodies that commit, by signing a Declaration of Mutual Confidence, to taking into account the evaluation reports – notably the test results – established by the Issuing Participants of a DoMC.

As indicated above, this system is designed to help those countries that do not have their own test equipment.

Utilizing Participants are, therefore, national legal metrology bodies in OIML Member States or Corresponding Members.

It is also appropriate to recall that the MAA remains a voluntary system in two ways: countries have the choice as to whether they participate or not in a Declaration of Mutual Confidence but as signatories, they also maintain a critical eye over the evaluation reports they use and reserve the right to not accept certain results.

Additional tests

OIML Recommendations are model regulations that OIML Member States commit to implementing at the time when they sign the Headquarters Agreement.

However, due to historical reasons behind national legislation and due to the way in which national legal metrology has evolved, today certain national regulations are not always in line with the respective OIML requirements.

Therefore, to ensure an optimal service to industry, the OIML provides the possibility to those countries that participate in a Declaration of Mutual Confidence to request that certain national tests be taken into account in addition to those specified in the Recommendation. These tests are the object of detailed procedures and are examined by the CPR, which decides whether or not to include them in the scope of application of the Declaration of Mutual Confidence.

In this way, manufacturers and importers of measuring instruments are directly made aware of those countries that require additional tests, and also of those DoMC Issuing Participants that are able to carry them out.

Availability of information

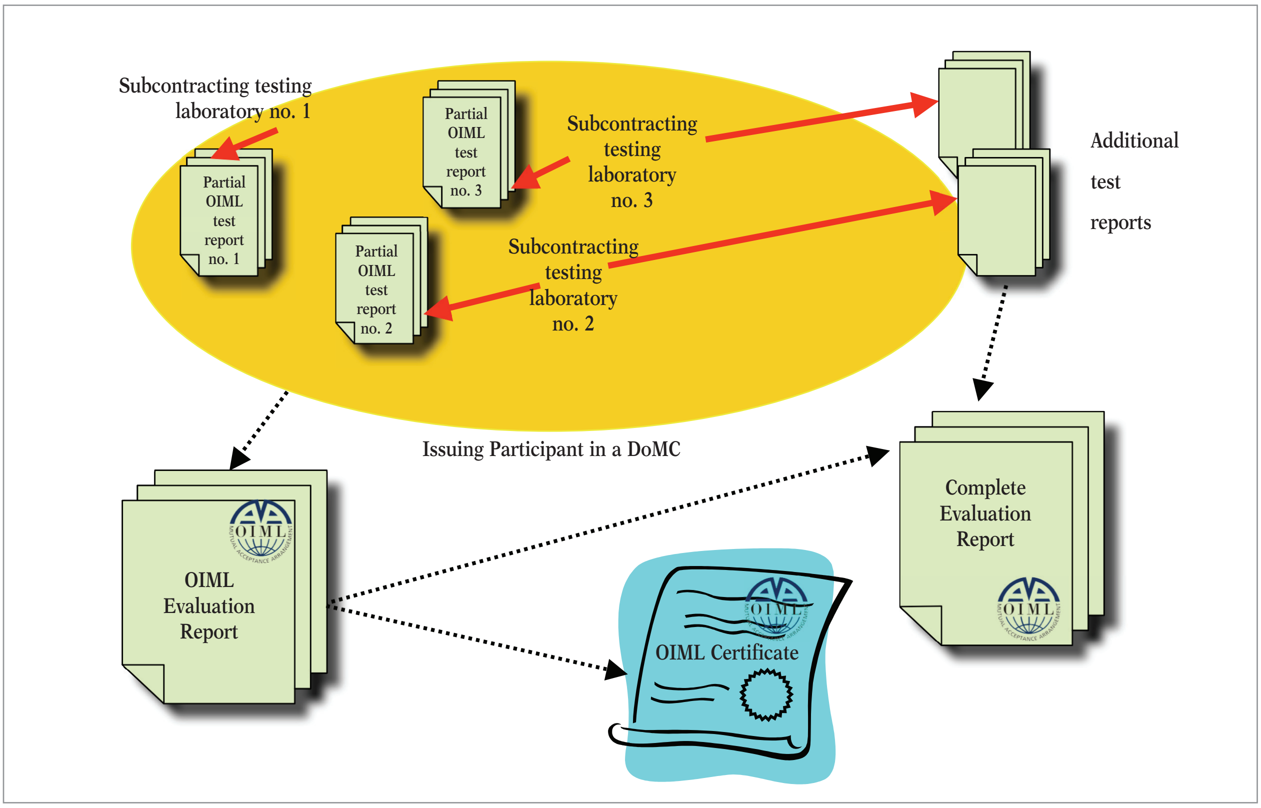
The Declarations of Mutual Confidence are registered and published by the BIML, and are available online on the OIML web site under the MAA section (www.oiml.org/maa).

This section also contains much general information concerning the setting up of the MAA, and all the up to date documentation.

Conclusion

Three years after the launch of the MAA, in the light of the experience to date it would appear that some adjustments are necessary. It has therefore been decided to revise the OIML Publications relative to the Certificate System and the MAA.

This revision has already begun and will also be an opportunity to discuss taking into account the results of tests carried out by manufacturers when issuing MAA evaluation reports and MAA Certificates. Indeed, for the time being the system is based exclusively on tests carried out by third party laboratories. However, in many countries (especially in Europe) the European Directive on Measuring Instruments [14] provides for the possibility, under specific conditions, for notified bodies to take into account test results supplied by the manufacturer.



There is no doubt that this process, which does not exist in a number of countries (in certain cases for regulatory reasons) will be at the core of the debate on the revision of the MAA publication.

This question is in fact crucial for certain categories of measuring instruments which necessitate specific and bulky test equipment, which often only the manufacturer may possess.

Criteria must therefore be defined and discussed in order to guarantee the impartiality of the staff in charge of testing in the manufacturer's company and the confidence in their independent judgment concerning the test results.

In the meantime and until these discussions reach the necessary conclusions, the OIML will shortly be launching a new Declaration of Mutual Confidence which should cover automatic catchweighing instruments on the basis of OIML Recommendation OIML R 51 [15] [16]. ■

References

[1] OIML B 3, *OIML Certificate System for Measuring Instruments*, OIML, 2003

[2] Amendment to OIML B 3, *OIML Certificate System for Measuring Instruments*, OIML, 2006

[3] OIML B 10-1, *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations (MAA)*, 2004

[4] Amendment to OIML B 10-1, *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations (MAA)*, OIML, 2006

[5] OIML R 60, *Metrological regulation for load cells*, OIML, 2000

[6] OIML R 76-1, *Non-automatic weighing instruments. Part 1: Metrological and technical requirements - Tests*, OIML, 2006

[7] OIML R 76-2, *Non-automatic weighing instruments. Part 2: Test report format*, OIML, 2007

[8] OIML R 49-1, *Water meters intended for the metering of cold potable water and hot water. Part 1: Metrological and technical requirements*, OIML, 2006

[9] OIML R 49-2, *Water meters intended for the metering of cold potable water and hot water. Part 2: Test methods*, OIML, 2006

[10] OIML R 49-3, *Water meters intended for the metering of cold potable water and hot water. Part 3: Test report format*, OIML, 2006

[11] ISO/IEC Guide 65, *General requirements for bodies operating product certification systems*, ISO, 1996

[12] ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*, ISO, 2005

[13] OIML D 30, *Guide for the application of ISO/IEC 17025 to the assessment of Testing Laboratories involved in legal metrology*, OIML, 2008

[14] Directive 2004/22/EC of 31 March 2004 on measuring instruments, Official Journal of the European Union, 30 April 2004

[15] OIML R 51-1, *Automatic catchweighing instruments. Part 1: Metrological and technical requirements - Tests*, OIML, 2006

[16] OIML R 51-2, *Automatic catchweighing instruments. Part 2: Test report format*, OIML, 2006

COOMET NEWS

International Conference "Metrology 2009" and the Competition for the "Best Young Metrologist of COOMET"

Minsk, 14–15 April 2009

Manfred Kochsiek

V.N. Koreshkov, President of Gosstandart Belarus, welcomed over 200 participants from 9 countries to the scientific Conference "Metrology 2009" (see Fig. 1). The event, dedicated to the 175th anniversary of the birth of D.I. Medeleyev, was held in Minsk, the Belarus capital.

The presentations dealt with current developments in the fields of fundamental, applied and legal metrology and the development or improvement of the metrological infrastructures in former Soviet countries.

The opening session was held in the presence of the contest participants, who then started their competition in a parallel session.

In 2009, Gosstandart Belarus organized the third COOMET Conference for Young Metrologists up to age 35.

COOMET, the Euro-Asian Cooperation of National Metrology Institutions, comprises NMIs of 17 countries, mainly former members of the COMECON block. The lectures were given in Russian or in English by 28 preselected participants from seven countries. The competition was very professionally organized by the staff of BelGIM, the Belarussian NMI, and was accompanied by social events.

The topics presented covered a wide variety of metrological issues. In the field of legal metrology, such topics (among others) as measurement uncertainty, grain humidity, electrical energy meters, and hierarchy schemes of measurement standards were of special note.

A high-ranking jury comprising nine experts from four countries assessed the presentations according to a predefined scheme of seven criteria (see Fig. 2). The eight best presentations reached the final assessment stage in a very narrow range between 4.3 and 4.6 (out of 5) points. This result reflects the generally excellent scientific level and manner of presenting the subjects. The winners were:

- 1st prize: Nataliya Chervjakovskaja (BelGIM, Belarus) on a probability approach in error optimalization in verification schemes (see Fig. 3);
- 2nd prize: Makram A. Zebian (PTB, Germany) on a finite element model of human ear canal for oto-acoustic emission probe calibration error assessment;
- 3rd prize: Dmitry Gogolev (VNIIMS, Russia) on uniformity assurance in CMM measurements of complex surface structures; and
- Special prize for the best lecture in English: Dmitry Solomakho (Belarussian National Technical University, Minsk) on the role of metrological modeling in the selection of a measurement strategy.

The prize money for the first three prizes was donated by the German Federal Ministry of Economic Cooperation and Development (BMZ). The special prize was sponsored by the PTB and the winner will participate in the International Congress on Metrology in Paris in June 2009. ■

Fig. 1: V. N. Koreshkov (center) welcomed participants. Also pictured are L. K. Isaev (left), Russian Federation, and N. Zhagora (right), Belarus

Fig. 2: Jury of the competition seminar

Fig. 3: N. Chervjakovskaja (BelGIM, Belarus) - First prize

WTO TBT COMMITTEE

TBT Committee Workshop on the role of international standards in economic development

16–17 March 2009

Report by Ms. Xueyan GUO (China),
Chairperson to the TBT Committee

The TBT Committee held a Workshop on *The Role of International Standards in Economic Development* on 16 and 17 March 2009. Participation was high, and some 70 developing country capital-based officials were sponsored by the WTO through the DDA Global Trust Fund. In total, over 200 TBT experts attended. The Workshop provided opportunity for delegations to share experiences on the development and use of international standards.

Mr. Harsha V. Singh, Deputy-Director General of the WTO, opened the Workshop. In his opening remarks, Mr. Singh provided an overview of issues related to standards, trade and the WTO. He stressed the economic benefits of standardization and highlighted some of the costs; he underscored the importance of the disciplines in the TBT Agreement as they apply to standardizing bodies and to Member governments and also drew our attention to the increasing importance of addressing non-tariff barriers to trade in the WTO, including in the negotiating context.

The workshop focused first on the **economics of standards.** A synopsis of current work on the topic of standards, trade and economic growth was provided. In particular, based on studies undertaken in Germany, the United Kingdom, Canada, Australia and China, we heard expert views from both academia and governments on the benefits and costs of standardization activities - and efforts to quantify these. The gist of the findings of various studies presented showed that standards, as a pool for technological know-how, can contribute positively to economic growth. It was pointed out that standards promote innovation and technical progress and are an important instrument to facilitate competition in markets and transfer of technology. But these benefits remain difficult to quantify and need to be better understood, both in qualitative and quantitative terms - more research is therefore needed, also with respect to aligning methodologies and assessment tools. Of course, there are also costs associated with the use of standards, these are somewhat more tangible. Participants were urged to circulate widely any case studies on the impacts of standards, regardless of methodologies used.

Several participants reflected on the relevance of standards to the crisis that is affecting the global economy today. It was pointed out that in times of crisis it is ever more important to ensure that standards are not used for protectionist purposes. Instead, standards should be seen as an opportunity. For instance, well crafted standards as the basis for regulatory measures may increase confidence in markets and serve to boost trade. As well, it was pointed out that standards are an important link between research, innovation and markets; in effect, an efficient tool for the transfer of technology. For companies in particular, participation in standardization processes could potentially compensate for a downturn in R&D spending. This is be particularly important today in the areas of sustainability and environmental technology.

It was also pointed out that standards need to be maintained to stay relevant: they have to be up to date with current technology and science - they should not lag behind technology. Science does not stay still. So timing is therefore important. Standards that arrive too late can lock in old technology and be counter-productive in terms of innovation.

A number of **practical case studies** that illustrate how the use of standards has contributed to economic and social development, in particular in developing countries, were presented and discussed. For instance, in the agricultural sector, we learned how international standards have been used to increase exports of asparagus and coffee from Peru. Egypt illustrated how the adoption and use of international standards in general had facilitated trade, leading to increases in both imports and exports. We were given the example of how the Pakistani textile sector had increased exports subsequent to the use of international quality standards.

We also heard how standards can have other benefits. The case of the US-Brazil cooperation to develop testing and measurement methods on biofuels, and the application of Chilean standards on energy efficiency showed how the standards can contribute to address global environmental challenges. Standards can also successfully address public safety issues, as illustrated by Colombia in the presentation on building codes and construction. Kenya's experience showed how the adoption of international standards in the electro technology field had contributed to improvement in the quality and safety of *imported* products.

A common element in several of the cases presented was the importance attributed to collaborative work between the public and private sectors; government support for standardization activities was considered important, particularly in developing countries. It was also important to have the absorptive capacity to implement standards (not only participate in their development), and, sometimes, to tailor them to local or regional circumstances.

Participants considered efforts to address developing country **capacity constraints** in respect of the use of international standards. Clearly, participation in international standard-setting activities is considered essential and remains a constraint. In this respect, several initiatives by international standardizing bodies, regional bodies, bilateral donors and other international bodies such as UNIDO to increase participation were mentioned. Kenya suggested that developing countries should to a greater extent be hosting working groups and technical committees developing standards. However, it was also pointed out that participation in and of itself serves no purpose: it has to be effective. Building *expertise* in developing countries and filling information gaps has to be done in ways that reflect the needs of each individual country.

Several participants expressed concern about the proliferation of private standards that could result in unnecessary barriers to trade that created confusion in the market place. It was pointed out that initiatives existed and were underway in other organizations, such as UNIDO, to help countries comply with such schemes, and that the issue was being addressed in the WTO SPS Committee.

The importance to identify best practices for technical cooperation in the standards-setting field was stressed. Aid effectiveness meant that Aid for Trade in the standards setting world has to be driven by needs, be sector-specific and include the effective participation of all stakeholders. As an example of Aid for Trade applied to standards, the relevant work of the Standards and Trade Development Facility (STDF) in the SPS area was presented.

Many key challenges remain with respect to standardizing activities. At the end of the workshop, in my capacity as Chair, I pointed at a few challenges that have arisen in the discussion; among these, I would stress the following:

Quantifying the benefits of standards: The studies and experiences shared at the outset of the workshop show the significant positive role standards can play in promoting innovation and technical progress. The use of standards makes production more efficient. Yet measuring and expressing the benefits of standards remains a key challenge. I would encourage Members, through this Committee, to share case studies that consider the economic benefits of the use of standards.

Involving all stakeholders: Creating awareness among all relevant stakeholders, including SMEs, of the importance of being involved in standard-setting activities is crucial. Broad stakeholder involvement ensures an open and transparent process, in line with the disciplines on standardizing bodies contained in the TBT Agreement. On various occasions during the workshop, speakers and participants pointed out that government support and involvement in standardization is important, particularly in developing countries - where standardization may not always be given priority, and the strategic importance of standards is not always appreciated. It is important to find incentives to increase support and promotion of standardizing activities in developing countries.

Participation in international standard-setting activities: Actual participation in standards-setting activities by developing countries remains a challenge, both financially and technically. Only a small proportion of developing countries are responsible for the management of working groups and technical committees, where the nuts and bolts of international standardization work takes place. Although we heard of various initiatives, finding *effective* ways of increasing such participation remains a challenge. It was pointed out that an essential component of making participation effective at the country level is a two-way exercise.

On the one hand - at the national level - it is important to raise levels of expertise in selected areas of importance to the participating developing country. And, on the other hand - and at the international level - it is important to engage that local knowledge and expertise in the international standard-setting community.

Building up standards-related infrastructure. Standards development is part of a bigger whole - part of a quality infrastructure that includes: metrology, standards development and conformity assessment activities, including accreditation. It is not obvious that all components of this infrastructure is needed everywhere; for instance, it was pointed out that in the Caribbean efforts are underway to build quality infrastructure at the regional level. Therefore, it is important that countries prioritize and are selective about where efforts to build capacity should be concentrated. The Committee may consider developing good practices for setting up quality infrastructure. Expertise could be drawn from both Members and international organizations working in this area.

I would finish by stressing a point that several speakers and participants reverted to in the course of the workshop. In this time of economic crisis, we, in the TBT Committee need to guard cases where standards are used as a basis for non-tariff barriers that are unnecessary. Continued effective use of our transparency provisions is crucial in the respect. We also need to reinforce and boost the beneficial, confidence-building aspects of standards. The use of international standards should serve the purpose of facilitating international trade, as envisaged in the WTO TBT Agreement. ■

PRESS RELEASE

The Southern African Development Community Accreditation Service (SADCAS)

The Southern African Development Community Accreditation Service (SADCAS) was launched on 23 April 2009 at the Grand Palm Hotel, Gaborone, Botswana. The occasion was graced by dignitaries from the SADC member states, diplomats from various countries and the SADC Executive Secretary Dr. Tomaz Augusto Salomao. The Botswana Minister of Trade and Industry Honourable Daniel Neo Moroka was the guest of honor.

SADCAS is a regional accreditation body established in terms of the SADC Memorandum of Understanding on standardization, quality assurance, accreditation and metrology to provide accreditation services to SADC member states. The first multi-economy body in the world, SADCAS was incorporated in December 2005 as a non-profit limited company and was approved by the SADC Council of Ministers in August 2007 as a subsidiary organization of SADC.

SADCAS, whose set up is being funded by the Norwegian Agency for Development Cooperation (NORAD), is to provide internationally recognized cost effective regional accreditation services for SADC member states aimed at supporting regional and international trade, enhancing the protection of consumers and improving the competitiveness of SADC products and services in both the voluntary and regulatory areas. Accreditation is the process of providing recognition to an organization for its competency in performing a specific task. It involves the assessment of technical competence of testing/calibration laboratories, certification and inspection bodies.

In his speech the guest of honor noted the key role that accreditation plays in socio-economic development and welcomed the establishment of SADCAS. He urged conformity assessment service providers to take up the services offered by SADCAS as a demonstration of competency and a means to build trust/confidence amongst trading partners. He further noted that all stakeholders including the general public stand to benefit from accreditation. The Minister also encouraged SADC member states to facilitate the acceptance of SADCAS in their own countries and to continually support the National Accreditation Focal Points which are the administrative links between SADCAS and member states.

In conjunction with the launch, a Memorandum of Understanding (MoU) on general cooperation was signed between SADC, represented by the SADC Executive Secretary Dr. Tomaz Salomao and SADCAS represented by the Board Chairman Mr. Riundja Kaakunga (Othy). The MoU formalizes the operational relationship between SADC and SADCAS.

In her closing remarks, Mrs. Maureen P. Mutasa, Chief Executive Officer of SADCAS, emphasized SADCAS' vision of being a leading regionally accepted and internationally recognized regional accreditation body aimed at supporting and enhancing industry and government's efforts and to be at the cutting edge of accreditation service delivery. She also said that SADCAS' vision will only come to fruition with the continued support of donors and also of importance going forward, the take up of SADCAS' accreditation services by clients in member states. ■

For more information please contact:

SADC Accreditation Service P Bag, 00320, Gaborone, Botswana
Telephone: +267 3132909/3132910
Fax: +267 3132922
E-mail: info@sadcas.org

SADCAS Chief Executive Officer Mrs. Maureen P. Mutasa with the Guest of Honour, the Honourable Mr. Daniel Neo Moroka, Minister of Trade and Industry (Botswana) after the unveiling of the plaque on the SADCAS launch

SADCAS
SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ACCREDITATION SERVICE

OIML Certificate System: Certificates registered 2009.03–2009.05

Up to date information (including B 3): www.oiml.org

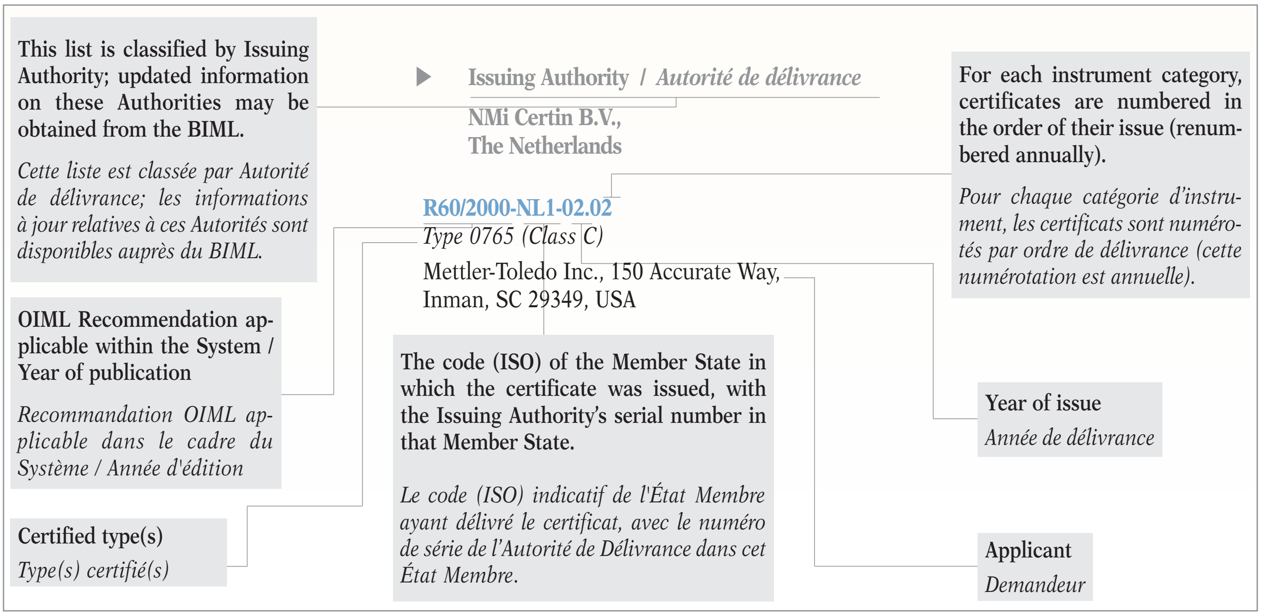
The *OIML Certificate System for Measuring Instruments* was introduced in 1991 to facilitate administrative procedures and lower costs associated with the international trade of measuring instruments subject to legal requirements.

The System provides the possibility for a manufacturer to obtain an OIML Certificate and a test report indicating that a given instrument type complies with the requirements of relevant OIML International Recommendations.

Certificates are delivered by OIML Member States that have established one or several Issuing Authorities responsible for processing applications by manufacturers wishing to have their instrument types certified.

The rules and conditions for the application, issuing and use of OIML Certificates are included in the 2003 edition of OIML B 3 *OIML Certificate System for Measuring Instruments*.

OIML Certificates are accepted by national metrology services on a voluntary basis, and as the climate for mutual confidence and recognition of test results develops between OIML Members, the OIML Certificate System serves to simplify the type approval process for manufacturers and metrology authorities by eliminating costly duplication of application and test procedures.



Système de Certificats OIML: Certificats enregistrés 2009.03–2009.05

Informations à jour (y compris le B 3): www.oiml.org

Le *Système de Certificats OIML pour les Instruments de Mesure* a été introduit en 1991 afin de faciliter les procédures administratives et d'abaisser les coûts liés au commerce international des instruments de mesure soumis aux exigences légales.

Le Système permet à un constructeur d'obtenir un certificat OIML et un rapport d'essai indiquant qu'un type d'instrument satisfait aux exigences des Recommandations OIML applicables.

Les certificats sont délivrés par les États Membres de l'OIML, qui ont établi une ou plusieurs autorités de délivrance responsables du traitement des demandes présentées par des constructeurs souhaitant voir certifier leurs types d'instruments.

Les règles et conditions pour la demande, la délivrance et l'utilisation de Certificats OIML sont définies dans l'édition 2003 de la Publication B 3 *Système de Certificats OIML pour les Instruments de Mesure*.

Les services nationaux de métrologie légale peuvent accepter les certificats sur une base volontaire; avec le développement entre Membres OIML d'un climat de confiance mutuelle et de reconnaissance des résultats d'essais, le Système simplifie les processus d'approbation de type pour les constructeurs et les autorités métrologiques par l'élimination des répétitions coûteuses dans les procédures de demande et d'essai.

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Water meters intended for the metering of cold potable water
Compteurs d'eau destinés au mesurage de l'eau potable froide

R 49 (2006)

Issuing Authority / *Autorité de délivrance*

Laboratoire National de Métrologie et d'Essais, Certification Instruments de Mesure, France

R049/2006-FR2-2009.02
Water meter type SWM (Echodis, Static Water Meter)
Actaris SAS, 9, rue Ampère, F-71031 Mâcon, France

R049/2006-FR2-2009.03
Water meter type SWM (Echodis, Static Water Meter), class 2
Actaris SAS, 9, rue Ampère, F-71031 Mâcon, France

R049/2006-FR2-2009.04
Water meter type SWM (Echodis, Static Water Meter)
Actaris SAS, 9, rue Ampère, F-71031 Mâcon, France

R049/2006-FR2-2009.05
Water meter type SWM (Echodis, Static Water Meter)
Actaris SAS, 9, rue Ampère, F-71031 Mâcon, France

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Continuous totalizing automatic weighing instruments
Instruments de pesage totalisateurs continus à fonctionnement automatique

R 50 (1997)

Issuing Authority / *Autorité de délivrance*

National Weights and Measures Laboratory (NWML), United Kingdom

R050/1997-GB1-2009.01
Milltronics MSI/MMI
Siemens Milltronics, 1954 Technology Drive, Peterborough ON K9J 6X7, Canada

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Automatic catchweighing instruments
Instruments de pesage trieurs-étiqueteurs à fonctionnement automatique

R 51 (2006)

Issuing Authority / *Autorité de délivrance*

National Weights and Measures Laboratory (NWML), United Kingdom

R051/2006-GB1-2009.01
Mercury Plus checkweigher / weight or weight-price labeller
Societa Cooperativa Bilanciai a.r.l, Via S. Ferrari No. 16, I-41011 Modena, Italy

R051/2006-GB1-2009.03
900 Series Checkweigher / Weight or Weight-Price labeller
AEW Delford Systems, Wyncolls Road, Severalls Industrial Park, Colchester CO4 9HW, United Kingdom

Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R051/2006-DE1-2009.01
Automatic catchweighing instrument - Type: GLM-E
Bizerba GmbH & Co. KG, Wilhelm-Kraut-Straße 65, D-72336 Balingen, Germany

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Metrological regulation for load cells (applicable to analog and/or digital load cells)
Réglementation métrologique des cellules de pesée (applicable aux cellules de pesée à affichage analogique et/ou numérique)

R 60 (2000)

Issuing Authority / *Autorité de délivrance*

Centro Español de Metrologia, Spain

R060/2000-ES1-2009.01
Strain gauge compression load cell
SENSOCAR S.A., Carrer Géminis 77, E-Terrasa, Spain

Issuing Authority / *Autorité de délivrance*
OIML Chinese Secretariat,
State General Administration for Quality Supervision and Inspection and Quarantine (AQSIQ), China

R060/2000-CN1-2008.13 ***(MAA)***
Load Cell - Model SQC (NH)
Ningbo Benui Electric Co. Ltd., No. 8 Laoshan Road, Dagang Industry Zone, Ninbgo City, P.R. China

R060/2000-CN1-2008.14 ***(MAA)***
Load Cell - Model GX NH
Zhejiang South-Ocean Sensor Manufacturing Co. Ltd., No. 888, Xingyuan Street, Qianlong Development Zone, 313216 Qianyuan Town, Deqing County, Zhejiang Province, P.R. China

R060/2000-CN1-2008.15 ***(MAA)***
Load Cell - Model GFX-1 (NH)
Zhejiang South-Ocean Sensor Manufacturing Co. Ltd., No. 888, Xingyuan Street, Qianlong Development Zone, 313216 Qianyuan Town, Deqing County, Zhejiang Province, P.R. China

R060/2000-CN1-2008.16 ***(MAA)***
Load Cell - Model AGX-1 (NH)
Zhejiang South-Ocean Sensor Manufacturing Co. Ltd., No. 888, Xingyuan Street, Qianlong Development Zone, 313216 Qianyuan Town, Deqing County, Zhejiang Province, P.R. China

R060/2000-CN1-2009.01 ***(MAA)***
Load Cell - L-PW-75/90/100/120/150/200/250/300/350
Jinan Jinzhong Electronic Scale Co. Ltd., No. 147, Yingxiongshan Road, Jinan, 250002 Shandong, P.R. China

R060/2000-CN1-2009.02 ***(MAA)***
Load cell - PA28-50/100/150/200/250
Beijing True-Tec Co. Ltd., 4/F, Bldg. 2, No. 8, Hong Da Bei Lu, BDA, 100176 Beijing, P.R. China

Issuing Authority / *Autorité de délivrance*
NMi Certin B.V.,
The Netherlands

R060/2000-NL1-2009.01 ***(MAA)***
A tensioin load cell S-beam - Type: PSTM ....
Keli Electric Manufacturing (Ningbo) Co. Ltd., No. 199 Changxing Road, Jiangbei District, Ningbo City, P.R. China

R060/2000-NL1-2009.02 ***(MAA)***
An oil damped single point load cell - Type: 9010
Vishay-Transducers, 8A Hazoran Street, IL-42506 Netanya, Israel

R060/2000-NL1-2009.03 ***(MAA)***
A bending beam load cell - Type: SP4....
Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45, D-64293 Darmstadt, Germany

R060/2000-NL1-2009.07 ***(MAA)***
A bending beam load cell - Type: 0745A....
Mettler-Toledo AG, Heuwinkelstrasse, CH-8606 Nanikon, Switzerland

Issuing Authority / *Autorité de délivrance*
Physikalisch-Technische Bundesanstalt (PTB),
Germany

R060/2000-DE1-2009.03
Load Cell. Strain gauge double bending beam load cell - Type: SB8
Flintec GmbH, Bemannsbruch 9, D-74909 Meckesheim, Germany

R060/2000-DE1-2009.04
Load Cell. Strain gauge double bending beam load cell - Type: PC22
Flintec GmbH, Bemannsbruch 9, D-74909 Meckesheim, Germany

R060/2000-DE1-2009.05
Load cell. Strain gauge single point load cell - Type: MP70
Sartorius Mechatronics T&H GmbH, Meiendorfer Strasse 205, D-22145 Hambourg, Germany

R060/2000-DE1-2009.06
Load cell. Strain gauge single point load cell - Type: MP71
Sartorius Mechatronics T&H GmbH, Meiendorfer Strasse 205, D-22145 Hambourg, Germany

R060/2000-DE1-2009.07
Load cell. Strain gauge single point load cell - Type: MP72
Sartorius Mechatronics T&H GmbH, Meiendorfer Strasse 205, D-22145 Hambourg, Germany

R060/2000-DE1-2009.08
Load cell. Strain gauge bending beam load cell - Type: MP77
Sartorius Mechatronics T&H GmbH, Meiendorfer Strasse 205, D-22145 Hambourg, Germany

R060/2000-DE1-2009.09
Load cell. Strain gauge bending beam load cell - Type: MP79, MP79T
Sartorius Mechatronics T&H GmbH, Meiendorfer Strasse 205, D-22145 Hambourg, Germany

▶ Issuing Authority / *Autorité de délivrance*
DANAK The Danish Accreditation and Metrology Fund, Denmark

R060/2000-DK1-2004.01 Rev. 1
Compression, strain gauge load cell - Type: HSC
ESIT Electronik Ltd. Sti., Nisantepe Mah., Alemdag, Umraniye, TR-3494 Istanbul, Turkey

R060/2000-DK1-2004.01 Rev. 2
Compression, strain gauge load cell - Type: HSC
ESIT Electronik Ltd. Sti., Nisantepe Mah., Alemdag, Umraniye, TR-3494 Istanbul, Turkey

R060/2000-DK1-2006.01 Rev. 1
Beam bending, strain gauge load cell - Type: BB
ESIT Electronik Ltd. Sti., Nisantepe Mah., Alemdag, Umraniye, TR-3494 Istanbul, Turkey

R060/2000-DK1-2006.03 Rev. 1
Beam bending, strain gauge load cell - Type: SC
ESIT Electronik Ltd. Sti., Nisantepe Mah., Alemdag, Umraniye, TR-3494 Istanbul, Turkey

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Nonautomatic weighing instruments
Instruments de pesage à fonctionnement non automatique

R 76-1 (1992), R 76-2 (1993)

▶ Issuing Authority / *Autorité de délivrance*
National Weights and Measures Laboratory (NWML), United Kingdom

R076/1992-GB1-2007.13 Rev. 2
Non-automatic weighing instrument formed by connecting the DPS-700 or CM-700 indicator to a weighing platform
Digi Europe Ltd., Digi House, Rookwood Way, Haverhill, Suffolk CB9 8DG, United Kingdom

R076/1992-GB1-2009.03
GFK..M non-automatic weighing instrument formed by connecting the GK indicator to a weighing platform
Adam Equipment Co. Ltd., Bond Avenue, Denbigh East Industrial Estate, Milton Keynes MK1 1SW, United Kingdom

R076/1992-GB1-2009.05
Non-automatic weighing instruments comprising the GSE 350-Series electronic weight indicators connected to a compatible R60 load cell
Avery Weigh-Tronix Ltd., Foundry Lane, Smethwick B66 2LP, West Midlands, United Kingdom

R076/1992-GB1-2009.08
Non-automatic weighing instrument designated the AWB120
Avery Weigh-Tronix Ltd., Foundry Lane, Smethwick B66 2LP, West Midlands, United Kingdom

▶ Issuing Authority / *Autorité de délivrance*
NMi Certin B.V., The Netherlands

R076/1992-NL1-2009.03
Non-automatic weighing instrument - Type: DS-982
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, 201505 Shanghai, P.R. China

R076/1992-NL1-2009.04
Non-automatic weighing instrument - Type: JP / JSP / JPP / JW / JWP
Taiwan Scale Mfg. Co. Ltd., 282, Sec. 3, Hoping W. Road, Taipei, Chinese Taipei

R076/1992-NL1-2009.04 Rev. 1
Non-automatic weighing instrument - Type: JP / JSP / JPP / JW / JWP
Taiwan Scale Mfg. Co. Ltd., 282, Sec. 3, Hoping W. Road, Taipei, Chinese Taipei

R076/1992-NL1-2009.05
Non-automatic weighing instrument - Type: FMM-T370x / TPRO2x00
Fook Tin Technologies Ltd., 4/F Eastern Center, 1065 King's Road, Quarry Bay, Hong Kong, Hong Kong

R076/1992-NL1-2009.09 Rev. 1
Non-automatic weighing instrument - Type: bCom Series
Mettler-Toledo (Changzhou) Measurement Technology Ltd., No. 111, West Hai Hu Road, ChangZhou XinBei District, 213125 Jiangsu, P.R. China

R076/1992-NL1-2009.12
Non-automatic weighing instrument - Type: bTwin (AMI & New AMI) / bTwin H2 (New AMI)
Mettler-Toledo (Changzhou) Measurement Technology Ltd., No. 111, West Hai Hu Road, ChangZhou XinBei District, 213125 Jiangsu, P.R. China

R076/1992-NL1-2009.13
Non-automatic weighing instrument - Type: 490 series
Precisa Gravimetrics A.G., Moosmattstraße 32, CH-8953 Dietikon, Switzerland

R076/1992-NL1-2009.14
Non-automatic weighing instrument - Type: AvantGuard 1600 Bed Model Li60
Hill-Rom S.A.S., ZI de Talhouet, F-56330 Pluvigner, France

R076/1992-NL1-2009.15
Non-automatic weighing instrument - Type: CJ
Shinko Denshi Co. Ltd., 3-9-11 Yushima, Bunkyo-ku, 113-0034 Tokyo, Japan

R076/1992-NL1-2009.15 Rev. 1
Non-automatic weighing instrument - Type: CJ
Shinko Denshi Co. Ltd., 3-9-11 Yushima, Bunkyo-ku, 113-0034 Tokyo, Japan

R076/1992-NL1-2009.16
Non-automatic weighing instrument - Family of type: R3xxseries
Rinstrum Pty. Ltd., 41 Success Street, Acacia Ridge QLD 4110, Australia

R076/1992-NL1-2009.17
Non-automatic weighing instrument - Type: T7...P / T7...XW
Ohaus Corporation, 19A Chapin Road, New Jersey, Pine Brook, NJ 07058 New Jersey, United States

▶ Issuing Authority / *Autorité de délivrance*
DANAK The Danish Accreditation and Metrology Fund, Denmark

R076/1992-DK1-2009.01
Non-automatic weighing instrument - Type: BWS / VW / CW / KW
Taiwan Scale Mfg. Co. Ltd., 282, Sec. 3, Hoping W. Road, Taipei, Chinese Taipei

R076/1992-DK1-2009.02
Non-automatic weighing instrument - Type: TPS Truck Pallet Scale
Taiwan Scale Mfg. Co. Ltd., 282, Sec. 3, Hoping W. Road, Taipei, Chinese Taipei

R076/1992-DK1-2009.03
Non-automatic weighing instrument - Type: PD100M / PD20M / PD300M
Cardinal Scale Manufacturing Co., 203 East Daugherty St., P.O. Box 151, MO 64870 Missouri, Webb City, Missouri, United States

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Non-automatic weighing instruments
Instruments de pesage à fonctionnement non automatique

R 76-1 (2006), R 76-2 (2007)

▶ Issuing Authority / *Autorité de délivrance*
OIML Chinese Secretariat, State General Administration for Quality Supervision and Inspection and Quarantine (AQSIQ), China

R076/2006-CN1-2009.01 ***(MAA)***
Weighing Indicator - Type: XK3190-A12 - XK3190-A12E
Shanghai Yaohua Weighing System Co. Ltd., No. 4059, Shangnan Road Pudong District, 200124 Shanghai, P.R. China

▶ Issuing Authority / *Autorité de délivrance*
NMi Certin B.V., The Netherlands

R076/2006-NL1-2009.01
Non-automatic weighing instrument - Type: 830x / 840x (where x represents a number from 0 to 9)
Datalogic Scanning, Inc., 959 Terry Street, Eugene, Oregon 97402 - 9150, Eugene, United States

R076/2006-NL1-2009.02 Rev. 1
Non-automatic weighing instrument - Type: 752KG, 753KG, 599KG or 597KG
Transcell Technology Inc., 975 Deerfield, Park Way, 60089 Illinois, Buffalo Grove, United States

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Discontinuous totalizing automatic weighing instruments
Instruments de pesage totalisateurs discontinus à fonctionnement automatique

R 107 (1997)

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

R107/1997-NL1-2009.01
Discontinuous totalizing automatic weighing instrument - Type: ABS
Precia-Molen, Franse Akker 1, NL-4824 AL Breda, The Netherlands

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Fuel dispensers for motor vehicles
Distributeurs de carburant pour véhicules à moteur

R 117 (1995) + R 118 (1995)

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

R117/1995-NL1-2009.01
Fuel dispensers for Motors Vehicles, model Quantium XXXX with a Qmax of 80 L/min.
Tokheim Netherlands B. V., Touwslagerstraat 17, NL-2984 AW Ridderkerk, The Netherlands

▶ Issuing Authority / *Autorité de délivrance*

Russian Research Institute for Metrological Service (VNIIMS)

R117/1995-RU1-2009.01
Fuel Dispensers Universal Advantages Series
Beijing Chang Gi Service Station Equipment Co., Jianshe W. Street, Binhe Industrial Zone, Pinggu District, 101200 Beijing, P.R. China

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Multi-dimensional measuring instruments
Instruments de mesure multidimensionnels

R 129 (2000)

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

R129/2000-NL1-2009.01
Multi-dimensional measuring instrument - Type: AV6010
Accu-Sort Systems. Inc, 511 School House Road, PA 18969 Telford, United States

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R129/2000-DE1-2009.03
Multi-dimensional measuring instrument - Type: VMS 530-IDS
SICK AG., Nimburger Strasse 11, D-79276 Reute, Germany

R129/2000-DE1-2009.04
Multi-dimensional measuring instrument - Type: VMS 530-NSDS
SICK AG., Nimburger Strasse 11, D-79276 Reute, Germany

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	R 106	R 107	R 117/118	R 126	R 129	

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	R 134					

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DK2 - FORCE Technology, FORCE-Dantest CERT	R 49					

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	R 106	R 107	R 117/118			

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FR2 - Laboratoire National de Métrologie et d'Essais	R 31	R 49	R 50	R 51	R 58
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	R 97	R 98	R 102	R 105	R 106
	R 107	R 110	R 114	R 115	R 117/118
	R 126	R 129			

GERMANY

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KOREA (R.)

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GB2 - National Physical Laboratory	R 97				

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- **Indonesia:**
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OIML TC 17/SC 7

26–30 October 2009, Mombasa, Kenya

44th CIML Meeting and Associated Events

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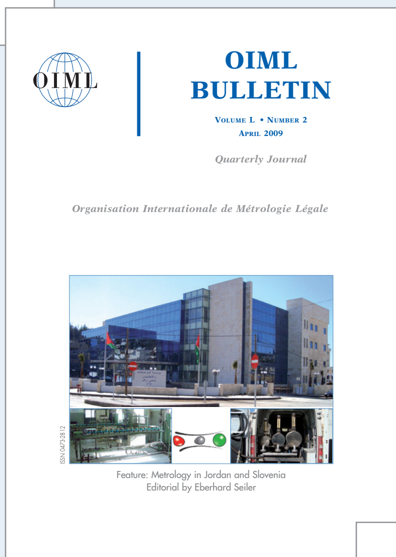

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