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THE OIML BULLETIN IS THE QUARTERLY JOURNAL OF THE ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE


The Organisation Internationale de Métrologie Légale (OIML), established 12 October 1955, is an intergovernmental organization whose principal aim is to harmonize the regulations and metrological controls applied by the national metrology services of its Members.


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THE CIML HELD ITS 45TH MEETING IN ORLANDO, FLORIDA (USA)

See account, page 17

# Editorial

Alan E. Johnston
CIML President

## Happy New Year!

The start of 2011 provides an opportunity to pause and reflect on the accomplishments of the past year and our priorities for the New Year.

2010 was a productive year for the OIML. The Memorandum of Understanding between the OIML and ILAC/IAF was renewed, paving the way for continued success of our joint collaboration on acceptance and certification systems.

At the 45th CIML meeting in September 2010, OIML Medals were awarded to Dr. Nikolai Zhagora (Belarus), Dr. Heinz Wallerus (Germany), and Mr. Brian Beard (South Africa) for their outstanding contributions to the development of legal metrology. The OIML Award for Excellent Contributions from Developing Countries to Legal Metrology was also given to the Thai Legal Metrology Authority.

At the meeting, Mr. Peter Mason (UK) was elected CIML President and he will take up office at the opening of the 46th CIML meeting. Dr. Grahame Harvey (Australia) was elected first Vice-President and Dr. Roman Schwartz (Germany) was elected second Vice-President.

The Committee also appointed Mr. Stephen Patoray BIML Director. Mr. Patoray recently took up his responsibilities with the BIML.

Also at the meeting, a number of important matters were discussed, resulting in the passage of resolutions related to the organization of a Conformity to Type seminar, revision of OIML D 29 (Application of ISO Guide 65 in legal metrology) and the development of a proposal for the structure of technical work, a Technical Management Committee and voting procedures for adoption of OIML publications.

I would like to thank Dr. Charles Ehrlich and his colleagues at the U.S. National Institute of Standards and Technology for hosting the 45th CIML meeting in Orlando. Their hospitality and attentiveness to OIML Members' needs contributed to a very successful meeting.

In closing, I would like to thank all our Members for their support and contributions as the OIML continues its efforts to promote the global harmonization of legal metrology and assist Members in meeting the challenges of delivering legal metrology programs in today's world economies.

I look forward to the 46th CIML meeting in Prague and wish you a successful, happy and healthy year. ■

# Editorial

Stephen Patoray
BIML Director

## Turning the page - A new chapter

I am writing this Editorial during my preliminary visit to the BIML since being appointed Director. It is a very exciting time for me with much to learn and many new challenges. As I begin this new journey, I would like to provide some background on myself and some thoughts to you.

I bring to the OIML over 35 years of experience in the field of measurements. Much of this time has been spent in product development, project management, quality management, association management, standards development, type evaluation and automation design.

I have been involved in ISO 17025 laboratory audits as both technical expert and lead auditor and am a certified quality auditor for ISO 9001. I also was Director of the National Type Evaluation Program (NTEP), which is the certification program for legal-for-trade measuring devices in the United States. Most recently I was an Investigative Agent for an Agency of the US Department of Agriculture. I have experiences in legal metrology from the unique perspectives of industry, standards development, type evaluation, conformity to type and as a regulator.

In simple terms, my primary intention in my new role is to channel this experience into helping to provide solutions to various problems and resolve issues.

As I quickly become acquainted with the specific work at the BIML, projects and priorities will be identified. I will rely on the excellent staff at the BIML and the advice and guidance from the CIML President, Vice-Presidents, President Elect to help me in this. I will also rely on you, the Members, to assist me in making sure that the BIML will always be present to support your investment in and commitment to the OIML so that it continues to be of real value.

Along with this work I am also committed to learn the French language and to quickly acclimate and contribute to the local community where I am living. My new colleagues at the BIML are wholeheartedly assisting me in this matter to ensure that my cultural transition goes as smoothly as possible!

It is with these experiences, knowledge and enthusiasm that I will begin my work at the BIML. In the very near future, I will correspond with each of the CIML Members to learn what is important to you and your country with respect to OIML.

Until we are next in contact, I would like to take this opportunity to wish you a very happy and prosperous New Year, and I look forward to working with each and every one of you to strive towards our common goals.

# Éditorial

Alan E. Johnston
Président du CIML

## Bonne Année !

Ce début de 2011 nous donne l'occasion d'une pause pour revoir les réalisations de l'année qui s'achève et réfléchir à nos priorités pour celle qui commence.

L'année 2010 a été très féconde pour l'OIML. Le protocole d'entente entre l'OIML et l'ILAC/IAF a été renouvelé, ce qui assure un cadre favorable à la poursuite de notre collaboration dans le dossier des Systèmes d'approbation et de certification.

Lors de la 45e réunion du CIML en septembre 2010, des médailles de l'OIML ont été remises à M. Nicolai Zhagora, Ph.D., (Bélarus), M. Heinz Wallerus, Ph.D., (Allemagne) et à M. Brian Beard (Afrique du Sud) pour leurs contributions exceptionnelles au développement de la métrologie légale. De plus, le Service de Métrologie Légale de la Thaïlande a remporté le prix de l'OIML pour sa contribution excellente à la métrologie légale d'un pays en développement.

Au cours de la réunion, un nouveau Président a été élu pour le CIML en la personne de M. Peter Mason (Royaume-Uni), fonction qu'il assumera pour la première fois lors de la 46e réunion du CIML. M. Grahame Harvey, Ph.D., (Australie) a été élu Premier Vice-président et M. Roman Schwartz, Ph.D., (Allemagne), Second Vice-président.

Le Comité a aussi nommé M. Stephen Patoray Directeur du BIML; il est récemment entré en fonction au BIML.

En outre, on a discuté d'un certain nombre de sujets importants pour adopter des résolutions portant sur l'organisation d'un séminaire sur la conformité au type, la révision du Document OIML D 29 (Application du Guide ISO 65 à la métrologie légale) et l'élaboration d'une proposition visant l'organisation des travaux techniques, un Comité de Gestion Technique et la procédure de vote pour l'adoption des publications de l'OIML.

J'aimerais remercier M. Charles Ehrlich, Ph.D., et ses collègues du National Institute of Standards and Technology des États-Unis qui nous ont accueillis pour la 45e réunion du CIML à Orlando. Le grand succès de cette réunion est sans contredit attribuable à leur merveilleux sens de l'hospitalité et au souci qu'ils ont eu de répondre aux moindres besoins des Membres de l'OIML.

J'aimerais enfin remercier tous nos Membres de leurs appuis et de leurs contributions grâce auxquels l'OIML peut continuer d'œuvrer en faveur de l'harmonisation mondiale de la métrologie légale et d'aider ses Membres à relever les enjeux que représente la mise en œuvre de programmes de métrologie légale dans les économies mondiales d'aujourd'hui.

J'ai hâte de vous revoir à la 46e réunion du CIML qui aura lieu à Prague et vous souhaite une nouvelle année sous le sceau du bonheur, du succès et de la santé !

# Éditorial

Stephen Patoray
Directeur du BIML

## Tourner la page - Un nouveau chapitre

Je rédige cet Editorial à l'occasion de ma toute première visite au BIML depuis ma désignation en qualité de Directeur. Cette époque est pour moi très exigeante car j'ai beaucoup à apprendre et je devrai faire face à d'importants nouveaux défis. Maintenant, en commençant cette nouvelle étape je souhaite vous donner quelques informations personnelles et vous faire part de quelques réflexions.

J'apporte quelque 35 années d'expérience dans le domaine de la mesure, dans la mise au point des produits, dans la gestion des projets et de la qualité, l'administration d'associations, la mise au point des normes, l'évaluation de type, et l'automatisation.

Impliqué dans des audits de laboratoires selon la norme ISO 17025 en tant qu'expert technique comme en tant que premier auditeur, j'ai été certifié auditeur qualité pour la norme ISO 9001. Je fus également Directeur du Programme d'Evaluation de Type National (NTEP), programme de certification des appareils de mesure sous contrôle légal aux Etats-Unis destinés au commerce. Dernièrement, je fus Enquêteur pour une Agence du Département américain de l'Agriculture. Mon expérience en métrologie légale repose sur diverses compétences propres à l'industrie, aux normes, à l'évaluation et à la conformité au type, et en qualité de régulateur.

Mon objectif principal dans mes nouvelles attributions sera de faire profiter de cette expérience afin de proposer des solutions à différents problèmes et questions diverses.

Mon travail au BIML fera nécessairement apparaître de nouvelles priorités. Le personnel du BIML voudra bien m'y aider avec les conseils et les avis du Président du CIML, des Vice-Présidents, et du Président Elu. Quant aux Pays Membres, je compte sur leur aide pour faire en sorte que le BIML soit toujours présent auprès de votre engagement en faveur de l'OIML.

Je me suis engagé à parler français et à m'insérer pleinement dans mon nouveau milieu. Dès à présent je sais toute l'aide que mes nouveaux collègues pourront m'apporter en ces circonstances.

C'est fort de mon expérience et de mon enthousiasme que j'entre au BIML. Très prochainement, je joindrai personnellement chaque Membre du CIML afin de connaître vos propres projets.

Laissez moi saisir cette occasion pour vous exprimer mes vœux de Bonne Année, heureuse et prospère, en me réjouissant d'associer nos efforts à la pleine réussite de nos objectifs communs.

SOFTWARE

# The challenge for legal metrology of operating systems embedded in measuring instruments

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**Key Words**: Operating systems, Embedded systems, Software validation, Common Criteria, Protection profile, OIML, D 31, ISO/IEC 15408, Measuring Instruments Directive (MID), WELMEC Guide 7.2, U Type Instrument

## Abstract

Software validation is an indispensable part of the type examination process in legal metrology. Since more and more functions are demanded by the users of measuring instruments and consequently offered by the manufacturers, often via the embedded operating system, an increased and evolving level of complexity is introduced which needs to be monitored and catered for.

Nowadays, type examination engineers are confronted with a greater number of risks which must be taken into consideration. It is, therefore, imperative that the validation procedure keep pace with the technological evolution of measuring systems.

However, there is growing conflict between the desired flexibility that an operating system should offer, on the one hand, and the testing effort and challenges that examination engineers are confronted with, on the other hand. Thus, appropriate methods and tools are needed to overcome this challenge.

In this regard an approach has been developed which aims at carrying out automated checks of the parameters related to operating systems embedded in measuring instruments. The origin is a protection profile that was developed for operating systems, and evaluated according to the Common Criteria standard. The profile has been adapted to the special needs of legal metrology in order to protect software, including the operating system, against accidental, unintentional and/or intentional changes. For practical reasons, this adaptation has been implemented as an applicable test script for Linux-based systems.

With this approach, even without profound knowledge of operating systems, efficient support for the examination of the security-relevant characteristics of measuring instrument software with embedded operating systems is therefore made possible, also for type examination and for verification.

## 1 Introduction

With the advent of programmable hardware components and their integration into measuring instruments, the influence and hence the importance of software, especially in legal metrology, has remarkably increased. Consequently, the validation of software has become an indispensable part of the type examination process [1], [2], [3].

Software development lead-time, product quality, and mass-customization are important issues in industrial development and manufacturing processes, and so it is comprehensible that manufacturers increasingly rely on programmable components which intrinsically offer a broad ensemble of high level functions which facilitate the development process.

The required functions are provided by, but also limited by, the facilities of the operating system applied - for example graphic performance, processor power, interface drivers, video drivers, and memory management, to name but a few. Therefore, with the availability of embedded personal computers (PC), it followed that this technology should also be exploited for measuring instruments. Instruments based on an embedded PC accompanied by external peripherals, sensors and acquisition interfaces, could accept a large number of commands and data from various nodes (interfaces, sensors, etc.), several different operating modes could be selected, key metrological parameters and software updates could be downloaded to the instrument, and measurement data could be transferred to external modules [4], [5], [6]. But as a consequence, all these features greatly extend the risks with respect to the characteristics to be safeguarded in legal metrology.

It is imperative that the software validation procedure in type examination processes keep pace with technological evolution, in the particular case discussed here, with the increasing use of operating systems in measuring systems.

This paper seeks to offer a principal way of showing how operating systems with growing complexity

embedded into a measuring instrument subject to legal metrological control can be handled in order to ensure conformity with the above-mentioned requirements.

After a brief introduction, the two major operating systems are briefly introduced followed by an illustrative example showing the evolution of the complexity of the Linux kernel with the increasing number of releases.

Subsequently, the contradictions between the general advantages of embedded solutions and the legal metrology regulations are discussed, which results in the analysis of the challenges which are established by the application of operating systems. Starting with an introduction to the Common Criteria approach for security of IT components, protection means for a measuring instruments with embedded operating systems are derived which finally leads to our proposed automatic examination of the system's configuration.

## 2 Existing software guidance documents

For the general task of software validation, appropriate support is already offered by OIML D 31:2008 *General requirements for software controlled measuring instruments* [8], and WELMEC Guide 7.2, available in its current issue 4 [10]. This Guide represents an interpretation of the corresponding parts of the Measuring Instruments Directive (MID) [9].

The objective of these documents is to provide guidance for development engineers of manufacturers as well as for type examination engineers. By doing so, they remove any "uncertainty" as to the interpretation of the more or less generally composed software requirements laid down in regulatory documents such as, for example, in the MID, and establish mutual confidence in the results of software examination.

OIML D 31 may specify details concerning the validation procedure subdivided into general and specific requirements. The general requirements specify the basic requirements which have to be fulfilled by every system. This includes the identification of the legally relevant part of the software, the correctness of the algorithms and functions, the protection against misuse and fraud, i.e. the legally relevant software shall be secured against unauthorized modification, loading, or changes by swapping the memory device.

Furthermore it deals with the support of hardware features by software including fault detection and durability protection. The specific requirements of D 31 cover all deviations from the general requirements, i.e. the validation of the specification and separation of metrologically critical parts and the specification of the interfaces between the parts, the indications of measurement values and other legally relevant information, the storage of data, the transmission via the communication system, the compatibility of the operating system and the hardware, and how to handle maintenance and reconfigurations.

The validation of software with respect to the developed requirements basically remains a demanding task due to the absence of straightforwardly defined procedures, i.e. of dedicated technical standards for metrological software. Despite the fact that when following the guiding documents, a considerable number of evaluations are necessary for the particular implementations they are, nevertheless, useful for a systematic, step by step analysis of the system under test.

In particular, the validity of these requirements implies their regular update. For the increased use of PC-based systems utilizing operating systems (OS), the above-mentioned requirements are still valid but are not qualified to answer all the particular problems that developers and testers are confronted with, because of an increased and evolving level of complexity of the operating systems [11], [12].

## 3 The major operating systems and their characteristics

The two OS most widely used in measuring systems are Microsoft Windows and Linux. Linux and MS Windows differ in their philosophy, cost, versatility and stability, each seeking to improve in their perceived weaker areas. Comparisons of the two OS tend to reflect their origins, historic user bases and distribution models [14], [15], [16], [17], [18], [19]. Typically perceived and regularly cited weaknesses mostly include poor consumer familiarity with Linux, and MS Windows' susceptibility to viruses and malware. MS Windows is a series of commercial software operating systems and graphical user interfaces produced by Microsoft. Thus, in contrast to Linux, its code is kept secret (proprietary).

Throughout the entire period of the Windows 9x systems through to the introduction of Windows 7, Windows has retained an extremely large share of retail sales among operating systems for personal desktop use, while Linux has sustained its status as the most prominent free software operating system. After their initial clash, both operating systems moved beyond the user base of the personal computer market and share a rivalry for a variety of other devices, with products for the server and embedded systems markets, and mobile internet access.

Each of the three families of Windows operating systems: Windows 9x (legacy), Windows NT, and Windows Embedded has its own code base and design.

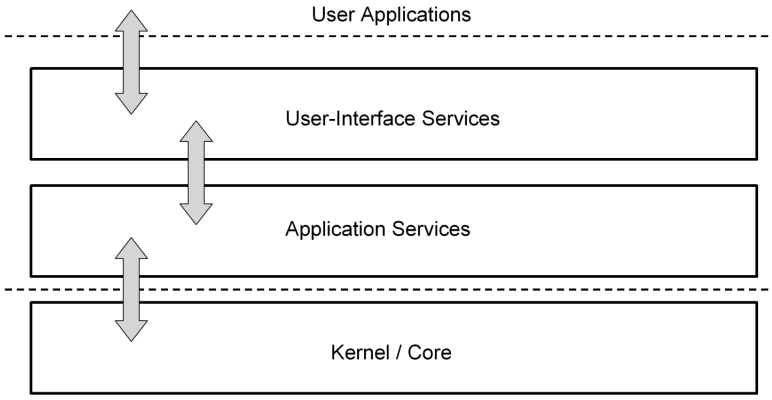


Fig. 1: A Linux kernel and its communication via different services with the user applications, indicated by the arrows. Different distributions rely on the same kernel.

The focus of the following comparisons is mainly on the NT family. Linux is a generic term referring to Unix-like computer OS that use the Linux kernel. The primary difference between Linux and many other popular contemporary OS is that the Linux kernel and other components are free and open source software. Linux is not the only such operating system, although it is by far the most widely used. Although there are several independent distributions, they are all based on the same Linux-kernel, see Figure 1.

The Linux kernel handles process control, networking, and peripheral and file system access. Device drivers are either integrated directly with the kernel or added as modules loaded while the system is running. Separate projects that interface with the kernel provide much of the system's higher-level functionality.

Linux is available for many types of architectures: x86, x64, Itanium, MIPS, PowerPC, ARM, and others. The Windows NT family is available on x86, x64, and Itanium, although Itanium compatible versions of Windows are only sold as servers and x86 is being phased out. Because of the diversity of supported CPU types, Linux finds applications today in routers, set-top boxes, PDAs and mobile phones as well as in servers and desktops. Windows Embedded has a long history, starting with DOS on Point Of Sale (POS) terminals. Microsoft has based many embedded platforms on the core Windows CE operating system, including AutoPC, Windows Mobile, Mediaroom, Portable Media Center, and many industrial devices and embedded systems.

In the following we will assume a Linux-based system, since this operating system and its derivatives are commonly used to facilitate the development of PC-based measurement systems subject to legal metrology, primarily due to its open source philosophy and other special advantages.

## 4 Complexity of operating systems and their evolution

The configuration options are the most essential part of the Linux kernel configuration. The granularity, meaningfulness and complexity of the configuration options and their dependencies within an operating system are fundamental for the end user to successfully configure the kernel in a Linux system [11], [12].

Studies of software complexity have shown that complexity can be measured by so-called software metrics [20]. Consequently, this approach was also applied by R. Lotufo in 2009 [12] to measure the complexity of 29 stable versions of the Linux kernel configuration options in order to study their evolution in terms of complexity [12].

We will not go into the details of complexity analysis, but want to mention certain illustrative parameters (metrics) such as the *size* and the *depth* of the kernel. *Size* is a simple but nonetheless an appropriate metric for software complexity, as shown in [13]. It was found that the larger the *size* of the scripts, the more configuration options and dependencies between them exist. Another metric is *depth* as a complexity measure. This can also be understood as the average length of every different path from a configuration option node to its leaves, i.e. configuration options without dependencies. With the increasing *depth* of a given configuration option, the chain of dependencies lengthens and the more complex it is to comprehend all of its dependencies, and therefore the more complex it is to make changes to them.

The first noticeable thing Lotufo figured out was the steady increase in *size*, such as in the number of Source Lines Of Code (SLOC), the number of configuration

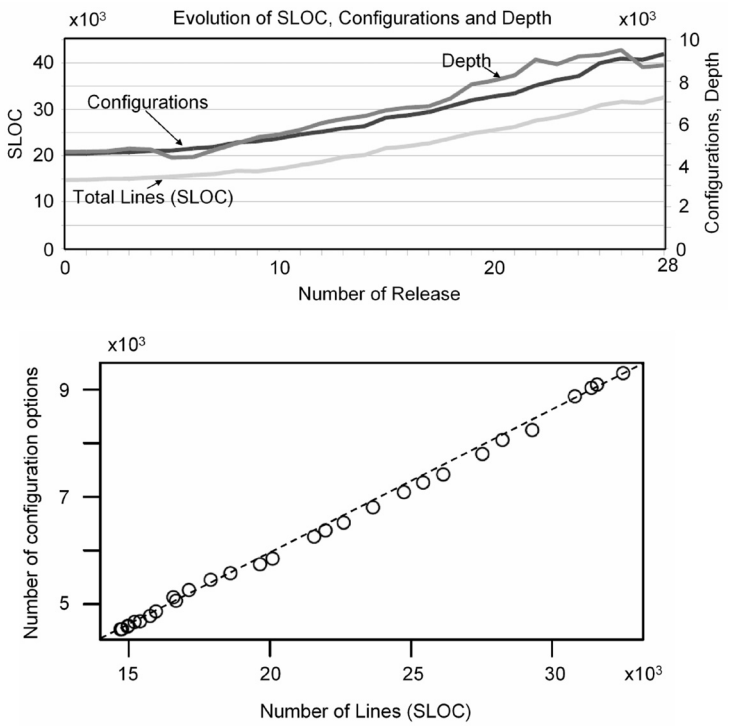


Fig. 2: *Upper graph*: Evolution of *size, depth* and *configurations* of Linux kernel configuration scripts from release 2.6.0 to 2.6.28.
*Lower graph*: Plot of the number of SLOC vs. the number of configuration options with ~ 0.99 correlation. Adapted from [12].

options or the number of dependencies (*depth*) with an increasing number of distribution. The correlation of the evolution of SLOC and the configuration options was ~ 0.99, which is very high, as can be seen in Figure 2.

The results for all the metrics extracted from the Linux kernel configuration scripts from release 2.6.0 to release 2.6.28 indicated that the complexity of the code for the configuration options has increased consistently. This implies that the Linux kernel development team should have difficulties in maintaining these configuration options, especially when dealing with configuration options with several dependencies, or with a long chain of dependencies.

With these findings, it was considered that there may be severe inconsistencies with the configuration options that just have not been found yet, because not many developers or users have fine-tuned all of the more than 9000 configuration options in the Linux kernel. The Linux kernel configuration has reached a *size* and *depth* and therefore a level of complexity that is no longer feasible to handle and maintain without effective tools.

## 5 General advantages of embedded solutions vs. legal metrology regulations

The outstanding advantages of measuring systems exploiting an OS are first and foremost the facilitated access to rather complex processes such as, for example, different data transmission techniques. A second point is the immense processor and graphic power which, together with the large memory available, allows the design of very comfortable and convenient graphical user-interfaces. The multi-user access to one particular system and the interconnection of distributed sensors or different measurement units is also a very important advantage.

And not to be forgotten, marketing has to be considered, since highly flexible systems will be sold much more easily.

The aforementioned advantages underline that PCs are designed for flexibility, so that - with the support of the manufacturer or programmer - the user can determine and modify software- controlled functions without too much effort.

In contrast to this flexibility, however, definitely stands the concept of type approval where certain characteristics and/or components are fixed so that they cannot be modified without the official consent of the approving body, because all processes or techniques which impact on the acquisition, processing, transmission and visualization of the measurement value have to be - in principle - under legal control.

Strict attempts were initially made to apply these principles to PCs as well, with the result that the newly gained flexibility of PC-based measuring systems was almost completely lost for applications in legal metrology. It is obvious that an area of eternal conflicts will develop if the antagonism described above cannot be resolved. A sealed PC would be a regression, even an anachronism. It is obvious that new solutions and correspondingly extended guidance are necessary.

To answer such pressing questions requires a sound knowledge of the software, software engineering techniques, and the OS, which is seldom the case even for the OS developers as we have seen above. Exemplary challenges type approval authorities will face are [23]:

(i) How to prevent the activation of non-authorized parts or functions of the software.

(ii) What possibilities exist to access "protected" data or commands through the operating system?

(iii) Is it possible to capture data from peripherals and sensors without using the software of the instrument?

(iv) Is it possible to install different, alternative software on the same hard disk, i.e. software that could use the same user interface and which could easily be confused with the approved original software?

## 6 Challenges of operating systems

The use of operating systems is often challenging for metrologists and even for system developers. Both operating systems' philosophies mentioned above comprise highly elaborate code which requires profound knowledge to be comprehensible and applicable. Hence an in-depth code validation might fail and might not be applicable, even if the code is open source as is the case for Linux-based systems. Even well-educated and experienced developers or type approval engineers might be confused by the interconnectivity these systems provide. Therefore an observation of the operating system must be carried out from an elevated level. The level of higher functions is proposed here to check for conformity with valid requirements.

As mentioned in [12], not many developers or users have fine-tuned every one of the more than 9000 configuration options in the Linux kernel, or even know all the interdependencies.

For instance, the same functionality which should be blocked for metrological/legal reasons, could be made accessible by a completely different function. Though blocked in one way, it can be circumvented by another application or configuration option, e.g. a blocked USB interface is activated by a sound driver.

To this end, the ensemble of functions, i.e. packages, offered by the individual Linux distribution must also be open source.

A further question is whether the relevant security functions of the kernel are exploited to an adequate extent or not.

If the measuring instrument provides access to the internet, the kernel cannot be regarded as a fixed structure, since the "kernel is alive". Updates of the kernel's functionality are available daily via the internet which on the one hand ensures the kernel's tolerance against current threats, but on the other hand, changes its configuration, which might have an impact on the acquisition, processing and visualization of measured data. To this end, the update functionality must be inhibited by choosing an appropriate increased risk class. A risk class is defined by the combination of the appropriate levels required for software protection, software examination and software conformity [10].

As with any operating system, there are risks that a user might misuse it by injecting a code into the kernel which intercepts process calls and alters them, thereby changing the values produced by the measurement system. This scenario can almost not be prevented programmatically, as the implemented security measures themselves are a target for malpractice.

The prevention of the misuse of the OS can be basically obtained by the physical sealing of i) the computer hardware and ii) the console access, preventing user access to any component. If a software component under legal protection, despite the sealing, is altered, it will be revealed by the software identification match between the version number and a qualified checksum, which is common practice recommended by the guides mentioned earlier. However, these hardware solutions either suffer from a limited flexibility or can be circumvented.

All of these exemplary scenarios have to be addressed to keep the system sound in the metrologist's view, i.e. to prevent accidental or unintentional changes and intentional changes. To provide help to secure an IT-system in legal metrology, requires the same basic approaches as to harden conventional IT-systems against manipulations. For the latter guidance is offered by several national institutions, e.g. the Federal Office for Information Security [24] (BSI), Germany or the National Security Agency [25] (NSA), USA.

## 7 The Common Criteria approach for security of IT components

In the last decade, an international standard for IT security, the so-called *Common Criteria for Information Technology Security Evaluation* (CC) [7] has been developed. It provides guidance for security evaluation by laying down generic requirements for major security functionalities of IT products and assurance measures to be applied to these functionalities. The means to adapt the generic requirements to particular application areas are the so-called *Protection Profiles*, which are predesigned in the CC standard.

While the protection profile is a means to express the security requirements in a comparable way, another instrument of the CC standard, the so-called *Security Target*, is a means to express the security function implemented in a particular product. By matching security targets with protection profiles, the evaluation of compliance with requirements is supported.

The big advantage of the CC approach is the comparability of evaluation results independently achieved by security evaluation bodies, besides the reference to the latest state-of-the-art of IT security. An aspect of special importance is that CC enforces the definition and clear description of assumptions and environmental conditions, under which a protection profile and a security target have been set up. Comparability is obviously only given under the same assumptions and conditions.

The approach is applicable to products that may be implemented in hardware, firmware, application software or any combination of them. The evaluation process establishes a level of confidence that the security functionalities of IT products under evaluation meet the requirements. The CC is therefore useful as a guide for the development and evaluation of IT products, even for their procurement. The CC is intentionally flexible, enabling a range of evaluation methods to be applied to a broad variety of IT products.

Though the approach of CC is very valuable and the only systematic and comprehensive one available, it is not a scheme that can simply be applied by the developer of a system quasi as an add-on to the normal specification. The levels of definition of the security functions and the protection profiles differ considerably from those a programmer needs. Especially for already existing complex systems like an operating system, it is necessary to interpret the security means implemented with regard to the security functions required by the protection profile.

Several evaluations of operating systems have been performed (Windows 2000 to Windows Vista, SuSE Linux, Red Hat Linux [26]) by the National Information Assurance Partnership (NIAP) [27]. Because of the complexity of the evaluation object, this was only possible by means of a cooperation of the evaluator with the manufacturer of the operating system.

To date, a successful application of CC-based methods in the legal metrology area is not known. This is, on the one hand, not fully explainable since the IT related requirements, as outlined above, are well structured in guides such as [8] and [10] and, therefore, well prepared for a revision in terms of a protection profile. On the other hand, this is comprehensible since the way of thinking and the terminology used in metrology and IT security are quite different. It will be a challenge in the near future to bring these two worlds together for the significant benefit of the IT security of measuring instruments.

Basically, the development process of a protection profile starts with an analysis of the threats the target of evaluation is exposed to. This comprises the identification of what is threatened as well as who or what is doing the threatening. Concerning a measuring instrument subject to legal control, matters that are threatened can be summarized as follows:

(A) The falsification of measurement values or the assignment of a measurement value to a wrong measurement.

(B) Wrong measurement functions or parameters of the measuring instrument.

(C) Inappropriate or missing protection means of the measuring instrument, implying that further threats such as A) or B) are facilitated.

In a standard analysis of who or what is the origin of a threat, roles are defined that are performed by persons. It is presumed that some intend to perform threats (A) to (C). A protection profile therefore does not require the same protection means for each role.

In countries where metrology is legally controlled, the roles and threats to be assumed are defined by law, to some extent. In general only the surveillance officer and no other person has privileges. When a measuring instrument is in use, it has to be protected against threats by anyone else.

## 8 Protection means for a measuring instrument with an embedded operating system

As discussed above, due to miniaturization, future measuring instruments will more and more often be equipped with embedded processors and additional components forming a circuit equivalent to that of a PC.

On such circuits it is possible to implement an operating system designed for personal computers.

In the following an approach is discussed that indirectly takes advantages of a CC-based security evaluation for a Linux distribution Red Hat RHEL 5. This distribution has received a Common Criteria Certificate EAL 4+ by the US authority NIAP [27], [28]. This certificate is only valid if the operating system is configured correctly according to strict rules. These configuration rules have been edited by another agency, NSA [25], [29].

The configuration rules are written for a desktop computer or a server. In the following chapter, modifications of the configuration rules [29] are discussed, that take into consideration the software requirements for legal metrology defined in OIML D 31 [8] and adapt the configuration rules to these requirements.

OIML D 31 [8] gives examples of configurations with PCs by focusing on the variant with a computer fully embedded into the measuring instrument. For this case a description will be given of how the protection measures offered by the operating system are used to repel the threats and possible attacks introduced above.

Up-to-date multi-tasking and multi-user operating systems support the protecting of programs and data domains as well as the functions of the operating system against inadmissible impacts by users or attackers. However, the integrated mechanisms only work if the operating system is configured correctly. Because of its complexity - as discussed above - this is not or not easily possible in each case.

The secure configuration of a computer as part of a measuring instrument differs from that of a part of a desktop in some aspects. Due to the requirements of legal metrology, measurement data, parameters, and measuring functions of a measuring instrument in use shall not be changeable, at least not without leaving a trace.

The idea of the security of operating systems is based upon the role of a system administrator who must be regarded as trustworthy. He is able to access all security parameters making him responsible for the security of the whole system. For a measuring instrument in use such a role is not planned in the regulations: the legally relevant functions of a measuring instrument are not allowed to be changed after the instrument has been put into use either by the manufacturer, by the users, the owners, the vendor of the measured goods or by the client. In countries that implement a market or user surveillance, it is possible that the surveillance persons - to a certain degree - take over the role of an administrator. One cannot expect, however, that surveillance staff carry out technical adjustments. It will be shown below that it is possible - without deep knowledge of the operating system - to perform a comparison of security parameters with a corresponding reference using some simple aids.

The secure configuration of Linux as part of a measuring instrument comprises the following items: protection of the kernel, protection of legally relevant programs and data, protection of accounts, provisions for file access (especially of the configuration files), provisions for communication via network, and restrictions for the plug & play mechanism.

### 8.1 Protection of the kernel

The heart of the operating system is a "kernel" (see Figure 1). As for Linux it consists of fixed parts, additional modules (kernel extensions) and device drivers that accomplish adaptation to the hardware platform and are loaded automatically if necessary. The kernel has its own domain in the virtual main memory, the so-called "kernel space". The kernel programs, active modules as well as the kernel data reside in this domain during runtime. The kernel space has to be protected against inadmissible access (threat (C)) and should not be changeable.

As the kernel performs the memory management during runtime and the processor runs with the highest hardware protection level, the kernel can supervise that there is no violation of the kernel space on its own.

The program code of the kernel and of the kernel modules is stored on mass storage devices. These are protected against falsification by means described in section 8.4, but only as long as the operating system is running. Conventional means, e.g. sealing the housing or hard disks, have to be used to ensure that the mass storage device cannot be exchanged or that protection is not circumvented by booting from another device instead of the regular one.

In the following the procedures at type examination, when putting on the market and in case of supervision, will be described.

It is impossible to analyze the kernel in the framework of a type examination of a measuring instrument. The following procedure is assumed to be an appropriate compromise between security and expenditure: The manufacturer is asked to use the kernel of a freely available Linux distribution but omitting all unnecessary modules and parts. Concerning freely available distributions, it is assumed that they do not contain inadmissible components that affect security. The comparison of the kernel software implemented in the measuring instrument with that of the reference distribution is relatively simple. Often the manufacturer has to enhance the minimum system to meet the needs of the customer. These additional parts have to be documented for the examination.

### 8.2 Protection of legally relevant programs

Linux as a multi-user operating system protects the programs and data of the various users against those of the others. Every user has his own "User Space" that only the owner can access. If legally relevant programs are running under a user's own account in a user space, they are protected effectively against threats (A) and (B) originating from other user spaces, i.e. against attacks by other users. No additional protection means are necessary. The legally relevant programs reside on the mass storage device of the system. The integrity of these programs is guaranteed by the means described in section 8.4.

For times when the system is switched off, the exchange of the mass storage device and booting from other storages should be inhibited by conventional means (see section 8.1).

### 8.3 Protection of accounts

To be able to work on a protected Linux operating system, it is necessary to be known to the system, i.e. the user needs to "have an account", and has to identify himself with a password. The user is granted access to his own directory and possibly also selectively to other domains. The wrong configuration could, however, enable a user to access forbidden user spaces, too. If a user could pretend to be an administrator, he could exchange or modify any program and could gain – on a permanent basis – more rights in the system than he is allowed to.

To avoid this, the file containing information on the passwords is examined intensively for irregularities. In addition, the configuration files for user groups, the system account, the administrator account and accounts of user groups who are allowed to execute certain programs with the permission level of the administrator are examined. Of course, it is assumed that every user chooses a password that cannot be guessed and that it is kept secret.

The settings described here lead to the protection of the legally relevant software against all threats (A), (B), and (C) because access to the legally relevant user space is inhibited by these means. It has to be ensured that nobody discovers the password of the administrator or the account of the legally relevant software. In practice, this can be achieved by assigning the person who is supervising with the task of choosing a password, writing it down, protecting it from being discovered, e.g. by an opaque envelope or by putting it into a compartment within the measuring instrument and sealing it. If the system is repaired, the service personnel can break the seal and use the password. Afterwards the security steps can be carried out anew.

Another option to inhibit inadmissible access to the system is to generate the password automatically when the operating system is started up for the first time. The password is written nowhere and nobody will be able to access the administrator account. If a failure occurs, the operating system has to be re-installed from scratch.

### 8.4 Protection of files, especially of configuration files

Files on a Linux file system are provided with a differentiated permission system for reading, writing and executing. These permissions can be determined separately for each file, its owner, a group of users, or all users. Files can, e.g., only be used by one account and some cannot even be read by other accounts. This has to be considered especially for legally relevant files. In combination with the secure accounts described above, threats (A), (B), and (C) can be repelled.

Before starting the examination, the settings of at least three selected files (configuration files, system files and legally relevant files) are fixed. Afterwards the corresponding files are read from the measuring system and the permissions are compared with the nominal value.

### 8.5 Protection against inadmissible services, firewall, protective network interface

A big advantage of PC components compared to solutions with micro-controllers is the perfect ready-to-use support of networking. For many engineers this is the most important argument for integrating such a system into the measuring instrument. The network interface is, however, the entrance for attackers. The operating system has to be configured so that this danger is minimized. Securing steps consist of adjusting certain kernel parameters and of stopping or starting only services that are absolutely necessary. Services are programs that run in the background and react to requests from the network.

When examining the kernel, these parameters are checked and the initiating procedure for services will be analyzed.

### 8.6 Restrictions for plug & play automatism

For the user of the system, one very comfortable property of the operating system is the plug & play

mechanism. Concerning security, these interfaces are problematic as even booting from external devices and the circumvention of important protection means is possible if the configuration is too weak. In any case, the option of external booting has to be blocked for measuring instruments. Basically, Universal Serial Bus (USB) interfaces should not be accessible. Single USB plug & play functions could be accepted, but their intensive and usually difficult examination is necessary.

When examining a USB interface, it is checked whether the boot option is inhibited, automatic loading of drivers is de-activated and only those drivers are loaded by a script or program that are necessary.

## 9 Automatic examination of the configuration

The measures for repelling the threats described above comprises many settings. To set them manually is error-prone and time consuming. This procedure has, therefore, been automated. This concept is well established, such hardening programs "lock down" an operating system by proactively configuring the system for increased security and decreasing its susceptibility to compromise. They can also assess a system's current state of hardening, granularly reporting on each of the security settings with which it works. A sophisticated tool in this category is "Bastille" [30]. However, this kind of tool is constructed for application on desktops and servers. They are not appropriate for use in a measuring instrument.

The tool developed by the PTB generates information about the security-relevant settings of the measuring instrument as described in sections 8.1 to 8.4. This information has to be checked and evaluated by the examiner.

Two applications are possible: Before type examination the tool is given to the manufacturer. The tool supports him in applying the right security settings. During type examination, the tool is executed again and the result is evaluated. If the security settings are satisfactory they are archived and a checksum is generated.

For the supervision and checking of an instrument in use, the tool can be applied again. The output has to be compared with the reference or its checksum, respectively. Even without profound knowledge of operating systems, an efficient examination of the security of measuring instruments in the field is possible.

## 10 Conclusion

To circumvent the pitfalls introduced by the complexity of operating systems embedded in measuring instruments subject to legal verification, we proposed an initial test paradigm. An application was exemplarily designed for measuring instruments with an embedded Linux-based operating system. The paradigm was derived from an existing protection profile which received a formal certification according to the Common Criteria Standard.

Based on this approach and on a basic threat scenario of measuring instruments subject to legal verification, protection means are proposed for the described configuration of measuring instruments. To this end, the compliance of a particular security solution implemented for an operating system with the security requirements established can be achieved. It is expected that the procedure described in this paper can be adapted to other variants of operating systems.

First applications have shown the feasibility of the paradigm. However, these first application tests also have shown the need for further developments and investigations in other fields of applications in order to reach the level of an internationally accepted standard procedure.

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## ORLANDO 2010

# 45th CIML Meeting and Associated Events

## Orlando, Florida, USA

21–24 September 2010

*The 45th Meeting of the International Committee of Legal Metrology took place at the DoubleTree Hotel, Orlando (Florida), United States, from Tuesday 21 through Friday 24 September 2010, and a Regional Legal Metrology Organization meeting took place on Monday 20 September.*

*On Thursday 23 September a tour was organized to the Kennedy Space Center (photos).*

ORLANDO 2010

# 45th CIML Meeting: Opening Address

Mr. Alan E. Johnston
CIML President

Ladies and Gentlemen,

Good morning and welcome to Orlando, Florida.

I would like to take this opportunity to make some opening remarks. Firstly, it is my pleasure to welcome all of the CIML Members and guests to the Forty-Fifth CIML Meeting. My special thanks go to Dr. Charles Ehrlich and his colleagues at the NIST for their organization of this meeting – knowing how much time and effort is involved I very much appreciate their work.

Over the past year there have been a number of changes in the composition of the Committee, so let me now welcome the following new CIML Members:

- Mr. Hossein Azareshi, Iran,
- Mr. Bayram Tek, Turkey,
- Mr. Paolo Francisci, Italy,
- Mr. Michael Onyancha, Kenya,
- Mrs. Angjelina Kola, Albania,
- Mr. Mirko Stopar, Slovenia,
- Mr. Mourad Ben Hassine, Tunisia,
- Mr. Itzik Kimchi, Israel.

The number of Member States is stable, and it is encouraging to note that a number of other countries are considering joining the OIML; although this process is quite long, we hope that it will succeed as soon as possible.

Unfortunately, we had to delist three Corresponding Members due to their excessive arrears and their non payment of fees. The number of Corresponding Members has therefore decreased from 58 to 55, however I am pleased to see that a large number of Corresponding Members – 18 countries in fact – are in attendance at this CIML Meeting, which shows a growing interest in our Organization.

We again have a very busy meeting and there are a number of very important issues to discuss on the agenda. This CIML Meeting will have to make decisions that are crucial for the future of the OIML.

You will be asked to make decisions about the CIML Presidency, the CIML Vice-Presidency, and the BIML Director. These decisions are indeed major decisions for our Organization.

You have also received information about the rapprochement with the BIPM and about the bilateral meeting that was held in March with the Bureau of the CIPM.

OIML technical work progressed considerably more slowly than we expected, mainly due to the heavy workload of most national legal metrology services. Consequently, there are not as many publications to be adopted this year as we had expected. I hope that this will improve over the next years.

Concerning the efficiency of the technical work, the Bureau will report on the progress in the revision of the Directives for Technical Work. This may seem a rather administrative and procedural issue, but we expect that it will result in a better efficiency of our work.

Concerning the OIML systems of certification and recognition, you have been consulted on the issue of Conformity to Type. This is a very strategic issue that we will discuss and I am sure that we shall come to some positive conclusions.

The financial issues are another important matter that this Meeting will be required to consider. In my opinion the financial situation of the Organization is excellent, although certain savings can still be made. And as the Bureau operated with a reduced staff for part of the year, some savings were also made here. The annual accounts that were sent to you show a positive result, albeit lower than planned in the budget. Additional savings are expected in 2011.

Following the management audit that was carried out in February 2010, I asked the BIML Director to prepare an Action Plan to take account of the comments expressed by the auditor and the actions that the BIML will be taking (or has taken) as a result. This Action Plan was distributed to all CIML Members.

The issue of the OIML Pension System has been the object of a report by the BIML Director, in liaison with Peter Mason and Philippe Richard. This issue will also be discussed during this CIML Meeting and I would like to take this opportunity to thank these gentlemen for their input on this very important matter.

May I also draw your attention to a request made by Guinea which we shall examine and which should then be examined by the Conference in 2012.

Thank you for your attention, and I look forward to some lively discussions during the meeting. I also hope you will have the time to enjoy some of the sights in Orlando and that you enjoy your stay in the United States.

I will now hand the floor over to Dr. Ehrlich, who will introduce our Guest Speaker. ■

ORLANDO 2010

# 45th CIML Meeting: Opening Address

Dr. Charles Ehrlich
CIML Member, USA

Good morning everyone,

Thank you Alan. I would like to add my welcome to the United States and to thank you all for coming. It is my pleasure and honor to introduce our Guest Speaker this morning, Dr. James Olthoff, Deputy Director of the NIST Physical Measurements Laboratory. Dr. Olthoff joined NIST in 1987 as a Research Physicist developing measurement methods for the semiconductor industry. Since then he served as Chief of the Electricity Division and as the Deputy Director of the Electronics and Electrical Engineering Laboratory. He has recently taken on the new position of Deputy Director for Measurement Services of the new Physical Measurements Laboratory at NIST, in which he has responsibility for essentially all of the calibration services provided by NIST. ■

ORLANDO 2010

# 45th CIML Meeting: Opening Address

Dr. James Olthoff
Deputy Director, NIST Physical Measurements Laboratory

Thank you Chuck. It is an honor to be here this morning and I want to welcome every one of you, and I extend a special individual welcome to President Johnston and Director Magana and of course a special welcome to all of you CIML Members and distinguished guests.

It is my pleasure on behalf of NIST Director Dr. Patrick Gallagher to welcome you to the United States for the Forty-Fifth Meeting of the CIML. Dr. Gallagher sends his regrets; he is unhappy that he could not be here but he asked me to convey his best wishes for you to have a very successful meeting and he also wanted me to express his deep appreciation for the work that you and your organizations do in the area of legal metrology. This is an area of great importance to NIST and to the United States.

It has been thirty years since the United States last hosted the CIML and it is our honor to host it again, especially as you are dealing with such important issues as those just mentioned – you will be selecting your President, Vice-President and Director and it is clear that this will be a very important meeting and that it will have great implications long into the future so I hope that it all goes extremely well.

I also want to welcome you to Orlando, one of the premier tourist destinations of the world – I have to applaud the Organizing Committee for choosing to have your meeting here as opposed to say in Washington D.C. as here you get to be entertained this week by wizards and ogres whereas in Washington D.C. right now all we have is a bunch of politicians who are worried about the upcoming elections so I am sure you will have much more fun here than where NIST is!

As many of you know, NIST has a long history of supporting legal metrology. The USA joined the OIML in 1972 and has played an active role in this Organization ever since joining but our history or our legacy of international metrology goes back much further than that – in fact back to the Nineteenth Century when in 1878 we became a signatory of the Convention of the Metre.

Now I do realize that compared to some of the countries that you represent this makes us a relative "newcomer" to this area but we consider this as a very important area for us to work in.

What you may be surprised or even shocked to hear is that in 1893 the Mendenhall Order marked the official US Government decision to render the fundamental standards for length and mass metric in the United States. I do realize that after almost a hundred years we still have a long way to go in terms of implementing this fully but I am hoping that as you spend time here this week and as you go through this meeting you will recognize some of the progress we have made – maybe even some of you who were here thirty years ago may notice some of the changes that have happened in the United States in relationship to implementing the metric system.

As you spend time here in Orlando and as you go through the shops you will notice that many items now have metric units on their packaging – it is important to note that our automotive industry now exclusively utilizes metric units in the building of their vehicles and in fact many US manufacturers are now adopting the

metric system as their primary measurement scale and this is continuing in many areas.

As most of you know, the US metrology system is vast and complex; it includes all the weights and measures offices of all fifty States and it works its way right down to many smaller entities such as cities and counties. It includes federal regulatory agencies such as the Food and Drug Administration, the US Department of Agriculture, manufacturers, and trade organizations, making it an extreme challenge to work in this very complex system. But the potential rewards are very great and in fact that becomes even more true as technology advances and as the US metrology system starts to deal with non weights and measures issues, for example as we attempt to implement the smart grid across the electric power system, or as we attempt to develop IT health care documentary standards to facilitate the exchange of medical information or even as we address worldwide issues such as global climate change, the issues of international metrology become greater and more important.

I also want to thank Mr. Magana for the opportunity we will have later this week for the US to present some highlights both of metrology in the United States and the legal metrology efforts that are underway; for that you will hear from three key US organizations: the National Conference on Weights and Measures, the Scale Manufacturers Association, and the NCSLI which is an organization that develops voluntary laboratory consensus standards.

The US metrology system also includes my organization, the National Institute of Standards and Technology, or NIST as it is more often called. NIST plays a unique role in the metrology infrastructure and is part of the Department of Commerce, which has the broad mandate to advance the economic growth in the United States. As part of this mandate, NIST has the overall mission to advance measurement science, standards and technologies, to enhance the economy, and to improve the quality of life for US citizens. We are the only federal laboratory that has this type of mandate in the United States and so based upon our mission that so clearly advocates for measurement science standards and technologies we clearly recognize the important role that the OIML and all the other standards agencies play in international trade and commerce.

Another important point to note about the National Institute of Standards and Technology is that we are non regulatory, meaning that we do not set laws. That puts us in the position of being unbiased and objective in terms of working with voluntary standards organizations to develop their standards. And so we can be viewed as an unbiased source of the most technically sound information that is available, which hopefully allows us to help those organizations to produce the best and fairest standards that could possibly be made.

NIST has supported international and legal metrology since its inception as the National Bureau of Standards in 1901 – in fact at that time our agency incorporated the US Office of Standards and Weights and Measures which was actually created way back in 1836. If you want to go back even further in history, the US Constitution adopted in 1787 calls for the federal government to fix the standard of weights and measures in order to facilitate commerce. And so that is the mission of NIST, which we promote proudly. At that time, the founders of the country were talking about inter-state commerce, and were worried about trade between the originating states. But in this day and age, international metrology of course has become of critical importance and has become one of the great missions of NIST. As US federal agencies go, NIST is not extremely large: we employ about 3000 scientists, technicians, and engineers, and exist on two campuses: one of the sites is located just north of Washington D.C. in Gaithersburg, Maryland, and the other is in Boulder, Colorado. We also host about 2000 domestic and international visitors and guest researchers every year, making us a very international organization. I see the great international representation here and really hope you can make a point of coming to visit us some time if you have never been to NIST.

NIST is firmly committed to the mission of the OIML and we show this by our participation in virtually all of the OIML's Technical Committees and Subcommittees, and we are honored to have been given the responsibility of serving as the Secretariat of over 20 % of those Committees – this is a responsibility and an honor that we take very seriously.

At NIST, the Physical Measurement Laboratory that I help manage oversees the Weights and Measures Division – this Division promotes the uniformity of US weights and measures, laws, regulations, and standards, it provides training to metrologists, to weights and measures officials and to US industry; it also issues publications such as the NIST Handbook 44 which contains all of the standards for weights and measures. Carol Hockert is the Director of that Division and she also serves as the Executive Secretary of the National Conference on Weights and Measures. This Division also serves as our official representative to the OIML. The Weights and Measures Division contains a program on international legal metrology and this is headed by the Group Leader Charles Ehrlich who is known to all of you of course; he is the US CIML Member and also serves on the Presidential Council. The mission of his program is to facilitate US participation in OIML technical work including US manufacturers, users of

weights and measures, legal metrology officials and anybody else in the United States who has a stake in legal metrology. By authority of the State Department, Dr. Ehrlich's Group votes on OIML technical matters including everything up to the level of the CIML.

Another program with a strong international metrology content that I have already mentioned at NIST is our metric program, which helps to implement our national policy to establish the SI as the preferred system for US trade and commerce. It helps provide leadership and assistance to those in the United States who are attempting to make the conversion and helps to do that in an organized and efficient way.

One of our major upcoming developments in this area relates to the US Fair Packaging and Labeling Act, which comes up for renewal in 2013. This Act was passed in 1966 by President Johnston and specifies what type of information must appear on the packaging of most products sold in the United States.

In 1992 NIST and the National Conference on Weights and Measures supported Congress' decision to amend this Act to allow manufacturers to label their products with both customary US units and metric units, thus allowing dual unit labeling and you will notice that a on a lot of packaging as you shop here in the United States. Since then, NIST and the National Conference on Weights and Measures have worked with the States to help them adopt laws that would permit metric only labeling, and 40 States have now adopted this approach.

More recently there are two NIST publications that propose to amend the federal law to allow the voluntary use of metric only units on consumer products. We believe that the adoption of metric only labeling would lead to a greater agreement between state and federal labeling laws, that it would simplify domestic and international trade, and that it would better satisfy the needs and desires of many US manufacturers and consumers alike.

Another significant development that we are very proud to be able to play a role in is in the OIML Mutual Acceptance Arrangement, or MAA, whereby countries can recognize data submitted by other countries. As you will hear later this week, the National Conference on Weights and Measures is a Utilizing Participant in the MAA for load cells and this enables test data from other nations to be used in the National Conference on Weights and Measures National Type Evaluation Program or NTEP. We look forward to this program as it evolves into different areas.

So let me close by saying that although the US has its own very large and complex metrology system, NIST considers it a high priority to harmonize the global standards and to participate to the fullest extent in international metrology activities and in the international metrology community such as the OIML.

We are committed to the international legal metrology efforts through our participation in the OIML's activities, and work to ensure that the US metrology community as a whole is aware of the important work that is being done by this Organization and by others in this area. I hope that as you meet this week you will gain a greater appreciation of the US metrology infrastructure as you all work towards many of the common goals.

So again I want to welcome you to the United States, and to Orlando, but I know that if you are averse to roller-coasters or even scared of large mice there are lots of opportunities in the area other than Disney World and Universal Studios! One of my personal favorites is the Kennedy Space Center which I understand some of you will be visiting later this week; I know that the Discovery Space Shuttle is on the pad so you may get a unique treat and an opportunity to see that. I hope you have a good trip to the Space Center and that you will have a great meeting.

Thank you very much. ■

## Dr. Charles Ehrlich

Thank you very much Jim. It is now my pleasure to introduce you to Mr. Tim Tyson, who will provide some opening remarks on behalf of the US National Conference on Weights and Measures or NCWM. ■

ORLANDO 2010

# 45th CIML Meeting: Opening Address

**Mr. Tim Tyson**
**Director of Weights and Measures, Kansas Department of Agriculture, and Chairman, NCWM**

Mr. President, Mr. Director, CIML Members,
Ladies and Gentlemen,

Good morning. I am Director of Weights and Measures at the Kansas Department of Agriculture, and I am also this year's Chairman of the NCWM, which a lot of you

are already familiar with. On behalf of the NCWM I would like to include my welcome to you to the United States, and I hope that you have an enjoyable stay here in Florida, the "Sunshine State"!

I am accompanied this week by two other representatives from the NCWM: Mr. Don Onwiler, the NCWM Executive Director, and Mr. Jim Truex, Administrator of the National Type Evaluation Program, or NTEP. You will be hearing from Mr. Onwiler later this week in a special session on Thursday morning about the NCWM and how it relates to the OIML. The three of us look forward to meeting you later this week.

You may have noticed that outside this meeting room in the foyer there is an NCWM display board - I invite you to stop by during the week to meet us and pick up some literature.

So, Mr. President, thank you for this opportunity of being here and for allowing me to make these opening remarks. I look forward to a very interesting week.

Thank you. ■

ORLANDO 2010

# 45th CIML Meeting

# Agenda

*Opening speeches*

*Roll call*

*Approval of the Agenda*

**1 Approval of the minutes of the 44th CIML Meeting**

**2 Report of the CIML President**

**3 Liaisons**
3.1 Report of the BIML Director
3.2 Presentations given by liaison organizations
3.3 Report on the Round Table with Regional Bodies

**4 CIML Presidency**
4.1 Presentation of the candidates to the CIML Presidency
4.2 Presentation of the candidates to the CIML Vice-Presidency

**5 Member States and Corresponding Members**
5.1 New Member States and Corresponding Members and perspectives
5.2 Outstanding arrears of Member States and Corresponding Members

**6 Developing countries**
6.1 Report of the Facilitator on Developing Country Matters
6.2 Award for excellent achievements

**7 BIML activities**
7.1 General report
7.2 Other BIML issues

**8 Technical activities**
8.1 Items for information
8.2 Items for approval
8.3 OIML Certificate System, MAA and other future systems
8.4 Revision of the Directives for Technical Work

**9 Financial matters**
9.1 Comments on the 2008 and 2009 accounts
9.2 Financial and management audit
9.3 OIML pension system

**10 Human resource matters**
10.1 Election of a CIML President
10.2 Election of a CIML Vice-President
10.3 Appointment of a BIML Director

**11 Awards and other matters**

**12 Future meetings**
12.1 2011 CIML Meeting
12.2 2012 CIML Meeting and OIML Conference

## FORTY-FIFTH MEETING
## of the INTERNATIONAL COMMITTEE of LEGAL METROLOGY
## Orlando, 21–24 September 2010

# RESOLUTIONS

**Resolution 1:** The Committee approved the Minutes of the 44th CIML Meeting with the following modifications:

- on page 30, 4th paragraph under 3.1, third line: insert "and Asian" between "European" and "Countries";
- on page 32, the third paragraph from the bottom, second line, delete "the drafting of".

**Resolution 2:** The Committee took note of the oral report given by its President.

**Resolution 3:** The Committee took note of the oral report on the rapprochement with the BIPM; it requested its President to implement Resolution No. 3 of the 44th CIML Meeting and to prepare an interim report, with the assistance of certain CIML Members, to be presented to the 46th CIML meeting with a view to taking final decisions at the 14th Conference in 2012.

**Resolution 4:** The Committee noted the report on the liaison with ILAC and the IAF and expressed its appreciation of this good cooperation.

The Committee instructed the Bureau to pursue the joint work with ILAC and the IAF, also considering the future needs related to OIML acceptance and certification systems.

**Resolution 5:** The Committee noted the report on the liaison with ISO and the IEC.

The Committee instructed the Bureau to pursue cooperation with ISO, to set up similar working relations with the IEC, and to convey relevant information on these issues to CIML Members.

**Resolution 6:** The Committee noted the report on the liaison with the Technical Barriers to Trade Committee (TBT) of the World Trade Organization (WTO) and instructed the Bureau to maintain appropriate contacts with this Organization and to convey relevant information on TBT issues to OIML Members.

**Resolution 7:** The Committee noted the report on the liaison with CODEX Alimentarius and instructed the Bureau to:

- continue to work towards ensuring consistency of OIML publications with those of CODEX;
- examine additional fields of cooperation with CODEX other than prepackages;
- consult CIML Members before submitting any proposals to CODEX.

**Resolution 8:** The Committee noted the report on the liaison with the UNECE and instructed the Bureau to inform CIML Members about progress in identifying possible fields of cooperation.

**Resolution 9:** The Committee thanked the representatives of the BIPM, ILAC/IAF, the IEC and CECIP for their presentations and instructed the Bureau to take due account of the expectations expressed by these organizations in the coordination of the work of the OIML Technical Committees and Subcommittees.

**Resolution 10:** The Committee took note of the conclusions of the Regional Bodies Round Table and invited the Regional Bodies to post information on the various workgroups web sites that are at their disposal.

**Resolution 11:** The Committee,

Considering that Article XV of the Convention calls for the election of a President and a first and second Vice-President and that, in case the President is absent or incapable, the first Vice-President shall temporarily assume the duties of the President, and

Considering that Article XV does not deal with the case that the first Vice-President resigns or his mandate otherwise ceases before that of the second Vice-President,

Decides that after the election of the Vice-President during the current meeting, the CIML will decide which of the two Vice-Presidents will be first Vice-President; and

Instructs the CIML President to prepare a proposal to be

submitted to the 14th Conference in 2012 on the interpretation of Article XV in the event that the position of first Vice-President becomes vacant and the President is incapable of performing his duties.

**Resolution 12:** The Committee, considering the request made by Guinea, decided that it cannot accept the request to reinstate Guinea as a Corresponding Member at this moment, given its outstanding arrears.

Guinea is encouraged to start reimbursing its arrears before submitting a request to the Conference.

**Resolution 13:** The Committee noted the report on the activities of the Bureau and requested the Bureau to continue providing web tools for the mutual information of Regional Bodies, in particular concerning Developing Country issues.

**Resolution 14:** The Committee noted the confirmation of the following OIML Publications by their respective Technical Committees and Subcommittees:

- OIML R 92:1989 *Wood moisture meters – Verification methods and equipment: general provisions*,
- OIML R 127:1999 *Radiochromic film dosimetry system for ionizing radiation processing of materials and products*,
- OIML R 131:2001 *Polymethylmethacrylate (PMMA) dosimetry systems for ionizing radiation processing of materials and products*,
- OIML R 132:2001 *Alanine EPR dosimetry systems for ionizing radiation processing of materials and products*,
- OIML R 133:2002 *Liquid-in-glass thermometers*.

**Resolution 15:** The Committee supports the organization of a seminar on the subject of Conformity to Type (CTT) and strongly encourages its Members to actively contribute to this seminar.

**Resolution 16:** The Committee,

Recalling its Resolution No. 16a of the 44th CIML Meeting to submit the Draft Revision of R 106-1 on automatic rail-weighbridges to direct CIML online approval, and

Noting the report by the Bureau on the result of the online vote;

Decides that a revised Draft Revision of R 106-1 shall be submitted to direct CIML online approval.

**Resolution 17:** The Committee instructed the Bureau to submit the Draft Revision of R 100 *Atomic absorption spectrometers for measuring metal pollutants in water* to direct CIML online approval.

**Resolution 18:** The Committee,

Noting that the Draft Revision of OIML D 16 *Principles of assurance of metrological control* had been submitted to the CIML for online ballot, but that it did not receive sufficient support to be approved,

Considering the comments made by the Netherlands and Norway,

Requests the secretariat of OIML TC 3/SC 2 to prepare a revised Draft Revision of OIML D 16 with the assistance of the Netherlands and Norway; and

Instructs the Bureau to submit this revised Draft Revision to direct CIML online approval.

**Resolution 19:** The Committee,

Considering the proposals by its Member for Australia for a new project and a new (Sub)Committee on Conformity to Type (CTT), and

Considering the comments received during the consultation of the members of the Presidential Council and the subsequent consultation of all CIML Members and relevant liaison organizations,

Resolves that a decision on the proposals shall be postponed until after the conclusions of a seminar on CTT, mentioned in Resolution No. 15, have become available; and

Instructs the Bureau to facilitate an electronic working group, chaired by the Member for New Zealand, with the objective to prepare the program for that seminar, taking into account the issues raised in the comments received.

**Resolution 20:** The Committee approved the following project:

- Revision of OIML D 29 *Guide for the application of ISO/IEC Guide 65 to assessment of measuring instrument certification bodies in legal metrology*,

to be undertaken by OIML TC 3/SC 5 following the publication of ISO 17065, superseding ISO/IEC Guide 65.

**Resolution 21:** (Removed)

**Resolution 22:** (Removed)

**Resolution 23:** The Committee approved the withdrawal of OIML TC 11/SC 2's project 'p2' on standardized thermocouples.

**Resolution 24:** The Committee,

Noting the report by the Bureau on the revision of the Directives for the technical work (OIML B 6-1),

Considering that the ad-hoc working group for this revision, after several meetings, has not been able to reach consensus on a number of issues, and

Considering the comments made by some of its Members on subsequent drafts for the revision of OIML B 6-1,

Instructs the Bureau to consult all CIML Members by way of an inquiry on their position with regard to specific issues, such as the structure of the technical work, the proposed Technical Management Committee and the voting procedures for the adoption of OIML Publications, with a view to preparing a new Draft Revision, to be considered for adoption by the CIML at its 46th Meeting.

**Resolution 25:** The Committee approved the 2008 and 2009 accounts and instructed its President to present them at the 14th OIML Conference.

**Resolution 26:** The Committee took note of:

- the information provided by the BIML Director concerning the report of the financial and management audit carried out in February 2010;
- the actions taken by the Bureau; and
- the Action plan proposed by the Bureau.

The Committee instructed its President to:

- send the report of this audit and the BIML Director's comments on that report to CIML Members,
- continue to follow up on this issue, and
- report back on it at the 46th CIML Meeting.

The Committee instructed the Bureau to continue its efforts to increase the efficiency of its finances and management.

**Resolution 27:** The Committee took note of the report on the pension system and of the comments made by Mr. Peter Mason and Dr. Philippe Richard.

The Committee noted that the re-evaluated assets cover much more than the value of the rights acquired and that there will be no need to call for any additional Member State contributions to face this liability.

The Committee instructed the Bureau to:

- implement the IPSAS standards for the 2010 accounts, by registering the full rights acquired in the OIML liabilities and the reevaluated value of the BIML buildings in the OIML assets;
- prepare a presentation of the 2008 and 2009 accounts along these lines with a view to presenting them at the 14th OIML Conference; and
- include in the revision of the OIML Financial Regulations this implementation of the IPSAS standards, and specify the rules and periodicity for the re-evaluation of the OIML building in the OIML assets.

**Resolution 28:** The Committee elected Mr. Peter Mason (UK) CIML President for a 6-year term.

According to the rules laid down in publication OIML B 14, he will take up office at the opening of the 46th CIML Meeting in 2011.

**Resolution 28a:** The Committee noted the comments by the French CIML Member on the use of French as the official language of the Organization and requested the President-elect to be attentive to this issue.

**Resolution 29:** The Committee elected Dr. Roman Schwartz (Germany) CIML Vice-President for a 6-year term.

**Resolution 30:** The Committee appointed Mr. Stephen Patoray BIML Director.

The Committee confirmed its expectation that the commitment to be proficient in French will be a condition of Mr. Patoray's employment contract.

**Resolution 30a:** The Committee,

Recalling its Resolution No. 11,

Following the election of a new Vice-President,

Elects Dr. Grahame Harvey first Vice-President.

**Resolution 31:** The Committee awarded the OIML Medal to:

- Dr. Nikolai Zhagora of Belarus;
- Dr. Heinz Wallerus of Germany; and
- Mr. Brian Beard of South Africa

for their outstanding contributions to the development of international legal metrology.

**Resolution 32:** The Committee expressed its thanks to the Czech Republic delegation for its presentation on the venue of the 46th CIML Meeting in 2011.

**Resolution 33:** The Committee expressed its thanks to Romania for its offer to host the 14th OIML Conference and 47th CIML Meeting in 2012. ■

ORLANDO 2010

# OIML Medals

## The OIML made three Awards in Orlando for outstanding contributions to legal metrology

The OIML presented Medals to Mr. Brian Beard, Dr. Heinz Wallerus, and Dr. Nikolai Zhagora for their outstanding contributions to the development of international legal metrology. All have been very active in OIML work for a long time.

The OIML extends its appreciation to the 2010 winners of the OIML Medal and wishes them every continued success in their legal metrology activities.

**Mr. Brian Beard**, South Africa, participated in OIML work for many years and is well known, specifically in countries of the Southern African Development Community. He was very active in the formation of the regional legal metrology cooperation SADCMEL and conducted many training workshops and seminars. He also contributed substantially to the elaboration of regional regulations.

**Dr. Heinz Wallerus** is Director of the Deutsche Akademie für Metrologie, DAM, the institute for training and qualification of German verification officials. Under his leadership OIML Document D 14 *Training and qualification of legal metrology personnel* was elaborated. He has organized and managed numerous workshops and seminars for participants from developing countries as well as long-term training for scholarship holders.

**Dr. Nikolai Zhagora** is Director of the Department of Metrology, State Committee for Standardization of the Republic of Belarus and has also been actively involved in international legal metrology for a number of years. He is Vice-President of COOMET, and as such is responsible for cooperation with international and regional legal metrology organizations, analysis of the activities of the corresponding international and regional organizations (OIML, WELMEC, APLMF, etc.), and development of the legal metrology activities in COOMET.

## ORLANDO 2010

# 2010 OIML Award for *Excellent Achievements in Legal Metrology*

**Eberhard Seiler**
OIML Facilitator for Devloping Country Matters

During the 45th CIML Meeting the winner of the 2010 *Award for Excellent Contributions in Developing Countries for Legal Metrology* was announced by the CIML President: The Thai Legal Metrology Service.

Eberhard Seiler, *OIML Facilitator for Developing Country Matters*, presented some key facts and highlighted the results achieved over many years by the Thai Legal Metrology Service; these outstanding achievements had led the OIML to decide to acknowledge and honor the work directed and supervised by the Department of Internal Trade, implemented predominantly through the Central Bureau of Weights and Measures in Bangkok.

The description of the Thai system in this issue of the Bulletin provides a good overview of the scope of the work and the results achieved. Since Thailand was not represented at the meeting, the Award Certificate was sent by special courier service together with a letter from the CIML President (see opposite).

This recognition of Thailand's achievements will hopefully stimulate applications for the 2011 Award. Details about the selection criteria and the selection procedure were published in the April 2009 edition of the Bulletin and applications should be submitted before 1 July 2011.



Above: The Thai Legal Metrology Service carrying out checks on site.
Opposite: The letter sent to the Thai Legal Metrology Service by CIML President Mr. Alan Johnston

Organisation Internationale de Métrologie Légale

International Organization of Legal Metrology

Le Président - The President

The Director-General, Department of Internal Trade, Mrs. Vatchari Vimooktayon, and
The Deputy Director-General, Mr. Veerasak Visutthatham
Department of Internal Trade
Ministry of Commerce
44/100 Moo 1, Nonthaburi 1 Road
T. Bangkrasor, A. Muang, Nonthaburi
Thailand 11000

October 20, 2010

Dear Madam, Sir:

As you may know, to highlight the importance of metrology activities in Developing Countries, and to provide an incentive for their improvement, the OIML has established an annual Award for *"Excellent Achievements in Legal Metrology in Developing Countries"*.

This Award is intended to raise the awareness of, and create a more favourable environment for legal metrology and to promote the work of the OIML. The Award intends:

> *"to acknowledge and honor new and outstanding activities achieved by individuals, national services or regional legal metrology organizations contributing significantly to legal metrology objectives on national or regional levels."*

The continuous efforts of your Department, together with the successful work of the Central Bureau of Weights and Measures are very much appreciated among the international legal metrology community and I therefore have the pleasure of informing you that the OIML has honoured this success by selecting the Thai Legal Metrology Service for the

*2010 Award for Excellent Achievements in Legal Metrology in Developing Countries.*

This decision was announced during the 45th Meeting of the International Committee of Legal Metrology, held in Orlando, USA. A presentation of your achievements, based on information provided by Mr. Sakchai of the CBWM was made to the CIML Meeting's participants by the OIML's Facilitator for Developing Country Matters, Mr. Eberhard Seiler.

This presentation has since been placed on the OIML website, *CIML Meeting 2010.* You will also find this award to the Thai Legal Metrology Service mentioned on the *Award Winners* under *VIP Pages.*

Since unfortunately neither you nor another legal metrology representative was able to participate in this year's CIML meeting, the Award Certificate is being sent by mail with this letter.

I would like to take this opportunity to convey my congratulations, as well as those of the OIML. I am convinced that your achievements are, and will be of high significance to the country. In addition, your experience will also be of importance to the work of the OIML. I therefore hope that Thailand will be able to become a Member State of our Organization in due course and thus be able to contribute to and influence our work for the benefit of legal metrology at the international level. As part of the Award, one representative of the Thai Legal Metrology System, will be invited to participate in the next CIML Meeting in Prague, Czech Republic in October 2011. The flight ticket and accommodation will be paid by the OIML. I hope, you will accept this offer and I look forward to meeting you in Prague.

Yours sincerely,
Alan Johnston

INFRASTRUCTURES

# Legal metrology in Thailand

SAKCHAI HASAMIN
Central Bureau of Weights and Measures, Thailand

## History

Many hundreds of years ago Thailand implemented its first weights and measures system. In addition to its own traditional Siamese system, many foreign systems were also used for trade between Thailand and overseas countries.

In 1897, King Chulalongkorn (King Rama V) expressed a desire to establish a uniform weights and measures system for Thailand, and so a study to find a suitable system was carried out. In 1905, a committee was set up to determine which of the existing weights and measures systems should be adopted as the legal system, and the committee finally concluded that the metric system should be adopted.

Up until 1912, in the era of King Rama VI, Thailand subscribed to the Metre Convention as a member state. Then, a committee was set up to draft the Weights and Measures Act based on the metric system. The act was approved and enacted in 1923, entitled the "Weights and Measures Act B.E. 2466". The Central Bureau of Weights and Measures was founded in the same year with the objective of implementing the Act.

Then in 1995, Thailand joined the OIML as a Corresponding Member.

## Law on Metrology

The Weights and Measures Act B.E. 2466 and the ministerial regulation issued under the Act were enacted in 1923 and revised many times over the years in order to fulfill social needs, follow economic growth, and keep pace with the development of measuring instruments. But OIML Recommendations were not adopted until 1995, when Thailand joined the OIML. A new Weights and Measures Act was enacted in 1999, entitled the "Weights and Measures Act B.E. 2542". The first ministerial regulation under the new act was enacted in 2003, and the provisions of the regulation are in alignment with OIML Recommendations. After that, many subsequent ministerial regulations were issued in order to extend the scope of legal control to cover measuring instruments such as rice moisture meters, CNG dispensers, etc.

## Legal Metrology Authority

The Central Bureau of Weights and Measures (CBWM) is responsible for legal metrology; its head office is located in the Nonthaburi Province, about 30 km from Bangkok.

It carries out its activities under the supervision of the Department of Internal Trade (DIT), Ministry of Commerce. The functions of the CBWM are as follows:

- supervision of the manufacturers, importers, repairers and sellers of measuring instruments;
- verification of measuring instruments used for the purpose of selling or purchasing commodities and calculating remuneration, taxes and fees;
- inspection of such measuring instruments;
- checking the declaration and the net content of prepackaged products;
- providing calibration services in the fields of mass, volume and length measurements.

## Regional/Branch offices

There are four regional Weights and Measures centers and 23 Weights and Measures branch offices across the country. Each regional center and branch office is able to perform supervision, verification and inspection of measuring instruments and is able to check pre-packaged products. In addition, each regional center is able to provide calibration services for branch offices and for private sector companies in its region. This is the direct result of the improvement of the capabilities of the regional centers by providing well equipped laboratories, well trained personnel, etc. The CBWM started to improve the capabilities of four regional centers in 1995:

- the first center, the Northern Center, is located in the Chiang Mai province and was officially opened on November 2, 1998;
- the second center, the North-Eastern Center, is located in the Khon Kaen province and was officially opened on November 22, 2000;

- the third center, the Eastern Center, is located in the Chonburi province and was officially opened on December 15, 2004;
- the fourth center, the Southern Center, is located in the Surat Thani province and will be officially opened at the end of 2010. At the time of writing this article (November 2010) the construction of the building is finished and the equipment is being installed.

## Measuring instruments under legal metrology control

All measuring instruments used for the purpose of selling or purchasing commodities and calculating remuneration, taxes and fees must be verified. All the following measuring instruments are subjected to initial verification:

- non-automatic weighting instruments;
- belt-conveyor scale systems;
- automatic bulk weighing systems;
- weights;
- liquid measures;
- dry measures;
- measuring tapes;
- straight rules;
- fabric measuring devices;
- petrol dispensers;
- flow meters;
- mass flow meters;
- water meters;
- LPG dispensers;
- NGV dispensers;
- rice moisture meters.

The regulation prescribes the term of validity of verification, which is two years, for some types of measuring instruments such as weighbridges, petrol dispensers, flow meters, mass flow meters and rice moisture meters. These measuring instruments must be re-verified every two years.

Some types of measuring instruments are subjected to control under other authorities, for example taximeters are under the control of the Department of Land Transport, electricity meters are under the control of the Metropolitan Electricity Authority and the Provincial Electricity Authority.

The number of measuring instruments verified each year is shown in Table 1:

| Year | No. of verified items |
|---|---|
| 2006 | 2 925 834 |
| 2007 | 3 382 338 |
| 2008 | 3 920 421 |
| 2009 | 2 323 866 |

## Control of prepackaged products

The Weights and Measures Act empowers the Minister of the Ministry of Commerce to issue Ministerial Notifications to prescribe:

- types of prepackaged products for which the net quantity must be declared;
- rules and procedures for the declaration;
- maximum permissible errors.

In the past, many Ministerial Notifications have been issued - however, the provisions of the Notification were not aligned with the relevant OIML Recommendations. In 2004, the CBWM had the intention of adopting OIML Recommendations R 79 and R 87. At the same time, the ASEAN Working Group on Legal Metrology developed the ASEAN Common requirements of prepackaged products based on R 79 and R 87, so in the event the Central Bureau drafted the new Ministerial Notification based on the ASEAN Common Requirements. The new Ministerial Notification was issued on August 17, 2007 and became effective on February 13, 2008.

The checking of prepackaged products is normally carried out on site using checking procedures which are in conformity with R 87 and the EU Directive. The number of prepackaged products which were sampled for checking the net quantity is shown in Table 2:

| Year | No. of prepackaged products |
|---|---|
| 2006 | 299 913 |
| 2007 | 484 814 |
| 2008 | 539 818 |
| 2009 | 434 775 |

## Legal metrology personnel

152 officials are involved in legal metrology activities; 53 work in the central Bureau and 99 in the regional centers and branch offices (normally seven in each center and three in each branch).

Most weights and measures officials graduated in the field of physics or engineering. When they take up employment they must be trained (on the job) in the Central Bureau for six months, following which they undergo several courses conducted by the Central Bureau.

## Training courses

The CBWM provides and organizes two to three training courses for its staff every year. Especially during the years 1999–2003, when the new Act and the new Regulations were enacted, the Central Bureau organized six to eight courses each year, as follows:

- verification of non-automatic weighing instruments;
- verification of petrol dispersers;
- checking the net content of prepackaged goods;
- verification of weighbridges;
- verification of LPG dispensers;
- verification of CNG dispensers;
- verification of rice moisture meters;
- calibration of mass standards;
- calibration of volume standards;
- weights and measures inspector;
- etc.


## Designated verification bodies

Due to its increasing work load, The CBWM had to designate certain manufacturers of measuring instruments to carry out initial verification. These manufacturers must have the capabilities that conform to the rules and regulations. Up to the present time, there are:

- 6 designated manufacturers for water meters;
- 1 designated manufacturers for petrol dispensers;
- 2 designated manufacturers for measuring tapes;
- 1 designated manufacturer for spring scales.

The number of measuring instruments verified by designated manufacturers is shown in Table 3.

## Cooperation with Regional Legal Metrology Organizations

The CBWM, as the representative of Thailand, joined the Asia-Pacific Legal Metrology Forum (APLMF) in 1994 and has actively participated in its activities, especially helping the APLMF to organize a large number of training courses and workshops, e.g.:

- Training course on rice moisture meters - 2002 - Khon Kaen province;
- Training course on rice moisture meters - 2004 - Chiang Mai province;
- Training course on fuel dispensers and LPG dispensers - 2005 - Chonburi province;
- Workshop on measuring instruments for agricultural products and foods safety - 2007 - Chiang Mai province;
- Training course on mechanical weighing instruments - 2008 - Chonburi province;
- Workshop on software controlled measuring instruments - 2010 - Bangkok.

The Central Bureau also cooperated with the Legal Metrology Authorities in ASEAN countries to establish the ASEAN Working Group on Legal Metrology under the ASEAN Consultative Committee for Standards and Conformance (ACCSQ). In the working group, Thailand is the lead country in the field of prepackaged products. The Central Bureau, as the representative of Thailand, encouraged member countries to harmonize the requirements for prepackaged products among ASEAN countries, and then the ASEAN Common Requirements of Prepackaged Products was finished and endorsed in 2004.

| Year | Water meters | Tapes | Spring scales | Petrol dispensers |
|---|---|---|---|---|
| 2006 | 586 754 | - | - | - |
| 2007 | 1 257 859 | 452 988 | - | - |
| 2008 | 73 000 | 635 233 | 8 000 | 1 007 |
| 2009 | 854 545 | - | 7 400 | 2 593 |

Table 3: Number of measuring instruments verified by designated manufacturers

## Activities planned for the future

1. The CBWM has made a proposal to revise the Weights and Measures Act. One objective of the revision is to develop a type approval system. The revised Act is now under the consideration of the Office of the Council of State; once it has been approved it will be submitted to the Cabinet and then to the Parliament. Meanwhile, the Central Bureau has to develop its capabilities to carry out type evaluation.
2. The Central Bureau also plans to improve its capabilities to carry out:
   - conformity assessment and audit of designated manufacturers;
   - software examination/verification.
3. The Central Bureau would like to set up a training coordinator team to take the responsibility of organizing various training courses for Weights and Measures Officials, staff of designated manufacturers, and staff of local administration authorities.
4. The Central Bureau would like to apply to become an OIML Member State, and the CBWM will submit this proposal to the Cabinet next year.

The CBWM is proud to have been given the 2010 Award for Developing Country Activities and extends its most sincere thanks to the OIML, to the CIML President and to Dr. Seiler for granting the Award. Thailand looks forward to continuing to play a role in the OIML, and to further developing its legal metrology infrastructure in the years to come. ■

## TC 3/SC 5

# Conformity assessment

# Paris, 4–5 October 2010

BIML

OIML TC 3/SC 5 *Conformity assessment* met in Paris, France, on 4 & 5 October 2010. Participants were welcomed by Mrs. Régine Gaucher and by Mr. Willem Kool.

Attendees introduced themselves, following which TC 3/SC 5 Secretariat Dr. Charles Ehrlich (USA) pointed out that as only 13 P-members (out of 26) were present, the quorum had not been established and therefore in order to be valid, decisions would have to be submitted to all P-members for vote. The agenda was approved.

### 1 Discussions on comments received on the 2 CD of the revision of OIML B 3

- It was decided that the minimum conditions under which test results submitted by the applicant may be considered by the Issuing Authority shall be included in 5.3.4, reference to D 29 not being sufficient as D 29 is only a Document and therefore not binding.
- The Netherlands suggested that after the revision of a Certificate, the old version should be removed from the OIML web site (a point often debated within the BIML but never formally decided). The Secretariat and some P-members, however, argued that the earlier version should be maintained on the web site to accommodate those countries in which the earlier version might still be applicable (similar to current practice for superseded OIML Recommendations which continue to be available for the same reason).
- It was agreed that when the revision of a Certificate concerns a transfer to a new applicant, the Issuing Authority shall make the necessary inquiries to ensure that the transfer is legitimate. If the new applicant requests a new Certificate to be issued, the latter will be issued in parallel to the existing one.

### 2 Discussions on comments received on the 1 CD of the revision of OIML B 10-1

- After considerable discussion concerning what was meant by the term "legal," participants agreed on a revised text proposed by the Secretariat.
- Participants then considered whether there should be one sole DoMC for all instruments under the MAA. It was argued, however, that the question was more the number of CPRs than DoMCs. But it was agreed that, for the time being, CPRs should be kept separate since in many cases the experts on the CPRs were different, but that CPR meetings should be combined whenever possible and CPR decisions taken by e-mail. It was further agreed that having a single DoMC, with Annexes for individual types of instruments, could have the advantage of presenting a 'stronger' MAA to the outside community.
- After some discussion of the proposals concerning the number and type of Participants required to establish a DoMC, participants agreed that there should be at least one other Utilizing Participant in addition to the two Issuing Participants before a DoMC can become established.
- The procedure for proposing a new DoMC should be rendered similar to that for a new work item in the Directives for OIML Technical Work. Anyone may propose a new DoMC (as long as there was an OIML Recommendation comprising all the required parts) and pass it on to the BIML, which would submit it to the CIML for approval. Any decision to continue or stop a DoMC would also be taken by the CIML, so a new paragraph would be added in order to clarify that the decision to launch a new DoMC is made by the CIML, and that the BIML would report annually to the CIML on the status of the MAA implementation.
- Concerns were expressed about the confidentiality of some of the audit report information. It was also argued, however, that detailed information may sometimes be necessary to fully appreciate a Testing Laboratory's and/or Issuing Authority's competence. Participants agreed that the internal audit report circulated to the CPR members shall be a summary report for the relevant scope of the DoMC but that additional information could be sought by CPR members.
- After discussion of the question of who is responsible for the withdrawal of a faulty or invalid MAA Certificate, it was clarified that this will not be the BIML, which is responsible only for the registration of a Certificate.
- Participants agreed that the BIML would revise the present CV format and that it should do a pre-check for relevant expertise and experience on each technical expert application, but that it was not the task of the BIML to reject any candidate based on this pre-check.
- Another issue discussed was the periodic requalification of experts which could be based, among other things, on the feedback from the lead assessor. No conclusions were drawn, but there was consent that the CVs of technical experts need – for the time being – not be updated on a regular basis.

## 3 Manufacturers' Testing Laboratories (MTLs)

- Following a general overview of this issue by Dr. Ehrlich, Dr. Roman Schwartz gave a presentation on the details and background of the May 2010 WD "Revision of OIML B 10-1, OIML D 30 and OIML D 29 taking into account test results from Manufacturers' Test Laboratories (MTL) under controlled supervision by the Issuing Participants in DoMC's" with detailed proposals for amendments to OIML B 10 and OIML D 30.
- Mr. Pierre de Ruvo, Executive Secretary of IECEE, had been invited to inform TC 3/SC 5 about the IECEE Certification Bodies (CB) Scheme, an important international product certification scheme for electro-technical products that covers more than 20 % of the world trade. He explained, among other things, the general principles covering the use of Manufacturers' Testing Laboratories (MTLs) in the CB scheme. That scheme distinguishes Testing at Manufacturer's Premises (TMP), Witnessed Manufacturer's Testing (WMT) and Supervised Manufacturer's Testing (SMT). In response to a question concerning the experiences with MTLs in the CB Scheme, Mr. de Ruvo replied that there were good experiences especially with SMTs, the reason being that SMTs were fully aware that cheating would kick them out immediately and would, in addition, lead to the cancellation of all certificates concerned. By contrast, it was mainly in third-party laboratories that irregularities or improper operation were sometimes found.
- Participants then extensively discussed the WD 2010/1, especially Chapter 1 "Basic principles and conditions applicable to MTLs and related Issuing Authorities", Chapter 4.1 "Additional requirements applicable to Issuing Participants ...", and Chapter 4.2 "MTL as a third-party Testing Laboratory".
- Participants took note of the position expressed by the BIML that the OIML Basic Certificate System and the OIML MAA are voluntary systems and as such do not create any legal obligations for Participants.
- Furthermore, the OIML Systems should never result in any liabilities for the OIML with respect to intellectual property rights. Issuing Authorities should have the consent of the manufacturer for all testing required under the systems and they should have a written statement from the applicant that the latter has all the rights pertaining to the product and the technical documentation.
- Finally, the participants agreed on the following proposal from Australia for a Resolution to be adopted by the CIML:

***Further to Resolution no. 20 at the 43rd CIML Meeting, Issuing Participants may request the registration of Manufacturers' Testing Laboratories (MTLs) under a DoMC, provided that conditions agreed by TC 3/SC 5 and laid down in respective amendments to OIML B 10, D 30 and D 29 are met. OIML MAA Evaluation Reports that contain test results from MTLs may be accepted by Participants on a voluntary basis.***

## Conclusions

- Dr. Schwartz and Mr. Harry Stolz will revise WD 2010/1 according to the discussions on 5 October and the inputs received from Mr. Paul Dixon and Ms. Nathalie Dupuis-Desormeaux.
- When revising WD 2010/1 it will also be considered how, at the request of the Issuing Participant, to best address the case where an EUT fails at re-test.
- Dr. Schwartz will also prepare an explanation of both the revised WD 2010/1 and the draft CIML Resolution (to be circulated to TC 3/SC 5 members by Dr. Ehrlich).
- Mr. Dixon will send Dr. Schwartz a proposal concerning MTLs as third-party (subcontracting) laboratories.
- Ms. Nathalie Dupuis-Desormeaux will send Dr. Schwartz a proposal concerning impartiality requirements based on the latest draft (2CD) of the revision of ISO/IEC 17065.

Before closing the meeting Dr. Ehrlich mentioned that this was the last TC 3/SC 5 meeting for Régine Gaucher, who resigned from her position in the BIML as of 1 September 2010. He expressed his and the committee's thanks and appreciation to her for her excellent work as co-secretariat of TC 3/SC 5 over the last five years, and also thanked her for agreeing to attend the present meeting. ■

## TC 1

# Terminology

## Warsaw, 29–30 September 2010

WILLEM KOOL, BIML

Following the publication of the third edition of the *International Vocabulary of Metrology* (VIM)[1] OIML TC 1 *Terminology* started the project to revise the *International Vocabulary of legal Metrology* (VIML)[2].

A second Committee Draft (2CD) was circulated to the members of the TC in July 2010. Based on comments received, the secretariat of TC 1, Dr. Jerzy Borzyminski of the Polish Central Office of Measures (GUM) prepared a draft for the third CD. This draft 3CD was discussed at a meeting of the TC, held in Warsaw, Poland, on 29 and 30 September 2010.

In the meeting, nine of the 16 P-members of TC 1 were represented. The meeting was chaired by Willem Kool, BIML Assistant Director / TC 1 contact person.

The VIML is intended to bring together the general concepts, terms and definitions that are specific to the field of legal metrology and to promote the harmonization and common use of these concepts, terms and definitions within the OIML and in particular in OIML Publications.

The revision of the VIML has become an important issue for the following reasons:

- Many of the entries in the VIM have been amended in comparison to the previous edition of 1993. The concepts, terms and definitions in the VIML need to be made consistent with those in the current edition of the VIM;
- The development of the ISO/IEC 17000-series of standards on conformity assessment. Many of the concepts used in those standards are relevant to the OIML and the OIML is committed to complying with ISO/IEC standards to the extent possible;
- The publication of OIML D 31 *General requirements for software controlled measuring instruments*. Some of the concepts of D 31 deserve to be included in the VIML to promote their consistent use in legal metrology;
- The revision of OIML D 1 *Elements for a Law on Metrology* and other OIML Documents has caused discussion about some concepts and their definitions, such as the relevance of the term 'metrological assurance'[3].

The 3CD proposes the following structure for the revised VIML:

0. Introduction. Basic terms
1. Metrology and its legal aspects
2. Legal metrology activities
3. Documents and marks in legal metrology
4. Classification of measuring instruments
5. Construction and operation of measuring instruments
6. Software in legal metrology
7. Tests in legal metrology

Annex: Selected terms of conformity assessment.

The next steps in the process of the revision of the VIML will be the circulation of the 3CD (by the end of January 2011) to the members of TC 1 for approval. Once approved by the TC, the draft will become an OIML Draft Vocabulary and will be submitted to the CIML for approval. The publication of the revised VIML is expected in 2012.

At the end of the meeting, the participants expressed their gratitude for the excellent venue and organization of the meeting and the very pleasant social events to Mrs. Janina Popowska, GUM President, and her staff. ■

[1] JCGM 200:2008, published by the OIML as OIML V 2-200:2010 and available for download on the OIML web site (http://www.oiml.org/publications/)

[2] OIML V 1:2000

[3] The TC 1 meeting decided to delete the entry 'metrological assurance' from the draft revision of the VIML as it was considered to be an ambiguous concept.

*Opening of the TC 1 meeting - Left to right: Willem Kool (BIML), Mrs. Janina Popowska (President of GUM), Mrs. Dorota Habich (Vice President of GUM and CIML Member for Poland) and Jerzy Borzyminski (Secretariat of OIML TC 1)*

*Coffee break - Participants in the TC 1 meeting continue to discuss the issues*

*Participants in the TC 1 meeting and their hosts*

LIAISONS

# New OIML/ILAC/IAF MoU signed at the ILAC/IAF Joint General Assembly

WILLEM KOOL, BIML

From 20 to 29 October 2010 the Chinese National Accreditation Service for Conformity Assessment (CNAS) hosted the ILAC/IAF joint annual meetings in Shanghai. The ILAC/IAF Joint General Assembly was held in conjunction with a series of committee and working group meetings of both organizations. The CIML President gave a presentation to the Joint General Assembly and a new Memorandum of Understanding (MoU) between ILAC, the IAF and the OIML was signed.

The MoU is the basis for the cooperation between the three organizations and is of particular interest to the OIML in the development and maintenance of the OIML Systems, such as the MAA (Mutual Acceptance Arrangement for type approval test results).

## Cooperation with ILAC

The cooperation with ILAC is in full operation in accreditation and in peer assessment in the framework of the OIML MAA. The OIML maintains a list of technical and metrological experts, validated by the OIML Committees on Participation Review in the MAA. Accreditation bodies shall use experts from this list to participate in the assessment teams whenever 'legal metrology' is in the scope of the activities to be accredited.

As part of their joint work program, the OIML and ILAC will develop training material on ISO/IEC 17025[1] requirements for technical and metrological experts and on legal metrology aspects for lead assessors from accreditation bodies involved in assessments in the field of legal metrology.

## The OIML/ILAC/IAF MoU

The new MoU (reproduced on the following pages) replaces the one from 2007 and has been slightly revised. A note was added to clarify what is meant by "... whenever legal metrology is included in the scope of accreditation". The term 'legal metrology' should be used, but, even if it is not, legal metrology is considered to be included if the accredited activities include assessment of conformity to OIML Recommendations and, when they exist, national legal metrology regulations.

## Cooperation with the IAF

Following the signing of the MoU, and in view of the possible development within the OIML of systems on Conformity to Type and the IQ-mark for the quantity of product in prepackages, a meeting of representatives of the IAF and the BIML was held to discuss the development of a joint work program. The following activities were identified for the initial joint work program:

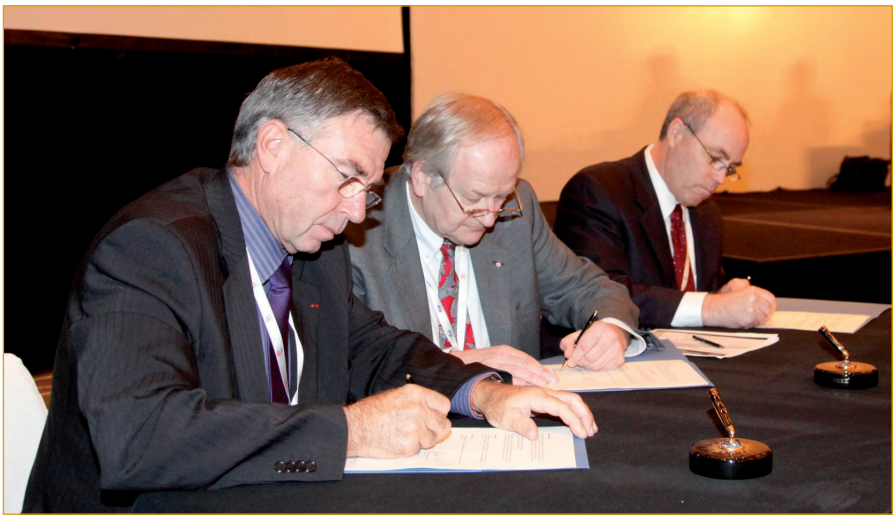
- a survey among IAF members about current accredited certification activities with regard to regulated and non-regulated measuring instruments. The information obtained should serve as a basis for further common activities;
- review by the IAF of draft OIML Basic Publications (in particular the one for the IQ-mark scheme) for compliance with relevant ISO/IEC conformity assessment standards and IAF application documents;
- review by the IAF of the draft program for an OIML Seminar on Conformity to Type (planned to be held in 2011) and IAF representation in the seminar.

There is a potential for a very fruitful cooperation between the IAF and the OIML, similar to that between ILAC and the OIML, in areas such as the training and qualification of assessors and the development of application documents. ■

Alan Johnston, CIML President, addressing the ILAC/IAF Joint General Assembly (Shanghai, 28 October 2010)

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

# New OIML/ILAC/IAF MoU signed



Signing of the ILAC/IAF/OIML MoU (Shanghai, 28 October 2010)

Left to right:
Daniel Pierre, ILAC Chair,
Alan Johnston, CIML President,
Randy Dougherty, IAF Chair.

Willem Kool and Alan Johnston attending a reception of Mr. Sun Dawai, Vice Minister of AQSIQ, China (far right).

Middle right is Mr. Xiao Janhua, CNAS Chief Executive and IAF Vice Chair.

# MEMORANDUM OF UNDERSTANDING (MoU)
# BETWEEN
# THE INTERNATIONAL LABORATORY ACCREDITATION COOPERATION (ILAC),
# THE INTERNATIONAL ACCREDITATION FORUM (IAF)
# AND
# THE INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY (OIML)

**The Chair of the International Laboratory Accreditation Cooperation (ILAC),**
**The Chair of the International Accreditation Forum (IAF) and**
**The President of the International Committee of Legal Metrology (CIML),**

- considering that measurement plays an essential role in developing confidence between trading partners and in demonstrating that goods comply with written specifications and legal requirements;
- considering that accreditation and legal metrology are key elements of an essential infrastructure for national and international consistency of measurements;
- considering that the use of competent product certification, quality management system certification, laboratory testing and calibration service and inspection service in legal metrology controls must be encouraged;
- considering that the existence of a Mutual Recognition Arrangement (MRA) between ILAC members has already led to the acceptance of test data delivered by an accredited body from another country by a number of national regulatory bodies and that further acceptance is being pursued in a number of regulated sectors (e.g. electromagnetic compatibility (EMC), energy efficiency, food);
- considering that the existence of a Multilateral Recognition Arrangement (MLA) between IAF members has already led to the acceptance of certifications delivered by an accredited certification body from another country by a number of national certification bodies;
- considering the importance of the International Organization of Legal Metrology (OIML) Mutual Acceptance Arrangement (MAA), the ILAC MRA and the IAF MLA to underpin a unified worldwide metrology system for consumer protection, industry, commerce and world-wide trade; and
- considering the complementary nature of OIML, ILAC and IAF work and the benefits of working together for the development of an international, global metrology system

have agreed to cooperate through this Memorandum of Understanding (MoU).

**Scope of the Memorandum of Understanding**

The aim of the cooperation between ILAC, IAF and the OIML is to:

a) maintain an active ILAC-IAF-OIML liaison by:

   i) facilitating common approaches in the interpretation and implementation of ISO/IEC 17025, ISO/IEC Guide 65, ISO/IEC 17021 and other relevant standards and/or technical criteria, and
   ii) harmonizing assessment procedures;

b) share interpretations of common issues of relevance to laboratories and/or certification bodies by:

   i) exchanging information,
   ii) jointly developing publications and, where practicable, conducting joint work on the development of technical guides, standards, procedures and policies relevant to the affected laboratories and/or certification bodies, and
   iii) cooperating in the development of joint training courses for assessors and conformity assessment experts operating in the field of legal metrology;

c) establish lists of technical and metrological experts and assessors trained by OIML and ILAC full Members and IAF MLA signatories;

d) request ILAC and IAF Members to use technical and metrological experts and assessors from the above-mentioned lists whenever legal metrology is included in the scope of the accreditation;
*Note:* Legal metrology activities should be mentioned in the scope of accreditation. However, even if the term "legal metrology" is not explicitly mentioned in the scope of accreditation, it *is*, for the time being, considered to be included if the accredited activities include assessment of conformity to OIML Recommendations and, when existing, national legal metrology regulations.

e) request IAF Members to promote, to the certification bodies, the use of technical and metrological experts validated by the OIML when legal metrology enters into the scope of the certification;

f) request the OIML to use assessors from ILAC full Members, that are trained by the OIML for OIML peer assessments;

g) request the OIML to recognize accreditations delivered under the conditions defined in this MoU;

h) promote and develop the consistency and complementarity of the ILAC Mutual Recognition Arrangement, the IAF Multilateral Recognition Arrangement and the OIML Mutual Acceptance Arrangement;

i) promote and develop inter-laboratory comparisons and, in particular, proficiency testing; and

j) invite representatives of each Organization to participate as liaisons in certain meetings of the other Organizations.

**Implementation**

This Memorandum of Understanding will come into force upon its signature by the ILAC Chair, the IAF Chair and the CIML President, and will remain in force until terminated in accordance with the provisions hereafter defined. It will be reviewed every three years.
Two work programs implementing this MoU will be decided on during an annual tripartite meeting:

- one by the ILAC Chair and the CIML President;
- one by the IAF Chair and the CIML President.

The appropriate ILAC bodies, IAF bodies and the International Bureau of Legal Metrology (BIML) will be responsible for implementing these work programs and for reporting on them at the ILAC General Assembly, at the IAF General Assembly and at the CIML Meeting.

**Amendments**

This Memorandum of Understanding, which supersedes the one signed between ILAC, IAF and OIML on 28 October 2007, may be amended at any time by a written agreement between the parties.

**Termination**

This Memorandum of Understanding may be terminated by either party upon three months written notice.

Daniel Pierre
Chair
International Laboratory Accreditation Cooperation (ILAC)

Randy Dougherty
Chair
International Accreditation Forum (IAF)

Alan Johnston
President
International Committee of Legal Metrology (for the OIML)

Signed on: 28 Oct 5.. 2010

# OIML Systems

## Basic and MAA Certificates registered 2010.09–2010.10

### Information: www.oiml.org section "OIML Systems"

#### The OIML Basic Certificate System

The *OIML Basic Certificate System for Measuring Instruments* was introduced in 1991 to facilitate administrative procedures and lower the costs associated with the international trade of measuring instruments subject to legal requirements. The System, which was initially called "OIML Certificate System", is now called the "OIML Basic Certificate System". The aim is for "OIML Basic Certificates of Conformity" to be clearly distinguished from "OIML MAA Certificates".

The System provides the possibility for manufacturers to obtain an OIML Basic Certificate and an OIML Basic Evaluation Report (called "Test Report" in the appropriate OIML Recommendations) indicating that a given instrument type complies with the requirements of the relevant OIML International Recommendation.

An OIML Recommendation can automatically be included within the System as soon as all the parts - including the Evaluation Report Format - have been published. Consequently, OIML Issuing Authorities may issue OIML Certificates for the relevant category from the date on which the Evaluation Report Format was published; this date is now given in the column entitled "Uploaded" on the Publications Page.

Other information on the System, particularly concerning the rules and conditions for the application, issue, and use of OIML Certificates, may be found in OIML Publication B 3 *OIML Certificate System for Measuring Instruments* (Edition 2003, ex. P 1) and its *Amendment* (2006) which may be downloaded from the Publications page. ■

#### The OIML MAA

In addition to the Basic System, the OIML has developed a *Mutual Acceptance Arrangement* (MAA) which is related to OIML Type Evaluations. This Arrangement - and its framework - are defined in OIML B 10-1 (Edition 2004) and its Amendment (2006), and B 10-2 (2004).

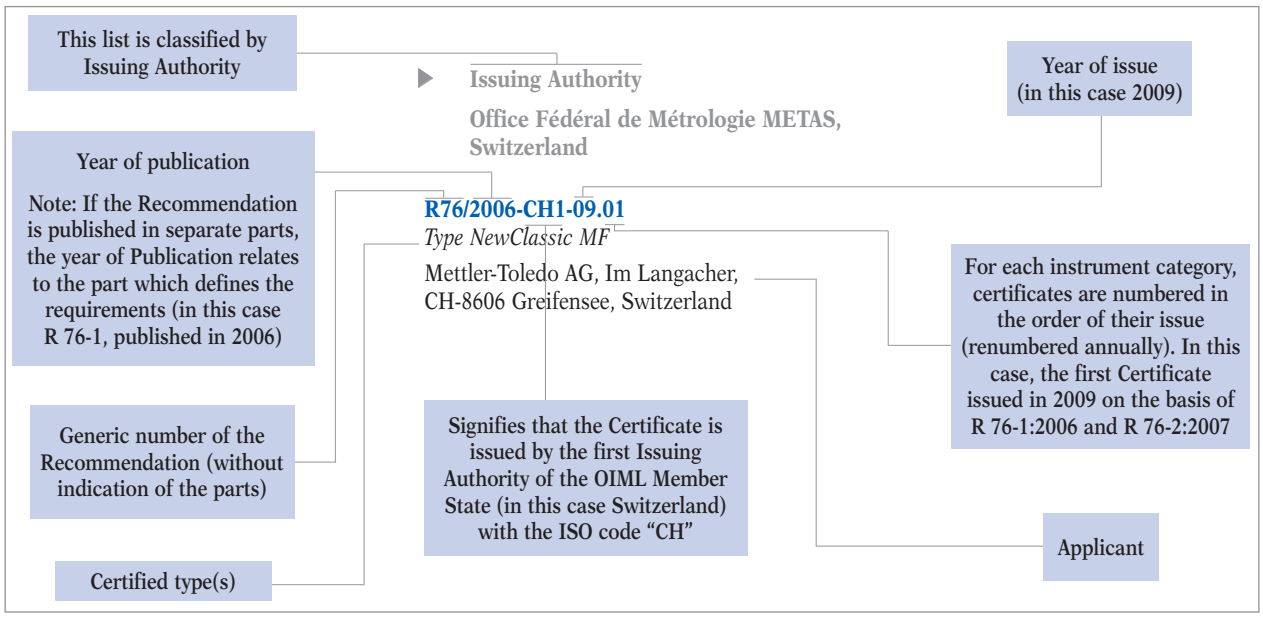
The OIML MAA is an additional tool to the OIML Basic Certificate System in particular to increase the existing mutual confidence through the System. It is still a voluntary system but with the following specific aspects:

- Increase in confidence by setting up an evaluation of the Testing Laboratories involved in type testing;
- Assistance to Member States who do not have their own test facilities;
- Possibility to take into account (in a Declaration of Mutual Confidence, or DoMC) additional national requirements (to those of the relevant OIML Recommendation).

The aim of the MAA is for the participants to accept and utilize MAA Evaluation Reports validated by an OIML MAA Certificate of Conformity. To this end, participants in the MAA are either Issuing Participants or Utilizing Participants.

For manufacturers, it avoids duplication of tests for type approval in different countries.

Participants (Issuing and Utilizing) declare their participation by signing a Declaration of Mutual Confidence (Signed DoMCs). ■



## 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*

Centro Español de Metrologia, Spain

**R049/2006-ES1-2010.02**
*Water meter family intended for the metering of cold potable water - Type: S220 $Q_3$ 2,5 and S220 $Q_3$ 4*

Elster Medicion S.A., Calle Velazquez 31, 4° left, ES-28001 Madrid, Spain

▶ Issuing Authority / *Autorité de délivrance*

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

**R049/2006-FR2-2009.07 Rev. 2**
*Water meter ITRON type TMII*

Itron Italia S.p.A., Strada Valcossera, 16, IT-14100 Asti, Italy

**R049/2006-FR2-2010.04**
*Water meter type A1*

Sappel, 67, rue du Rhône, BP 10160, FR-68304 Saint-Louis Cedex, France

**R049/2006-FR2-2010.05**
*Water meter type A2*

Sappel, 67, rue du Rhône, BP 10160, FR-68304 Saint-Louis Cedex, France

**R049/2006-FR2-2010.06**
*Water meter type B1*

Sappel, 67, rue du Rhône, BP 10160, FR-68304 Saint-Louis Cedex, France

**R049/2006-FR2-2010.07**
*Water meter type C1*

Sappel, 67, rue du Rhône, BP 10160, FR-68304 Saint-Louis Cedex, France

## 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-GB1-2008.01 Rev. 3**
*CW3 Checkweigher*

Loma Systems Group and ITW Group, Southwood, Farnborough, Hampshire GU14 0NY, United Kingdom

**R051/2006-GB1-2010.02**
*SCW30A Checkweigher*

Saimo Technology UK Ltd., Unit 15 Meadowcroft Way, Leigh Commerce Park, Leigh WN7 3XZ, United Kingdom

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

**R051/2006-NL1-2010.03**
*Automatic catchweighing instrument - Type: DACS-G-S015… and DACS-G-S060…*

Ishida Europe Ltd., 11 Kettles Wood Drive, Woodgate Business Park, Birmingham B32 3DB, United Kingdom

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

**R051/2006-DE1-2010.02**
*Automatic catchweighing instrument - Type: Litronic-MPS III SWS3*

Liebherr-Mischtechnik GmbH, Im Elchgrund 12, DE-88427 Bad Schussenried, 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*

**International Metrology Cooperation Office, National Metrology Institute of Japan (NMIJ) National Institute of Advanced Industrial Science and Technology (AIST), Japan**

**R060/2000-JP1-2010.02 Rev. 1 (MAA)**
*Beam (shear) load cell - Type: LCM13K500-C, LCM13T001-C, LCM13T1.5-C, LCM13T002-C, LCM13T003-C, LCM13T005-C*

A&D Company Ltd., 3-23-14 Higashi-Ikebukuro, Toshima-Ku, JP-170-0013 Tokyo, Japan

**R060/2000-JP1-2010.12 Rev. 1 (MAA)**
*Compression load cell - Type: CC1-H-10T, CC1-H-20T, CC1-H-25T, CC1-H-30T, CC1-H-40T, CC1-H-50T, CC1-H-10T-IS, CC1-H-20T-IS, CC1-H-25T-IS, CC1-H-30T-IS, CC1-H-40T-IS, CC1-H-50T-IS*

Kubota Corporation, 1-2-47 Shikitsu-higashi, Naniwa-ku, JP-556-8601 Osaka, Japan

**R060/2000-JP1-2010.14 (MAA)**
*Beam (bending) load cell - Type UB1-500, UB1-1T, UB1-2T*

Yamato Scale Co. Ltd., 5-22 Saenba-cho, JP-673-8688 Akashi, Hyogo, Japan

**R060/2000-JP1-2010.14 Rev. 1 (MAA)**
*Beam (bending) load cell - Type: UB1-500, UB1-1T, UB1-2T, QUB1-500, QUB1-1T, QUB1-2T*

Yamato Scale Co. Ltd., 5-22 Saenba-cho, JP-673-8688 Akashi, Hyogo, Japan

**R060/2000-JP1-2010.15 (MAA)**
*Load cells - Type: LCM13K100-C, LCM13K200-C, LCM13K300-C*

A&D Company Ltd., 3-23-14 Higashi-Ikebukuro, Toshima-Ku, JP-170-0013 Tokyo, Japan

**R060/2000-JP1-2010.16 (MAA)**
*Compression load cell - Type: DC002-10T, DC002-20T, DC002-25T, DC002-30T, DC002-40T*

Minebea Co. Ltd, 1-1-1 Katase Fujisawa-shi, JP-251-8531 Kanagawa-ken, Japan

**R060/2000-JP1-2010.17 (MAA)**
*Load cells - Type: LCCD11T010-KC, LCCD11T020-KC, LCCD11T030-KC*

A&D Company Ltd., 3-23-14 Higashi-Ikebukuro, Toshima-Ku, JP-170-0013 Tokyo, Japan

**R060/2000-JP1-2010.18 (MAA)**
*Beam (bending) load cell - Type: UB2-100, UB2-200, UB2-300, QUB2-100, QUB2-200, QUB2-300*

Yamato Scale Co. Ltd., 5-22 Saenba-cho, JP-673-8688 Akashi, Hyogo, Japan

▶ Issuing Authority / *Autorité de délivrance*

**National Weights and Measures Laboratory (NWML), United Kingdom**

**R060/2000-GB1-2010.04 (MAA)**
*Tool steel tension (S-type) strain gauge load cell*

CAS Corporation, #19, Ganap-Ri, Gwangjuk-Myoun, Yangju-Si, KR-482-841 Kyunggi-Do, Korea (R.)

**R060/2000-GB1-2010.05 (MAA)**
*Stainless steel compression strain gauge load cell*

Elite Transducers Ltd., 5-6 Zephyr House, Caleva Park, Aldermaston, Berkshire RG7 8PN, United Kingdom

▶ Issuing Authority / *Autorité de délivrance*

**NMi Certin B.V., The Netherlands**

**R060/2000-NL1-2009.04 (MAA)**
*Tension load cell S-type - Type: S40/...*

Hottinger Baldwin Measurement (Suzhou) Co. Ltd., 106 Hengshan Road, CN-215009 Suzhou, P.R. China

**R060/2000-NL1-2009.05**
*Digital compression load cell - Type: RCD ...*

Dini Argeo Srl, Via Della Fisica, 20, IT-41042 Spezzano di Fiorano (MO), Italy

**R060/2000-NL1-2009.06**
*Compression load cell - Family of type: RCA...*

Dini Argeo Srl, Via Della Fisica, 20, IT-41042 Spezzano di Fiorano (MO), Italy

**R060/2000-NL1-2009.14 Rev. 1**
*Single point load cell - Type: PW15../..*

Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45, DE-64293 Darmstadt, Germany

**R060/2000-NL1-2009.16 (MAA)**
*Compression load cell - Type: ZSF-SS, ZSFY-SS and ZSFW-SS*

Keli Electric Manufacturing (Ningbo) Co. Ltd., N° 199 Changxing Road, Jiangbei District, CN-315033 Ningbo, P.R. China

**R060/2000-NL1-2009.17 (MAA)**
*Shear beam load cell - Type: SQBT-SS...*

Keli Electric Manufacturing (Ningbo) Co. Ltd., N° 199 Changxing Road, Jiangbei District, CN-315033 Ningbo, P.R. China

**R060/2000-NL1-2009.18 (MAA)**
*Shear beam load cell - Type: HSX-SS...*

Keli Electric Manufacturing (Ningbo) Co. Ltd.,
N° 199 Changxing Road, Jiangbei District, CN-315033 Ningbo,
P.R. China

**R060/2000-NL1-2010.01 (MAA)**
*Bending beam load cell - Type: 380 and 380W*

Vishay-Transducers, 8A Hazoran Street, IL-42506 Netanya, Israel

**R060/2000-NL1-2010.08 (MAA)**
*Bending beam load cell - Type: BC-xxxxF*

CAS Corporation, #19, Ganap-Ri, Gwangjuk-Myoun, Yangju-Si,
KR-482-841 Kyunggi-Do, Korea (R.)

**R060/2000-NL1-2010.09 (MAA)**
*Compression Load Cell - Type: RL116XP*

Rice Lake Weighing Systems, 230 West Coleman Street,
US-54868 Wisconsin, Rice Lake, Wisconsin, United States

**R060/2000-NL1-2010.10 (MAA)**
*Compression load cell - Type: BM14G4*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-NL1-2010.11 Rev. 1**
*Single point Load Cell - Type: 1022, 1022P and LPS*

Vishay Precision or Tedea-Huntleigh, 8a Hazoran Street,
New Industrial, IL-42506 Natanya, Israel

**R060/2000-NL1-2010.13 (MAA)**
*Bending beam load cell - Type: L6D-xx-xx-xx-xx- R61 Series*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-NL1-2010.14 (MAA)**
*Shear beam load cell - Type: B8Q Series*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-NL1-2010.15 (MAA)**
*Double ended shear beam Load Cell - Type: HM9E*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

▶ **Issuing Authority / *Autorité de délivrance***

**Physikalisch-Technische Bundesanstalt (PTB), Germany**

**R060/2000-DE1-2006.02 Rev. 1**
*Strain gauge bending beam load cell - Type: PW15AH...*

Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45,
DE-64293 Darmstadt, Germany

**R060/2000-DE1-2010.02 Rev. 1**
*Strain gauge double bending beam load cell - Type: BM6G*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-DE1-2010.05 (MAA)**
*Strain gauge single point load cell - Type: PW25*

Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45,
DE-64293 Darmstadt, Germany

**R060/2000-DE1-2010.06 (MAA)**
*Strain gauge single point load cell - Type: PW27*

Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45,
DE-64293 Darmstadt, Germany

**R060/2000-DE1-2010.07**
*Strain gauge shear beam load cell - Type: BM8G*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-DE1-2010.08**
*Strain gauge shear beam load cell - Type: BM3*

Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC),
N° 66, Zhongyuan Road, P.O. Box 2, CN-Puzhen Hanzhong,
723007 ShaanXi, P.R. China

**R060/2000-DE1-2010.11 (MAA)**
*Strain gauge single point load cell - Type: L6T*

Zemic Europe B.V., Leerlooierstraat 8, NL-4871 EN Etten-Leur,
The Netherlands

## INSTRUMENT CATEGORY
*CATÉGORIE D'INSTRUMENT*

## Automatic gravimetric filling instruments
*Doseuses pondérales à fonctionnement automatique*

## R 61 (2004)

▶ **Issuing Authority / *Autorité de délivrance***

**Physikalisch-Technische Bundesanstalt (PTB), Germany**

**R061/2004-DE1-2010.01**
*Automatic gravimetric filling instrument - Type: Bagging controller BC1000*

CHROTECH GmbH, Reisertstrasse 6, DE-53773 Hennef (Sieg),
Germany

## 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-GB1-2001.02 Rev. 2**
*Rice Lake Weighing Systems 820i and 920i*

Rice Lake Weighing Systems, 230 West Coleman Street, US-54868 Wisconsin, Rice Lake, Wisconsin, United States

**R076/1992-GB1-2009.10 Rev. 02 (MAA)**
*AD PLUS and AD PLUS Series, AP PLUS (and variants) and AD PLUS Models, non-automatic weighing instruments*

CAS Corporation, #19, Ganap-Ri, Gwangjuk-Myoun, Yangju-Si, KR-482-841 Kyunggi-Do, Korea (R.)

**R076/1992-GB1-2010.08 (MAA)**
*#821G, non-automatic weighing instrument*

Ryco Equipment Inc., 6810 220th Street SW, Mountlake Terrace, US-WA 98043 Belllingham, United States

**R076/1992-GB1-2010.09 (MAA)**
*720i-1A, 720i-1E, 7201-2A and 720i-2E non-automatic weighing instruments*

Rice Lake Weighing Systems, 230 West Coleman Street, US-54868 Wisconsin, Rice Lake, Wisconsin, United States

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

**R076/1992-NL1-2009.06**
*Non-automatic weighing instrument - Type: FMM-PDx00M / FMM-T310x(B)*

Fook Tin Technologies Ltd., 4/F Eastern Center, 1065 King's Road, Quarry Bay, HK-Hong Kong, Hong Kong

**R076/1992-NL1-2009.07**
*Non-automatic weighing instrument - Type: DC-782 & DMC-782*

Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan County, CN-201505 Shanghai, P.R. China

**R076/1992-NL1-2009.08**
*Non-automatic weighing instrument - Family of type: IND560 / IND560x*

Mettler-Toledo Inc., 1150 Dearborn Drive, US-Ohio 43085, Worthington, United States

**R076/1992-NL1-2009.10**
*Non-automatic weighing instrument - Family of type: CL5000 Series / CL5000 J (R, P & G Series)*

CAS Corporation, #19, Ganap-Ri, Gwangjuk-Myoun, Yangju-Si, KR-482-841 Kyunggi-Do, Korea (R.)

**R076/1992-NL1-2009.34**
*Non-Automatic weighing instrument - Type: GP, GC, GW series*

Snowrex International Co. Ltd., 2F No. 9, Lane 50, Sec. 3, Nan-Kang Road, TW-Taipei, Chinese Taipei

**R076/1992-NL1-2010.18 (MAA)**
*Non-Automatic weighing instrument - Type: MC-980A or MC-980MA*

Tanita Corporation, 14-2, 1-Chome, Maeno-cho, Itabashi-ku, JP-174-8630 Tokyo, Japan

**R076/1992-NL1-2010.23 (MAA)**
*Non-Automatic weighing instrument - Type: TW-V / TX-V series*

Shimadzu Corporation, 1, Nishinokyo-Kuwabara-cho, Nakagyo-ku, JP-604-8511 Kyoto, Japan

**R076/1992-NL1-2010.29 (MAA)**
*Non-Automatic weighing instrument - Type: IZ-7000*

Ishida Co. Ltd., 44, Sanno-cho, Shogoin, Sakyo-ku, JP-606-8392 Kyoto, Japan

**R076/1992-NL1-2010.30 (MAA)**
*Non-Automatic weighing instrument - Type: EN-xxxx*

Ishida Co. Ltd., 44, Sanno-cho, Shogoin, Sakyo-ku, JP-606-8392 Kyoto, Japan

**R076/1992-NL1-2010.33**
*Non-automatic weighing instrument - Type: DS-781, DS-781SS, DS-782*

Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan County, CN-201505 Shanghai, P.R. China

**R076/1992-NL1-2010.35 (MAA)**
*Non-Automatic weighing instrument - Type: PW-650A or PW-650MA*

Tanita Corporation, 14-2, 1-Chome, Maeno-cho, Itabashi-ku, JP-174-8630 Tokyo, Japan

**R076/1992-NL1-2010.36**
*Non-automatic weighing instrument - Type: T32M... / T32XW... / T22M... / T32PE... / T32XWE...*

Ohaus Corporation, 19A Chapin Road, US-NJ 07058 Pine Brook, United States

▶ **Issuing Authority / *Autorité de délivrance***

**Physikalisch-Technische Bundesanstalt (PTB), Germany**

**R076/1992-DE1-2004.04 Rev. 3**
*Non-automatic electromechanical weighing instrument with or without lever works - Type: XP..., XS..., XA...*

Mettler-Toledo GmbH, Im Langacher, CH-8606 Greifensee, Switzerland

**R076/1992-DE1-2005.04 Rev. 2**
*Non-automatic electromechanical baby weighing instrument - Types: M375x1, M376x1, M376x2, BIS01A - E*

Seca GmbH & Co. kg., Hammer Steindamm 9-25, DE-22089 Hamburg, Germany

## 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***

**Office Fédéral de Métrologie METAS, Switzerland**

**R076/2006-CH1-2009.02 Rev. 1 (MAA)**
*Non-automatic electromechanical weighing instrument - Type: NewClassic SG*

Mettler-Toledo GmbH, Im Langacher, CH-8606 Greifensee, Switzerland

▶ **Issuing Authority / *Autorité de délivrance***

**National Weights and Measures Laboratory (NWML), United Kingdom**

**R076/2006-GB1-2010.02 (MAA)**
*Weighing indicators, as part of a non-automatic weighing instrument, designated the CW90-A; CW90-E, CW90X-A and CW90X-E*

Rice Lake Weighing Systems, 230 West Coleman Street, US-54868 Wisconsin, Rice Lake, Wisconsin, United States

▶ **Issuing Authority / *Autorité de délivrance***

**NMi Certin B.V., The Netherlands**

**R076/2006-NL1-2009.11**
*Non-automatic weighing instrument - Type: 752KG, 753KG, 599KG or 597KG*

Pelstar, LLC, 11800 S. Austin, Alsip, IL 60803 United States

**R076/2006-NL1-2009.31**
*Indicator, as part of a non-automatic weighing instrument, Type: Alaska*

Inwag Systems Renata Wlodarczyk, Legionow Polskich 43, PL-99-220 Wartkowice, Poland

**R076/2006-NL1-2010.28 (MAA)**
*Indicator, as part of a non-automatic weighing instrument, Type 500*

Dibal S.A., Astintze Kalea, 24 Pol. Ind. Neinver, ES-48160 Derio (Bilbao-Vizcaya), Spain

**R076/2006-NL1-2010.31 (MAA)**
*Non-Automatic weighing instrument - Type: bRite*

Mettler-Toledo (Changzhou) Measurement Technology Ltd, N° 111, West HaiHu Road, ChangZhou XinBei District, CN-213125 Jiangsu, P.R. China

**R076/2006-NL1-2010.32 Rev. 1 (MAA)**
*Non-Automatic weighing instrument - Type: Aviator (A51 series, A71 series)*

Ohaus Corporation, 19A Chapin Road, US-NJ 07058 Pine Brook, United States

**R076/2006-NL1-2010.34**
*Non-automatic weighing instrument - Type: DS-700E, DS-788SS*

Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan County, CN-201505 Shanghai, P.R. China

Issuing Authority / *Autorité de délivrance*

**Physikalisch-Technische Bundesanstalt (PTB), Germany**

**R076/2006-DE1-2008.03 Rev. 1**
*Non-automatic electromechanical weighing instrument with or without lever system - Type: BD SI 200, BG SI 200, DG SI 300, DX SI 300*

Sartorius Wägetechnik, Weender Landstrasse, DE-37073 Göttingen, Germany

**R076/2006-DE1-2010.02**
*Non-automatic electromechanical weighing instrument for persons - Type: WMS01A*

Seca GmbH & Co. kg., Hammer Steindamm 9-25, DE-22089 Hamburg, Germany

**R076/2006-DE1-2010.03**
*Non-automatic electromechanical weighing instrument with or without lever system - Type: Liebherr Litronic-MPS III SWS*

Liebherr-Mischtechnik GmbH, Im Elchgrund 12, DE-88427 Bad Schussenried, Germany

## INSTRUMENT CATEGORY
*CATÉGORIE D'INSTRUMENT*

### Automatic level gauges for fixed storage tanks
*Jaugeurs automatiques pour les réservoirs de stockage fixes*

### R 85 (2008)

Issuing Authority / *Autorité de délivrance*

**NMi Certin B.V., The Netherlands**

**R085/2008-NL1-2010.01**
*Automatic level gauge for measuring the level of liquid in storage tanks. Type: Proservo NMS531 with indicating device Promonitor NRF560*

Endress+Hauser Japan Co. Ltd., 862-1 Mitsukunugi Sakaigawa-cho, Fuefuki-shi, JP-Yamanashi, Japan

## 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*

**International Metrology Cooperation Office, National Metrology Institute of Japan (NMIJ) National Institute of Advanced Industrial Science and Technology (AIST), Japan**

**R117/1995-JP1-2009.01 Rev. 1**
*Fuel dispenser for motor vehicles, Tatsuno Sunny-GII series and Sunny-XE series*

Tatsuno Corporation Yokohama plant, 200 Lijima-cho, Sakae-ku, JP-244-8501 Yokohama, Japan

## 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-NL1-2010.01 Rev. 1**
*Multi-dimensional measuring instrument - Type: SPK-1000*

Teraoka Seiko Co. Ltd., 13-12 Kugahara, 5-Chome, Ohta-ku, JP-146-8580 Tokyo, Japan

## OIML CERTIFICATE SYSTEM

# List of OIML Issuing Authorities

*The list of OIML Issuing Authorities is published in each issue of the OIML Bulletin. For more details, please refer to our web site: www.oiml.org/certificates. Changes since the last issue of the Bulletin are marked in red.*

| | | R 16 | R 21 | R 31 | R 49 | R 50 | R 51 | R 58 | R 60 | R 61 | R 76 | R 81 | R 85 | R 88 | R 93 | R 97 | R 98 | R 99 | R 102 | R 104 | R 105 | R 106 | R 107 | R 110 | R 112 | R 113 | R 114 | R 115 | R 117/118 | R 122 | R 126 | R 128 | R 129 | R 133 | R 134 | R 136 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AT1 | Bundesamt für Eich- und Vermessungswesen (BEV) | | | | | ■ | ■ | ■ | | ■ | ■ | | ■ | ■ | | ■ | ■ | | ■ | ■ | | ■ | ■ | ■ | | | ■ | ■ | ■ | | | | | | | |
| AU1 | National Measurement Institute (NMI) | | | | ■ | ■ | ■ | | ■ | | ■ | | ■ | | | | | | | | | ■ | ■ | | | | | | ■ | | ■ | | ■ | | | |
| BE1 | SPF Economie, PME, Classes Moyennes et Energie | | | | | | | | | | ■ | | | | | ■ | ■ | | | | | | | | | | | | | | | | | | |
| BG1 | State Agency for Metrology and Technical Surveillance (SAMTS) | | | | | | | | | | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | |
| BR1 | Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | |
| CH1 | Office Fédéral de Métrologie (METAS) | ■ | | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | | | | | ■ | ■ | | | | ■ | ■ | ■ | | | | | | ■ | | | | | | |
| CN1 | General Administration of Quality Supervision, Inspection and Quarantine of P. R. China (AQSIQ) | | | | | | | | ■ | | ■ | | | | | ■ | ■ | | | | | | | | | | | | | | | | | | |
| CZ1 | Czech Metrology Institute (CMI) | | | | ■ | | | | | | ■ | ■ | ■ | | | | | | | | ■ | | | | | | | | ■ | | | | | | ■ | |
| DE1 | Physikalisch-Technische Bundesanstalt (PTB) | ■ | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | | ■ |
| DK1 | The Danish Accreditation and Metrology Fund (DANAK) | | | | | ■ | ■ | | ■ | ■ | ■ | | | | | | ■ | | | | ■ | ■ | ■ | | | | | | ■ | | | | ■ | | ■ | |
| DK2 | FORCE Certification A/S | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DK3 | Dansk Elektronik, Lys & Akustik (DELTA) | | | | | ■ | ■ | | ■ | ■ | ■ | | | | | | | | | | | ■ | ■ | | | | | | | | | | ■ | | ■ | |
| ES1 | Centro Español de Metrología (CEM) | | | | ■ | | ■ | | ■ | ■ | ■ | | | | | ■ | ■ | | | | | | | | | | | | | | ■ | | | | | |
| FI1 | Inspecta Oy | | | | | ■ | ■ | | ■ | ■ | ■ | | ■ | | | | | | | | | ■ | ■ | | | | | | ■ | | | | | | | |
| FR1 | Ministère de l'Economie, de l'Industrie et de l'Emploi (MEIE) | *All activities and responsibilities were transferred to FR2 in 2003* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FR2 | Laboratoire National de Métrologie et d'Essais (LNE) | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | | ■ | ■ | | ■ | | | ■ | ■ | ■ | ■ | | | ■ | ■ | ■ | | ■ | | ■ | | |
| GB1 | National Weights and Measures Laboratory (NWML) | | | | ■ | ■ | ■ | | ■ | ■ | ■ | | ■ | | | | ■ | | | | ■ | ■ | ■ | | | | | | ■ | | | | ■ | | ■ | |
| GB2 | National Physical Laboratory (NPL) | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | |
| HU1 | Hungarian Trade Licensing Office (MKEH) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| JP1 | National Metrology Institute of Japan / National Institute of Advanced Industrial Science and Technology (NMIJ / AIST) | | | | | | | | ■ | | ■ | | | | | | | | | | | | | | | | | ■ | ■ | | | | | | | |
| KR1 | Metrology and Measurement Division (KATS) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| NL1 | NMi Certin B.V. | | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | | | ■ | | ■ | | | ■ | ■ | ■ | | | | | | ■ | | ■ | ■ | ■ | | ■ | |
| NL2 | KIWA Nederland B.V. | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NO1 | Norwegian Metrology Service (Justervesenet) | | | | | ■ | ■ | | | ■ | ■ | | | | | | | | | | ■ | ■ | ■ | | | | | | ■ | | | | ■ | | | |
| NZ1 | Measurement and Product Safety Service (MAPSS Wellington) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| PL1 | Central Office of Measures (GUM) | | | | | | | | | | ■ | | | | | | ■ | | ■ | | | | | | | | | | | | | | | | | |
| RO1 | Bureau Roumain de Métrologie Légale (B.R.M.L.) | | | | | | | | | | | | | | | ■ | ■ | | | | | | | ■ | | | ■ | ■ | | | | | | | | |
| RU1 | Russian Research Institute for Metrological Service (VNIIMS) | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| SE1 | Swedish National Testing and Research Institute AB (S.P.) | | | | | ■ | ■ | | ■ | ■ | ■ | | ■ | | | | ■ | | | | | ■ | ■ | | | | | | ■ | | | | | | | |
| SI1 | Metrology Institute of the Republic of Slovenia (MIRS) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| SK1 | Slovak Legal Metrology | | | | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | ■ | | | | | | | |
| US1 | NCWM, Inc. | | | | | | | | ■ | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| VN1 | Directorate for Standards and Quality (STAMEQ) | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |


# Measurement and Metrology – In union there is strength!

*Mesurexpovision and the 15th International Metrology Congress will be held jointly on 3–6 October 2011 in Paris (Porte de Versailles)*

**The Congress and Mesurexpovision organizers (the *Collège Français de Métrologie* and *GL Events Exhibitions* respectively) have decided to unite their efforts to create, on a European scale, an event which is dedicated to their activities and which will provide an opportunity to the whole profession by offering a cost-effective, complete and coherent program in one place and on the same dates. The program is ambitious and will be a landmark in the world of metrology.**

***MESUREXPOVISION*** is the reference forum for measurement and testing professionals and is simply the place to be to find solutions for the future in France.

The *Congrès International de Métrologie*, which is unique in Europe, is a forum for technical exchanges between all the actors in the field of measurement including experts, authorities, and industrial manufacturers and users.

The aim of this Congress is to show that **measurement is a tool that can be used to improve processes**. And it is by way of round tables involving industrialists, all of which will have a practical slant and which will be centered around day to day issues, that the exchanges will take place. The round table discussion topics have now been set:

- Better measurements lead to reduced costs
- Medical biology and accreditation: the keys to success
- Who are tomorrow's metrologists?
- Mastering temperatures in the health sector
- Mastering and saving energy in industry
- New measurement techniques

The Congress program will be complemented by the following themes:

- Mastering measurement processes, both analytical and testing: uncertainty, traceability, verification, training, certification, mathematical and digital modeling, the metrological function, etc.
- Regulatory domains, legal metrology and international recognition
- Metrology in new fields: biotechnology, the environment, sensory measurements, etc.

**All the physical and chemical quantities are concerned, as are all sectors of industrial activity.**

A call for papers is ongoing and proposals for abstracts should be received by the CFM by 15 January 2011.

For the first time, the Congress papers will be published in periodicals that have reviewing committees. For 2011, the CFM has also encouraged the presence of industrialists in the preparation of the Congress to reinforce interest in the subjects to be covered: EDF, GSK Biologicals, Renault, the SNCF and Total will be making contributions.

Industry professionals will also be attending, and Hexagon Metrology has confirmed its support for the event as a key sponsor.

***This is the only event of its kind in Europe*** *– the Congress is organized by the Collège Français de Métrologie in partnership with Euramet, the BIPM, the OIML, the NCSLi and the NPL to ensure wider international visibility, together with users and the following technical competence centers: EDF, GSK Biologicals, Hopitaux de Paris, Renault, SNCF, Total, Acac, BEA Métrologie, Cetiat, IMQ, LNE, Hexagon Metrology, and Stork Intermes.*

**Press information:**

Sandrine Gazal,
General Secretary of the Collège Français de Métrologie

Tel.: +33 (4) 6706 2036 - info@cfmetrologie.com - www.metrologie2011.com

The OIML is pleased to welcome the following new

## CIML Member

- **Slovenia:**
  **Mr. Samo Kopač**

## OIML Meeting

**TC 6 Prepackaged products**
11–15 April 2011 (Tokyo, Japan)

**TC 9/SC 2 Automatic weighing instruments**
18–19 April 2011 (NMO, Teddington, United Kingdom)

**www.oiml.org**
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## Committee Drafts

**Received by the BIML, 2010.09 – 2010.10**

| | | | | |
|---|---|---|---|---|
| Evaluation of measurement data - Supplement 2 to the "Guide to the expression of uncertainty in measurement" - Extension to any number of output quantities | E | 1 CD | JCGM | Various |
| Pressure transmitters with elastic sensing elements | E | 3 CD | TC 10/SC 2 | RU |
| Revision R 126: Breath alcohol analyzers | E | 7 CD | TC 17/SC 7 | FR |
| OIML R 137 Gas meters<br>- Part 1: Metrological and technical requirements<br>- Part 2: Metrological controls and performance tests | E | 2 CD | TC 8/SC 7 | NL |

CIML meets in Orlando, Florida (USA)

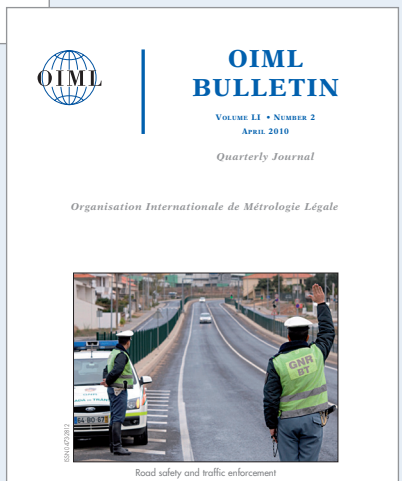
# Call for papers

**OIML Members**
**RLMOs**
**Liaison Institutions**
**Manufacturers' Associations**
**Consumers' & Users' Groups, etc.**

Winner of the 2009 OIML Award for Excellent Contribution to Legal Metrology in Developing Countries: Assignment Report

- Technical articles on legal metrology related subjects
- Features on metrology in your country
- Accounts of Seminars, Meetings, Conferences
- Announcements of forthcoming events, etc.

Working across cultures in legal metrology



Road safety and traffic enforcement

The **OIML Bulletin** is a forum for the publication of technical papers and diverse articles addressing metrological advances in trade, health, the environment and safety - fields in which the credibility of measurement remains a challenging priority. The Editors of the Bulletin encourage the submission of articles covering topics such as national, regional and international activities in legal metrology and related fields, evaluation procedures, accreditation and certification, and measuring techniques and instrumentation. Authors are requested to submit:

- a titled, typed manuscript in Word or WordPerfect either on disk or (preferably) by e-mail;
- the paper originals of any relevant photos, illustrations, diagrams, etc.;
- a photograph of the author(s) suitable for publication together with full contact details: name, position, institution, address, telephone, fax and e-mail.

*Note: Electronic images should be minimum 150 dpi, preferably 300 dpi.*

Technical articles selected for publication will be remunerated at the rate of 23 € per printed page, provided that they have not already been published in other journals. The Editors reserve the right to edit contributions for style, space and linguistic reasons and author approval is always obtained prior to publication. The Editors decline responsibility for any claims made in articles, which are the sole responsibility of the authors concerned. Please send submissions to:

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