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Air pollution:
Exhaust-gas analyzers and air quality monitoring

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Contents

OIML BULLETIN

VOLUME XLVI • NUMBER 3
JULY 2005

evolutions

update

AIR POLLUTION:
SEE ARTICLES ON PAGES 5 AND 15

Sommaire

BULLETIN OIML

VOLUME XLVI • NUMÉRO 3
JUILLET 2005

évolutions

informations

Editorial

Chris Pulham
Editor, B I M L

Taking a deep breath

When you receive this Bulletin the OIML will just have finished celebrating its Fiftieth Anniversary and the Fortieth Meeting of the International Committee of Legal Metrology will have taken place in Lyon, France, followed by the Twelfth International Metrology Congress.

But at the time of writing this Editorial and putting together the Bulletin, the BIML is a fast-moving hive of activity and we are concentrating 100 % of our efforts on making the Lyon event an outstanding success after months of creating, planning, organizing, and managing. It is very appropriate that we are holding our Half-Century Anniversary Meeting in France, where the Treaty setting up the OIML was signed in 1955. Back to roots – but not for long.

In the meantime, our regular activities continue: the implementation of the OIML Mutual Acceptance Arrangement has encountered initial success beyond our expectations and the first CPR meeting will be held in Lyon in conjunction with the CIML Meeting. A sign of its success is that we are having to limit participation due to the meeting room capacity!

Ongoing technical activity is also encouraging after a period of reconciliation; a number of new Committee Drafts have been received recently by the BIML and will become drafts of new or revised Recommendations. After certain restructuring, many Technical Committees are now reviewing their work plans and pressing on with developing new drafts on a variety of topical legal metrology-related subjects, adapting to the changing times.

We have also re-thought and re-drafted the OIML Strategy and Action Plan, and translated these key medium to long-term documents into a concrete BIML Work Program which we are already implementing and which has already produced results. Following a brand new framework is challenging but exciting at the same time, and ensures that every action undertaken is relevant.

With the growing use of the internet and e-mail, communication with Members is increasing, is more rapid, and is more effective. Some of the traditional "red tape" has been cut and efficiency of information transmission has thus increased. We are making increased efforts to further improve communication with our Members (the OIML - and the BIML - exist for and because of our Members) and this is the tip of the iceberg, as we have plans for online technical forums, online voting, information exchange, technical assistance to Developing Countries, centralization of information from Regional Legal Metrology Organizations and much more just as soon as we can implement it.

Also on the communication front, we have designed and printed a brand new leaflet destined to explain in simple, practical terms, why legal metrology is important and what the OIML's objectives are. The four-page color leaflet, which exists in English and French, can be translated into other languages and the print-ready artwork supplied on request to any Member.

So, as the BIML Staff pack their bags for the short trip to Lyon we are already thinking of the projects lined up for our return, and many are already under way. Just taking a deep breath before pressing ever onwards ... ■

AIR POLLUTION

Computer-aided exhaust-gas analyzers – new options for modern measuring instruments

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1 Introduction

In the 1970's and 1980's there were growing problems with environmental pollution caused by the increasing number of motor vehicles, especially in city centers. Due to pollutant exhaust gases, there was high exposure to people and to the environment and at that time there were no possibilities to check the emissions of motor vehicles. As a result, in various countries world-wide exhaust-gas tests were demanded and corresponding measuring instruments developed. For this reason exhaust-gas tests were regulated by legislation in many countries, e.g. for new motor vehicles and as repeated exhaust-gas tests at certain intervals for older motor vehicles. On April 1, 1985, the exhaust-gas test was introduced in Germany. At that time, the measurement was relatively simple. Usually, besides a visual check of the exhaust-gas system, only the carbon-monoxide content of the exhaust gas was measured despite the fact that carbon dioxide, unburned hydrocarbons and nitric oxide are also emitted. For diesel vehicles soot particles are also present.

In 1991, OIML R 99 *Instruments for measuring vehicle exhaust emissions* was first published. This Recommendation is valid for exhaust-gas analyzers for the examination of emissions of four-stroke spark-ignition engines and Wankel engines. Exhaust-gas analyzers determine the volume concentration of certain exhaust-gas components (carbon monoxide, carbon dioxide, and hydrocarbons). Since it was revised and published jointly with ISO in 2000, OIML R 99/ISO 3930 [1] includes 24 functional tests for the corresponding exhaust-gas analyzers, so that they can be set up within the scope of legal metrology. These tests, however, concern the hardware of the measuring instrument, but not the software.

Legislation has become stricter recently concerning gas emissions of motor vehicles, and the maximum permissible values for exhaust-gas components are becoming smaller, for example the classification EURO 1 to EURO 4 which is valid in Europe. Exhaust-gas analyzers, therefore, must determine lower concentrations of emissions within narrower limits of error. Microprocessors are now used to enable more functions and easier operation, and computers are used to operate measuring instruments, evaluate data and display results.

Within the scope of legal metrology, the use of a PC, however, requires compliance with special technical requirements in order to guarantee the measurement accuracy and reliability, e.g. electromagnetic compatibility or security against manipulation. Thus, hardware and software requirements were developed which essentially originate from the introduction of information technology for scales with respect to legal metrology; e.g. the activities of WELMEC [3].

The advantage of computer-aided exhaust-gas analyzers (besides simplicity of application) is their capability to statistically evaluate test results. Certain car manufacturers wish to record the results from garages centrally in order to draw conclusions as to the quality of their engines and the exhaust-gas system. Therefore, computer-aided exhaust-gas analyzers are increasingly integrated into computer networks which also offer the possibility of automatic invoice printing and data integration.

As exhaust-gas analyzers must be serviced at regular time intervals due to dirt, the question arose as to how such maintenance can be made as cost-effective as possible, while at the same time guaranteeing availability for the customer. Therefore, manufacturers decided to only exchange the transducer: on the due date of a maintenance or verification or when a defect occurs, an exchange transducer is sent to the garage by the manufacturer and simply exchanged so that the garage can be operational again within minutes. In the past, such a procedure necessitated an on-site re-verification (with the corresponding expense) and good timing coordination with the verification authorities. As in most cases there were delays, the manufacturers of exhaust-gas analyzers asked the PTB to research possibilities which would render a subsequent verification of the whole system on site or at the manufacturers' premises unnecessary, and so technical requirements were developed allowing this possibility.

Below, first the general requirements on software are described, which are basically valid for exhaust-gas analyzers within the EC in accordance with the Measuring Instruments Directive (MID, 2004/22/EC)

and the associated MID requirements on software [2]. This is followed by a description of additional requirements which must be fulfilled in the case of exchanging instrument subassemblies.

2 Basic assembly of measuring instruments

An exhaust-gas analyzer includes all the components and their software which contribute to the generation, evaluation and display of the measurement values as well as the corresponding controls for the operator. These measuring systems can contain all the components in one housing (microcontroller based measuring instruments, see 2.1) or can be made up of parts which are connected to each other by sealed links or reciprocal identification under seal (microcontroller based measuring instruments or computer-aided measuring instruments). Alternatively, the exhaust-gas analyzer can be composed of compatible sub-assemblies (2.3). This solution implies that the system has special software features, described in 3.2.

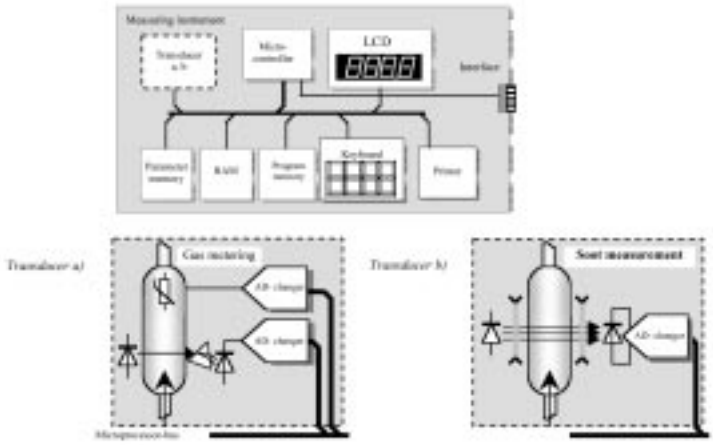


Fig. 1 Exhaust-gas analyzer, build-for-purpose measuring instrument

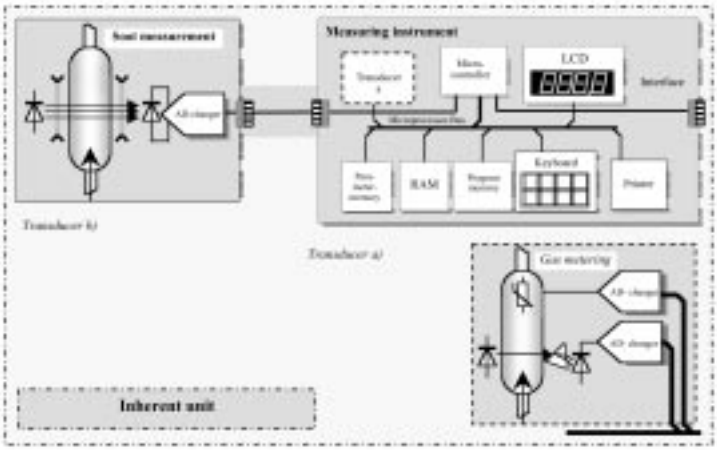


Fig. 2 Exhaust-gas analyzer with several inherent components (protected by sealing or reciprocal identification under seal)

2.1 Microcontroller based measuring instruments

Microcontroller based measuring instruments can be realized as measuring systems in one enclosed casing. As shown in Fig. 1 the sensors for gas and/or soot are connected to the internal microcontroller bus, as is the display. All components together form an inextricable built-for-purpose unit. Concerning software requirements the solution illustrated in Fig. 2 belongs to the same category. Here the components are connected via cable but exchanging is inhibited by sealing or reciprocal identification under seal.

2.2 Computer-aided measuring instruments

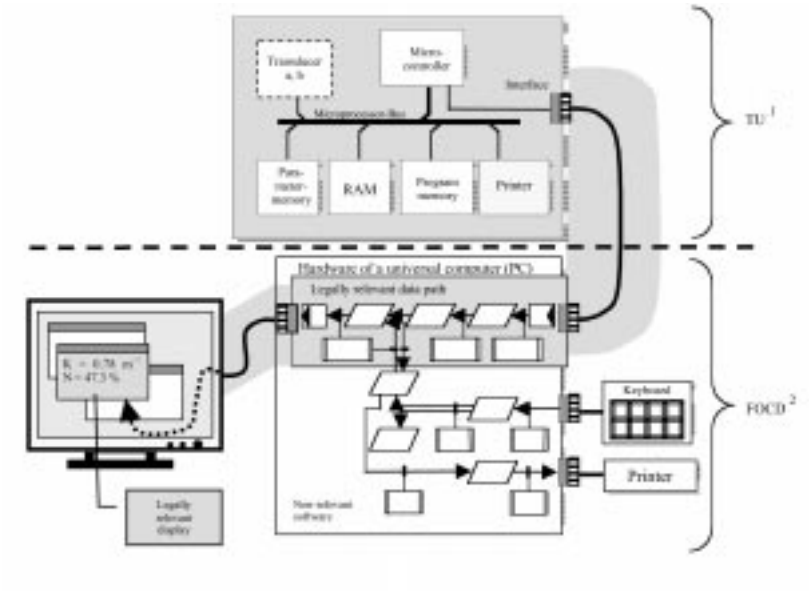
Figure 3 illustrates a computer-aided measuring system in which some parts are placed in the transducer unit and others realized as software on a general purpose computer. To guarantee the conformity of each measuring system with the approved type, one solution is to preserve the configuration and the properties of the system by sealing the cables and housing of the computer and to restrict software functions. Another more flexible solution that allows exchange of the hardware (transducer unit TU or device for operation, control, and display) without re-verification of the system is possible provided the conditions described below are observed. The software on the general purpose computer may be separated as in Fig. 3 in a legally relevant data path and in non-legally relevant software or the complete software may be legally relevant.

3 Requirements for exhaust-gas analyzers

3.1 General requirements

3.1.1 Conformity of serial produced instruments with the approved type in respect to software

Each verified instrument must comply with the approved type. It must be possible to verify without further tools whether an approved software version is installed in the instrument.



[1] TU = Transducer Unit [2] FOCD = Facility for Operation, Control and Display

Fig. 3 Exhaust-gas analyzer with several inherent components

3.1.1.1 Software identification

For exhaust-gas analyzers the software identification - a distinctive string or number inextricably linked with the software, mentioned in the approval certificate - is suitable for that purpose. It may also be a checksum of the executable code but this is not required. The instruction manual must explain to the user how to display the software identification.

3.1.1.2 Software separation

The manufacturer generally has two options to design software:

- No distinction is drawn between legally relevant and non-legally relevant functions. In this case, the complete software is legally relevant.
- A distinction is drawn between legally relevant and non-legally relevant functions. In this case, a software separation must be realized.

Software separation would be useful, for example, if the engine diagnosis software is to be updated regularly. As this software is regarded as being not legally relevant the holder of the type approval could avoid re-approval of the software, if the design of the software complies with the requirements on software separation. The software must be designed such that changes in legally non-relevant software parts do not affect the functions and data in the relevant part.

Figure 4 shows a symbolic presentation according to IEC 61131-3 [4] of software separation. In the part with the grey background the "legally relevant data path" is marked. This data path consists of two elements:

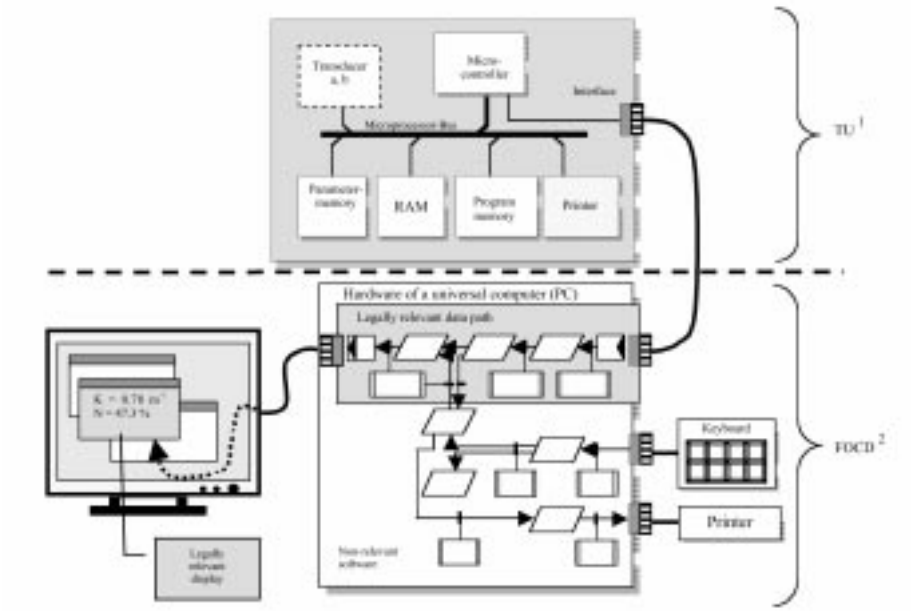
- all variables of the program that carry data relevant for the measurement result, and
- all subroutines or procedures that transport the relevant data along the path and contribute to the calculation of the final measurement result or have any impact on it.

In the following, three examples for technical solutions for separation of software components are described.

A) Independent program containing all legally relevant data and functions.

B) Dynamic Link Library (DLL) containing all legally relevant data and functions.

C) Set of legally relevant variables and subroutines within a program with other variables and subroutines.



[1] TU = Transducer Unit [2] FOCD = Facility for Operation, Control and Display

Fig. 4 Exhaust-gas analyzer with compatible subassemblies

3.1.1.3 Software interface

Depending on the programming language there is a certain risk that the legally relevant functions or data can be affected by program changes in the legally non-relevant part. It is required that exchange of data between these parts can only be performed via a clearly defined software interface. The interface may be realized e.g. by one variable or a set of variables, that one program part writes to and the other reads from for further processing and vice versa.

The software interface must be "protective" as is required for a hardware interface, i.e. there must be neither commands nor data flows via this interface, which influence legally relevant functions, data, or parameters in an unauthorized way (compare with 3.1.3).

The following solutions for a software interface are acceptable:

a) Data exchange via file,

b) Dynamic data exchange (DDE) or "pipes",

c) Subroutine or function parameters.

These proposed solutions yield the advantage that there is a low risk that the application programmer of the legally non-relevant software part inadvertently realizes a path different from the approved one.

3.1.2 Protection against manipulation

The measuring instrument software must not have any function which enables the user to perform unauthorized functions. If the software separation is realized according to 3.1.1.2 and 3.1.1.3, even legally non-relevant programs, which the user possibly starts, do not influence the legally relevant functions and data.

In order to show changes in the program codes, a check sum is calculated from the program code and the parameters. This serves as protection against manipulation by the user and may be additionally used as software identification for the conformity check (see above). The legally relevant program calculates the check sum of its own machine code and of relevant parameters and compares the result with the nominal value and induces an error reaction if necessary.

3.1.3 Protectiveness of interfaces of measuring system components

All interfaces of the measuring system shall be protective. An interface is protective if no inadmissible influence of measurement values or functions is possible.

The manufacturer of an exhaust-gas analyzer is responsible for ensuring that all commands, parameters and data which can be exchanged via a protective interface are interpreted in a correct way by the interface program and have an exactly defined effect. There must be neither undocumented commands nor commands with undefined functions. The manufacturer must provide a complete list of commands and must confirm the completeness of this list. The Notified Body responsible for type examination decides on the admissibility of the documented commands.

The same applies to a protective software interface which is needed when software separation is realized (compare with 3.1.1.3).

3.1.4 Exchange of legally relevant software components – Download of legally relevant software

This item is of particular importance if the hardware and the operating system enable loading of software, e.g. in case of a PC-based FOCD. Here "loading" comprises transferring, activating, and starting programs without instantaneous re-verification.

Software can be loaded into the PC by means of different media:

- by memory media such as memory sticks, CDs, floppy disks,
- by exchange of memory media, e.g. memory cards, EPROMs,
- by communication networks via modem connection or internet,
- by a direct connection to another computer, e.g. a notebook.

First of all, the manufacturer must decide whether loading of software is needed after verification. If the measuring system offers the technical facility of loading software due to its characteristics, and the manufacturer decides not to make use of it, measures must be taken to prevent loading e.g. by sealing (see 3.2.1). Depending on the features of the system different options are given for software loading and hardware exchange. These are compiled in Table 3-1 for a transducer with micro-controller and in Table 3-2 for a FOCD based on a universal computer.

A mark in the columns (f), (g) and (i), (k) for a FOCD indicate that the hardware (universal computer, PC) can be exchanged without breaking a seal provided that the requirements stated in 3.2.1 are fulfilled. If solutions (h) or (l) apply, the following requirements do not need to be fulfilled. However, a re-verification is necessary after loading or hardware exchange.

3.1.4.1 Loading of approved software

The following solutions are acceptable:

I) In order to exchange software subject to legal control, a switch or a jumper protected by a seal must be actuated. Before verification, it is checked whether the approved software is installed on the measuring system (Table 3-1, (c),(d),(e); Table 3-2, (h), (l)).

II) It must be technically guaranteed that the holder of the approval has authorized the loaded software. This can be realized e.g. by a modem connection with a secret telephone number or a CD ROM or similar supplied by the holder of the approval. Thus, it can be assumed that the software is authentic and it is the approved version. The software changes are recorded in a sealed event logger. Subsequently, it can be asserted by means of the event logger, if all registered versions had been approved for this measuring system (Table 3-1, (a), (b); Table 3-2, (f), (g)).

III) When using a PC-based FOCD with encoded measuring data transfer, a seal must be broken, to use a new software version on the PC (see 3.2.1). Thereby, legal control is possible (Table 3-2, (f), (g), (i), (k)).

3.1.4.2 Fixed software components

Fixed software components consist of non-loadable program parts and data. With respect to software download, fixed software components have the following functions:

- Automatic prevention of measurements during loading, unless a correct measurement can be guaranteed,
- Check of memory capacity of the event logger,
- Prevention of download if memory capacity of the event logger is depleted,
- If loading occurs via communication channels: Dial up to the server,
- Automatic buffering of received software,
- Automatic authenticity and integrity check of the software, query of the user's agreement,
- Recording of all essential events and test results by the event logger for subsequent download monitoring,
- Automatic software installation in a secure memory space,
- Initiation of suitable error-handling routines, if need be,

	Download requirements fulfilled? (Chapter 3.1.4)				
	Yes		No		
	Software separation? (s. 3.1.1.2A) - C))		Software separation? (s. 3.1.1.2A) - C))		
	Yes	No	Yes		No
			Mechanical securing of the parameters and legally relevant programs?		
			Yes	No	
Securing of the complete software. Loading and hardware exchange only possible by breaking a seal			×		×
Loading of *non-legally relevant software* without registration or breaking the seal possible	×				
Loading of *legally relevant software* (including non-legally relevant software) possible with registration	×	×			
	(a)	(b)	(c)	(d)	(e)

Table 3-1 Software exchange for transducers or FOCDs (no PC)

- If loading is performed via public communication channels without the presence of a verification officer or maintenance clerk: dialing up enabling a remote control by the verification authority.

Fixed software components also include the legally relevant data and parameters which shall not be changed without breaking a seal:

- Key for verification of integrity and authenticity of loaded software,
- Key of encoded data transfer according to requirement 3.2.1,
- When loading via communication channels: Internet addresses, network-card address, telephone number of modem, server password etc.,
- Metrological parameters.

Fixed software components cannot be realized on a standard PC without additional hardware. Normally, these components reside in the transducer.

3.1.4.3 Authenticity and integrity

Authenticity

Here authenticity of the loaded software means that it is a version designated by the holder of the approval for the relevant instrument. It is assumed that the holder only supplies approved versions as legally relevant software components, since he as holder is responsible for the conformity between the entire exhaust-gas analyzer and the approved type.

Technical protection measures cannot prevent the holder of the approval from making software available for loading which has not been approved. They shall, however, ensure that the instrument itself recognizes whether a loaded software module originates from the holder or whether it is a deceptive simulation by an intruder. This can be realized by cryptographic measures such as signing with a public key system, assuming that the approval holder has the secret key and keeps it confidential.

	Download requirements fulfilled? (Chapter 3.1.4)					
	Yes			No		
	IT security against unauthorized software exchange OK? (Chapter 3.2.1)			IT security against unauthorized software exchange OK? (Chapter 3.2.1)		
	Yes		No	Yes		No
	Software-separation? (s. 3.1.1.2 A) or B))			Software-separation? (s. 3.1.1.2 A) or B))		
	Yes	No		Yes	No	
Securing. Loading and hardware exchange only possible by breaking a seal			×			×
Loading of *non-legally relevant software* possible without registration or breaking a seal	×			×		
Loading of *legally relevant software* (including non-legally relevant software) possible with registration	×	×				
Exchange of FOCD hardware possible without registration or breaking a seal	×	×		×	×	
	(f)	(g)	(h)	(i)	(k)	(l)

Table 3-2 Software and hardware exchange (for FOCDs) based on a universal computer (e.g. a PC)

Integrity

Integrity means that loaded software has not been changed during transport, transmission, or loading.

3.1.4.4 Provisions for metrological monitoring

The verification authorities must be able, by technical means, to trace back all legally relevant loading processes.

These can be realized e.g. by means of an event logger with the following characteristics:

- Automatic storage of date, time, and identification of the loaded legally relevant software and an identification of the loader,
- If memory capacity is depleted, the fixed software component in the measuring instrument prevents a further download,
- Only by breaking a seal can the event logger memory be erased,
- The program governing the event logger entries is part of the fixed non-downloadable software component (see 3.1.4.2),
- Only an approved program displays the registry of the event logger.

It is important that the verification authorities, when downloading via internet or modem, have the possibility to control the registry of the event logger via internet or modem. The measuring instrument's corresponding internet address or telephone number of its modem must be supplied to the verification authorities including, if needed, suitable software for communication with the measuring instrument.

3.1.4.5 Agreement of the user

The user is responsible for the measuring instrument, once he holds it ready for use or puts it into service. When all steps to release and download are accomplished, the readiness for download of the measuring system must be obvious. The release is only valid for one download with a certain time limit.

3.2 Additional requirements for the exchange of subassemblies

3.2.1 Prevention of unauthorized loading of legally relevant software

The metrological characteristics of an exhaust-gas analyzer must not be changeable after verification without being traceable. The mentioned requirement takes into account especially universal computers which are used as FOCD. For FOCDs, an acceptable solution is described in 3.2.1.1. The features to be considered for an exhaust-gas analyzer are described in chapter 3.2.1.2.

3.2.1.1 Prevention of unauthorized software loading for FOCD with universal computer

An FOCD is often realized with a universal computer, that normally allows loading of software at any time. In 3.1.4.1 the alternatives I), II), and III) are distinguished: for I), software loading is completely prevented by sealing, for II) and III) loading is possible. The following solution refers to II) and III). Figure 5 shows the data path of measured values in a system under consideration.

Encoded data of measurement values are transferred from the transducer to the legally relevant FOCD software on the universal computer, meaning that only this FOCD software can process the measurement values. Other PC software, which cannot establish a communication with the transducer since the key is unknown, cannot be used for the measuring purpose.

The use of the keys can be configured conveniently if the check sum of the FOCD software or a value derived from it is used as a key. Thereby, on the PC no key must be stored. If new FOCD software is installed on the PC, the new key of the FOCD software derived from the check sum must be stored in the transducer and must be sealed.

If a new FOCD software version is installed, a re-verification must be carried out since the new key applied by the FOCD software is not suitable for decoding data of the transducer being encoded by the old key. It is assumed that the holder of the approval arranges for a new key for decoding values measured for each new software version. It is laid down in the approval, whether and when the FOCD software can be changed without implementing a new key.

The quality of the encoding must be high enough that it is impossible to expediently manipulate the values measured despite encoding, for example when using an editor program.

If an exhaust-gas analyzer is protected against unauthorized exchange of the legally relevant FOCD software as described, vice versa, the hardware of the FOCD as well can be exchanged without re-verification, as the protective mechanism is independent of the hardware. The terms stated in 2.3 have to be taken into account.

3.2.1.2 Prevention of unauthorized software loading for components on the basis of a micro-controller circuit

For transducer units and FOCDs not including a universal computer and therefore not having features for which the software loading is required, the fulfillment of the download requirements guarantees that unauthorized loading is impossible. Even if not all of these download requirements are fulfilled, loading of non-legally relevant software is acceptable under the following conditions (Table 3-1, column (c)):

1) Software is separated according to chapter 3.1.1.2. It was proven that any downloaded non-legally relevant program cannot affect the functions of the legally relevant part.
2) Legally relevant data and programs are protected against manipulation or exchange by means of mechanical sealing.
3) It is confirmed in the approval that loading of non-legally relevant software is allowed.

Alternatively, loading of non-legally relevant software must be prevented by sealing (Table 3-1, columns (d) and (e)).

3.2.2 Additional specifications required by the manufacturer

If the FOCD is designed as "universal" hardware (e.g. computer), the manufacturer must lay down in the instructions for use the necessary characteristics of the hardware for proper operation of the exhaust-gas analyzer. Specifications on the following items are particularly necessary:

- minimum efficiency pulse frequency of the computer hardware,
- minimum memory equipment, if necessary, specification of technology,
- minimum equipment of interfaces, drives etc.,
- requirements on video card,
- description of operating system and its version number,
- necessary low-level drivers,
- CE sign of PC components.

This requirement is described in detail in connection with software loading in chapter 3.2.1.

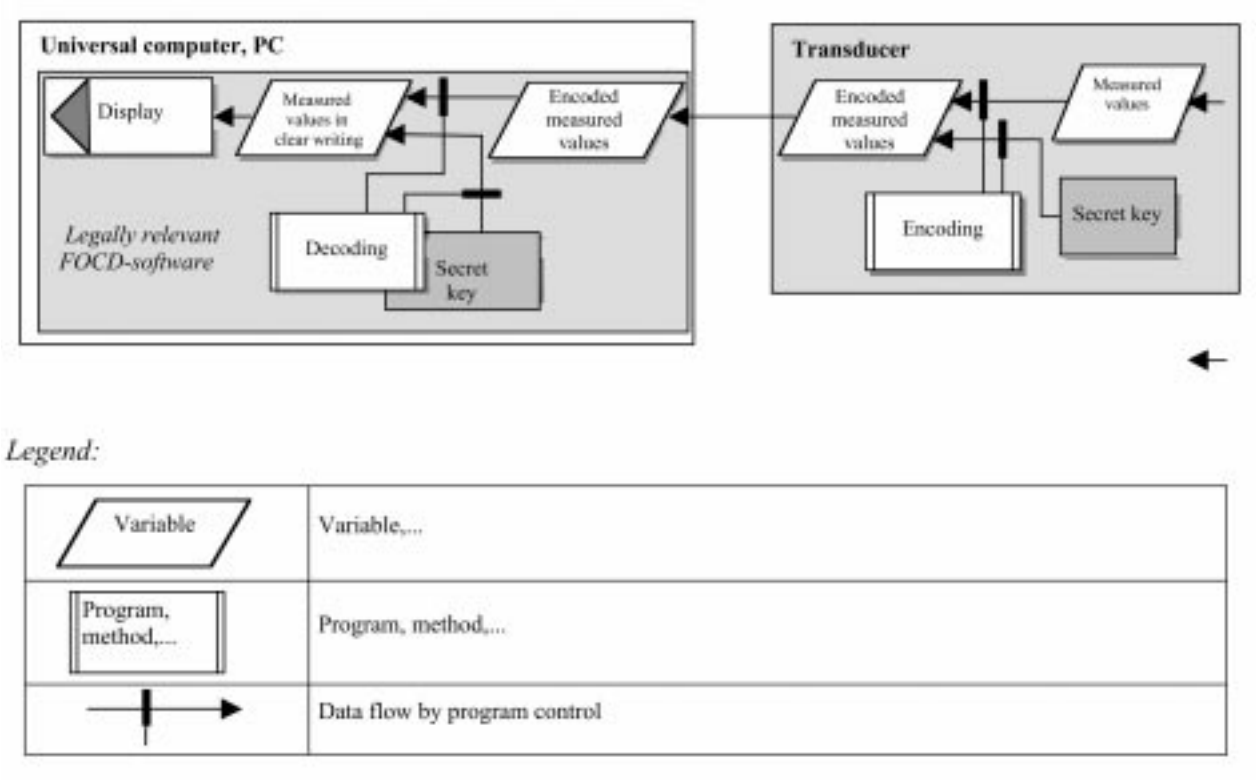


Fig. 5 Securing of legally relevant FOCD software against unauthorized exchange

4 Summary

Exhaust-gas analyzers have evolved during approximately 20 years from stand-alone measuring instruments to complex computer-aided measuring systems, which are often connected to data networks. In order to guarantee the accuracy and reliability of measurements, even if modern cost-saving exchange concepts take place, the requirements described had to be defined. The extensive MID software requirements acted as a basis so that only a small number of additional requirements had to be defined.

Meanwhile, a first measuring system based on exchangeable subassemblies was approved by the PTB. Verification officers were correspondingly advised on the new special features of the new concept and are now able to perform verifications and re-verifications. Other manufacturers have shown an interest in the realization of the new concept for their products. As many manufacturers market Europe-wide and to some extent also world-wide, it can be conceived that in other countries corresponding notified bodies are as well approached with this development. Therefore, the authors are prepared to disseminate experience gained in Germany or to perform an international exchange of experience.

After the MID will have been introduced in October 2006, it remains to be seen in which way the different notified bodies will act with respect to conformity assessment for new exhaust-gas analyzers and which possibilities will arise, concerning a possible nationally required re-verification. ■

5 References

[1] OIML R 99/ISO 3930:2000(E) "Instruments for measuring vehicle exhaust emissions"

[2] www.mid-software.org

[3] www.welmec.org

[4] IEC 61131-3:2003(E) "Programmable controllers - Part 3: Programming languages"

AIR QUALITY MONITORING

The role of the French Central Laboratory

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1 Abstract

In France, four institutions support the national air quality monitoring system:

- **The Ministry of the Environment** which is responsible for drawing up the regulations and monitoring policy;
- **ADEME** (Government Agency for Environment and Energy Management) which is mandated to co-ordinate the technical aspects of the monitoring system;
- **AASQA** (Air Quality Monitoring Associations) which is a network of non profit-making associations approved by the Government and which establish monitoring measurements either at local, departmental or regional level; and
- **LCSQA** (Central Laboratory for Air Quality Monitoring) which is responsible for providing technical assistance and support to the AASQA. It notably has the mission to develop a national traceability chain concerning classical and regulated substances.

On 30 December 1996, the French government adopted an Act of Parliament (called "LAURE") that specifically addresses air quality monitoring. Today, the national system comprises more than 700 fixed stations equipped with over 2000 automatic analyzers and other measuring instruments.

Since then, the LCSQA has continued to grow to include new research fields, new instruments and new skills. In particular, LCSQA has to pay attention to subjects giving cause for concern such as "new" pollutants (PAH, VOC, heavy metals, pesticides) and new tools used as prediction tools to provide "pollution maps".

2 Introduction

The ambient air quality is an issue which concerns everybody. The 2003 summer heat wave and resulting incidents of high ozone pollution in France and the south east of England showed the extent to which high levels of air pollution generated health problems, especially those more at risk such as children and the elderly.

The "LAURE" Act lays down regulations for preventing, monitoring, reducing or eliminating atmospheric pollution and the goals aimed at to preserve the quality of the air. Because of this new Act, it was decided to strengthen the existing national laboratory structure (i.e. the LCSQA, created in 1991) to bring together all the technical skills available in the field of air quality issues. These competencies provide the capability to carry out the LCSQA's broad mission and the flexibility to respond to changing and evolving national or European priorities.

3 The Central Laboratory for Air Quality Monitoring

Three national laboratories are involved in the LCSQA organization: the LNE (Laboratoire National de Métrologie et d'Essais), the EMD (Ecole des Mines de Douai) and the INERIS (Institut National de l'Environnement Industriel et des Risques).

Each laboratory is responsible of one or two main missions in the framework of the annual or pluri annual program of research and studies developed with the Ministry of Ecology, the ADEME and the AASQA.

For example, the LNE is responsible for the topic "Quality assurance", INERIS is in particular responsible for "cartography and modeling", and the EMD is responsible for the topic "Particles".

4 LCSQA missions

The role of the LCSQA structure is to:

- Carry out technical and experimental studies in the framework of the National Air Quality Monitoring program;
- Improve the quality of measurements;
- Develop and harmonize the methods and the tools used in the local or regional laboratories; and
- Take part in national and international standardization.

5 Traceability of measurements

One of the main roles of the LNE in the LCSQA structure is to ensure the good quality and reliability of measurements on a long-term basis:

- To develop, maintain and improve national references;
- To maintain the agreement and good coherence of references with other National Metrology Institutes;
- To organize and implement traceability from field measurements to high metrological level references, through the national traceability chain; and
- To perform uncertainty analysis calculations.

6 Description of the LCSQA national traceability chain

Figure 1 shows the French calibration chain structure for measurements. Each metrological level is linked to an official body, which recognizes the quality of the calibrations and measurements.

At level 1, the national reference level, a link is assured within the CIPM (Comité International des Poids et Mesures): international comparisons by the Comité Consultatif pour la Qualité de Matière (CCQM) with the CIPM Mutual Recognition Arrangement (CIPM MRA) and European comparisons by EUROMET.

At level 2, for the AASQA regional laboratories, the French accreditation body (COFRAC) delivers ISO 17025 accreditation for the calibrations. To date, the majority of the seven "level 2" laboratories are accredited by COFRAC.

At level 3, for the measurement stations, the French Ministry of Ecology does not impose any accreditation but some AASQA stations nevertheless choose to be accredited.

The national traceability chain is applied within the French territory and the distribution of the seven regional laboratories is represented in Fig. 2.

The national calibration chain is a highly important tool to perform the data quality objectives fixed by European Directive 1999/30/EC. The whole of France is covered, and additional coverage for overseas departments is in progress for four pollutants: sulphur dioxide (SO_2), nitrogen oxides (NO/NO_X), carbon monoxide (CO) and ozone (O_3). For benzene (C_6H_6), there is a direct transfer standard between Level 1 and Level 2 and calibration operations take place every three months.

Figure 3 describes the metrological connection between the three levels of the traceability chain.

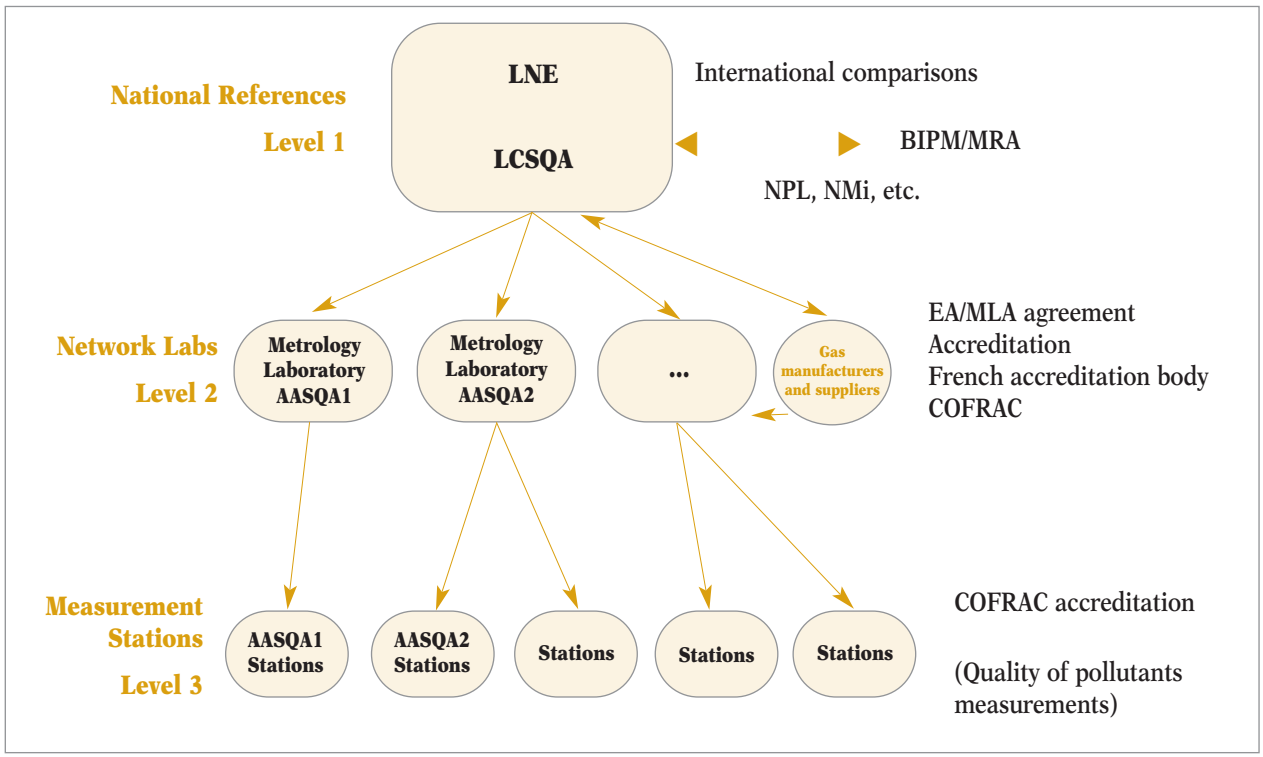


Figure 1 The traceability chain

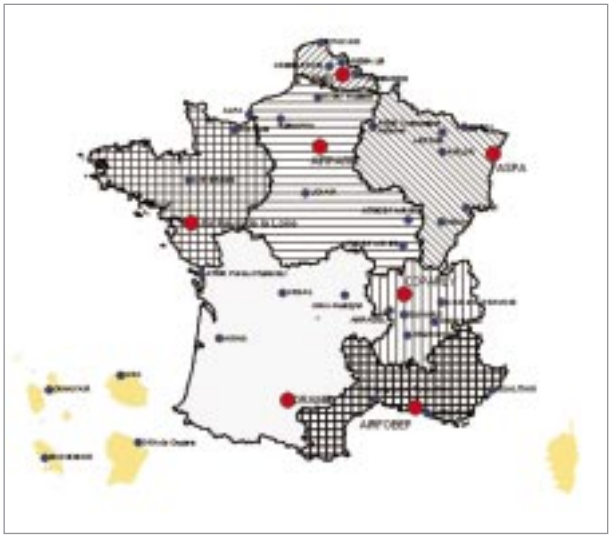


Figure 2 The seven regional laboratories

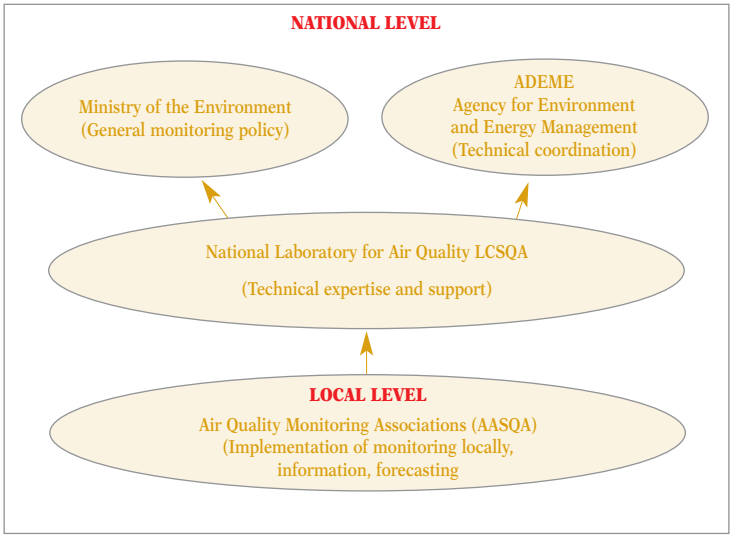


Figure 4 Schematic view of the French ambient air monitoring system

In practice and periodically (every 3 months), the transfer standards circulate between the three laboratory levels.

For example, the Level 2 laboratory sends to the Level 1 laboratory (LNE) a cylinder containing compressed gas at a particular concentration (generally given by a gas manufacturer). The Level 1 laboratory provides the concentration of gas and the uncertainty of measurement to the Level 2 laboratory. Thus, the Level 2 laboratory has a standard of reference connected to Level 1.

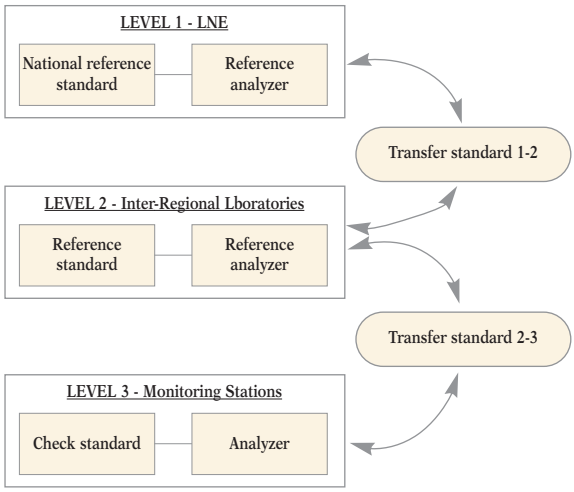


Figure 3 Transfer standards for the three levels

Then the Level 3 laboratory sends a cylinder of compressed gas at a particular concentration (generally given by a gas manufacturer) to the Level 2 laboratory, which in turn provides the value of the gas concentration and the uncertainty of measurement to the Level 3 laboratory.

In the case of ozone measurements, the transfer standard is a piece of apparatus: an ozone generator.

7 Organization of ambient air monitoring

Figure 4 shows a schematic diagram of the national and regional levels implemented in the framework of the air monitoring.

At national level

At national level, the two national organizations (Ministry of the Environment and the Agency for Environment and Energy Management) are the major actors in the monitoring of the air quality: the Ministry of the Environment is responsible for drawing up regulations and operating the air quality monitoring network, and the Agency for Environment and Energy Management is involved in the technical coordination of the research programs and studies.

The ADEME plays a role in harmonizing the metrology of measurement devices, the chain of data acquisition (acquisition stations, control language, central processors and the Air Quality Database host unit), and in data processing.

At local level

The 38 certified monitoring organizations consist of four types of partners: national government, the territorial communities, the emitters (carriers, industrial establishments, etc.) and the AASQA organizations. Each organization manages one or more measurement networks composed of stations. These stations are equipped with one or more analyzers, which automatically and regularly measure one or more specific pollutants and in some case other parameters (weather, vehicle counts, etc). The stations are located at sites representative of different types of exposure. The results are transmitted automatically to the central computers of the certified organizations where they are validated, analyzed and distributed over servers (Internet, responders, etc).

8 Regulations

European Directives

The adoption in 1996 of the framework Directive on assessment and management of air quality can be considered as a major development in the field of air quality. This Directive introduces a general framework dealing with a larger list of air pollutants in a common way and retains the idea of the ozone Directive of obliging authorities to provide adequate information on pollution levels to the public and even to alert people in the event of pollution exceeding a certain short-term threshold.

Details of the air quality standards and specific monitoring strategies for the various pollutants are subjects of a series of "daughter Directives".

The first of the new daughter Directives (99/30/EC) with revised limit values for SO_2, fine particulate matter (PM 10: particulate matter with an effective diameter of ten micrometers or less, "inhalable" particles), NO_2 and lead came into force in 1999.

The second daughter Directive (2000/69/EC) relating to limit values for benzene and carbon monoxide came into force on 13 December 2000.

The third daughter Directive relating to ozone (2002/3/EC) was adopted on 12 February 2002 and sets long-term objectives equivalent to the World Health Organization's guideline values and target values for ozone in ambient air to be attained where possible by 2010.

The fourth and final daughter Directive (2004/107/EC) relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air was adopted on December 2004.

The French Air Act and implementation decrees

The adoption of a new French Air Act on 30 December 1996 and its implementation decrees gave a new impulse to the assessment and management of air quality in France, setting the preventive, monitoring, reduction or suppression of atmospheric pollution objectives and the goals for preserving air quality. As an example, the "Monitoring" part indicated that monitoring equipment must be installed:

- By 1/1/97 in cities > 250 000 inhabitants
- By 1/1/98 in cities > 100 000 inhabitants
- By 1/1/2000 all the nationwide territory should be covered.

9 Monitoring programs

In the framework of the national monitoring of air quality, classical and regulated substances are measured at a field level in each of the stations managed by the AASQA. In particular, the following substances are included in the annual programs:

- Sulphur dioxide - SO_2 (UV fluorescence)
- Nitrogen oxide - NO_2 (chemiluminescence)
- Carbon monoxide - CO (IR correlation)
- Ozone - O_3 (UV absorption)
- Benzene - C_6H_6 (Gas chromatography BTX)
- PM 10 (beta attenuation, TEOM microbalance)
- Lead (automatic samplers)

10 New Programs

The new programs of air quality monitoring are the direct consequence of the European Directives. Nevertheless, some specific pollutants can be monitored in the regional areas concerned. Moreover, new studies on the toxicity of certain organic compounds (PAH, VOC, pesticides), minerals or particles can involve specific monitoring if necessary. For example:

- Heavy metals (Ni, Cd, As)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Volatile Organic Compounds (VOCs)
- Fine particles (PM 2.5)
- Pesticides
- Mercury (Hg)

11 Various instruments

Nationally used devices for monitoring the ambient air quality are equipped with tools complementary to the measurements of traditional parameters (SO_2, NO/NO_X, CO, O_3, etc.). In particular, the national air quality network is equipped with:

- Passive samplers (more than 1000 sites investigated in 2001)
- Mobile labs: 1 unit per region
- Models: real time mapping of traffic pollution, ozone forecast, scenarios, etc. (emissions)

12 Air Quality Index: ATMO index

The Decree of 10 January 2000 relative to the air-quality index represents an important element in the policy on air-quality management, and provides definitions of the ATMO index and the recommendations required for its calculation. The effort provided by the Ministry of the Environment, the ADEME and the monitoring agencies, made possible the definition of a single index for whole large urban areas (> 100,000 inhabitants). The index gives explanations in a common language easily understandable to a non-specialist public, which can now understand the overall air quality in different urban areas.

As is the case for all aggregate indicators of the same kind, the ATMO index is designed as a tool that makes it possible to translate in a quantitative and simple way the synthesis of numerous measurement data recorded daily by official air quality monitoring agencies (AASQA).

Criteria used to provide the ATMO index are:

- In urban and suburban sites;
- Daily;
- 4 pollutants (SO_2, NO_2, O_3, particles);
- 2 urban sites per pollutant;
- The index is the highest of the four sub-indices;
- 10 levels (index 1 "very good" to index 10 "very bad").

13 Future directions and conclusions

For the LCSQA the coming years will be crucial for giving to its structure a new impulse and higher visibility at national and international levels.

Moreover, it will have to pay attention to new subjects of concern:

- Indoor air;
- "New pollutants" to be monitored (PM10/2.5, PAH, VOC, Metals, POP, etc.) with a constant issue on which type of traceability chains to set up;
- Ozone (O_3) threshold alert related to meteorological events (a heat-wave for example);
- To consolidate the national prediction and observation devices, overlapping the means of measurement with data and tools of simulation;
- Developing a prediction platform providing maps of ozone at national level;
- Maintaining a high level of confidence in all measurements: classical and new pollutants.

The LCSQA has now reached a level of maturity which enables the operational structure to acquire a real identity with the national systems for monitoring the quality of ambient air. Its technical bases are now solid and reliable. Nevertheless, the LCSQA has to deploy its competences in a national context where financial resources are limited.

Today, important work is being carried out to give to the LCSQA a new national and international dimension. ■

FOCUS

Thailand: Progress in legal metrology

MANFRED KOCHSIEK
CIML Vice-President
Physikalisch-Technische Bundesanstalt (PTB)
Braunschweig, Germany

Picture 1

Picture 2

Picture 3

Thailand, an OIML Corresponding Member, is an emerging economy in South East Asia with 62 million inhabitants, and benefits from a large agricultural area measuring 2000 km North–South by 800 km East–West; its GNP in 2004 was approximately 2000 USD per capita. A further increase in GNP of about 40 % is expected within the next five years.

CIML Vice-President Manfred Kochsiek was invited to the opening ceremony of the Eastern Verification Center (Chonburi), since Germany has been promoting the development of legal metrology in Thailand for ten years (129 months of expert training with consultation and installations).

In Thailand, responsibility for legal metrology falls under the Department of Internal Trade. There are five verification centers: Bangkok, Chiang Mai, Khon Kaen, Chonburi and Surat Thani. Of these five, four are fully equipped and can now successfully fulfill their tasks, e.g. verification of scales, gas pumps, LPG, medical measuring units, humidity meters, pre-package control, etc.

In total there are 160 trained verification officers with technical or scientific qualifications who are supported by a further 160 assistants.

Picture 1 shows Mr. Siripol (2nd from the left), General Director of the Department of Internal Trade, and Manfred Kochsiek (2nd from the right) during the opening ceremony. The Director of the Central Bureau of Weights and Measures (CBWM) is Mr. Verasak. With Germany's support, Thailand has now also started to organize regional workshops for the neighboring countries.

The regional activities of the CBWM in the context of the Association of Southeast Asian Nations (ASEAN) has become a new priority and on Thailand's initiative the Working Group for Legal Metrology (WGLM) was founded.

In 2003 and 2004 the CBWM organized ASEAN seminars concerning questions of harmonization of prepackage control regulations in the region with the support of a German expert.

Approximately 100 experts from industry and from various authorities in Thailand are now being trained per year; for example one recent training session in December 2004 concerned prepackage control.

Manfred Kochsiek's visit ended with visits within the country, including a scale manufacturer and the National Metrology Institute (NIMT).

Concerning work with developing countries, two observations were made:

- In OIML R 76, nowadays mainly only electronic nonautomatic weighing instruments are dealt with; and
- Following the withdrawal of the old OIML R 3 and R 28 in 1988, verification officers from developing countries frequently ask questions about guidelines for mechanical scales.

The scale manufacturer visited near Bangkok is a family enterprise with 50 employees, with a production of spring scales (max. 30 kg and 60 kg); there is only one type. Approx. 60.000 scales are manufactured per year which are verified in the factory (for Thailand). This type of scale is also exported to Malaysia, Laos and Cambodia. Picture 2 shows the owner with leading verification officers in front of several hundred scales which are ready for verification. More than 400.000 mechanical scales are produced in Thailand each year.

Picture 3 shows a public scale in a free market (max. 6 kg) and a 1 kg control weight (both were verified in April 2004) for market shoppers, who can check the goods bought by themselves with regard to their weight.

Since in Thailand over one million mechanical scales are in use, it is suggested that the OIML should publish a verification guide as an aid for verification officers.

Discussions with the General Director led to expect that in 2005 Thailand will apply to become an OIML Member State, and both the PTB and the BIML will continue to monitor legal metrology activities in this country and offer every assistance possible. ■

OIML Certificate System:
Certificates registered 2005.02–2005.04
Up to date information (including B 3): www.oiml.org

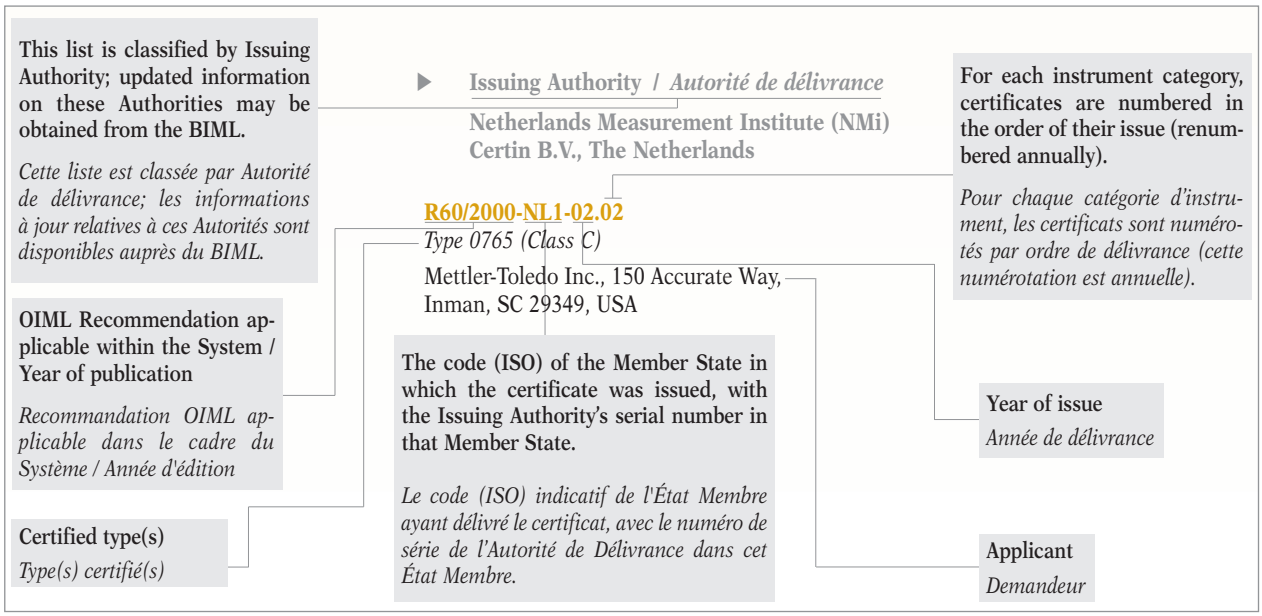
The *OIML Certificate System for Measuring Instruments* was introduced in 1991 to facilitate administrative procedures and lower costs associated with the international trade of measuring instruments subject to legal requirements.

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

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

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

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



Système de Certificats OIML:
Certificats enregistrés 2005.02–2005.04
Informations à jour (y compris le B 3): www.oiml.org

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

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

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

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

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

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Diaphragm gas meters
Compteurs de gaz à parois déformables

R 31 (1995)

▶ Issuing Authority / *Autorité de délivrance*

Netherlands Measurement Institute (NMi) Certin B.V., The Netherlands

R031/1995-NL1-2002.01 Rev. 10
Diaphragm gas meter

Wizit Co. Ltd, 53B 5L Namdong Industrial Complex, Gojang-Dong, Namdong-Gu, Incheon, Korea (R.)

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

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

R 51 (1996)

▶ Issuing Authority / *Autorité de délivrance*

Inspecta Oy, Finland

R051/1996-FI-2004.01
Automatic catchweighing instrument in shovel dozers PKV Pro xxx or YES xxx

Tamtron Oy, Vehnämyllynkatu 18, FIN-33700 Tampere, Finland

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R051/1996-DE1-2003.03 Rev. 1
Automatic catchweighing instrument Types EWK xyz and SYNUS xx

Sartorius A.G., Postfach 32 43, D-37070 Göttingen, Germany

R051/1996-DE1-2004.06
Automatic Catchweighing Instrument

Deltapack Verpackungsmaschinen GmbH & Co. KG, Weissenburgring 23, D-35415 Pohlheim, Germany

R051/1996-DE1-2004.07
Automatic Catchweighing Instrument Type DornerSteuerung FB

Dorner Electronic GmbH, Kohlgrub 914, A-6863 Egg, Austria

R051/1996-DE1-2005.03
Automatic Catchweighing Instrument Types EWK xyz WZG and SYNUS xx WZG

Sartorius Aachen GmbH & Co. KG, Am Gut Wolf 11, D-52070 Aachen, Germany

▶ Issuing Authority / *Autorité de délivrance*

DANAK The Danish Accreditation and Metrology Fund, Denmark

R051/1996-DK1-2005.01
Automatic Checkweighing Instrument Types ECS Check Weigher, ECS Filling Machine & ECS Weight Correction Machine

Kosan Crisplant A/S, P.O. Pedersens Vej 22, DK-8200 Aarhus N, Denmark

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*

National Weights and Measures Laboratory (NWML), United Kingdom

R060/1991-GB1-1995.01 Rev. 1
Load Cell Model N° Sensortronics 60001 C

Vishay Transducers, 677 Arrow Grand Circle, CA 91722 Covina, United States

R060/2000-GB1-2001.01 Rev. 2
Single Ended Shear Beam (bending) strain gauge load cell

Thames-Side Maywood Ltd., 17 Stadium Way, Tilehurst, Reading RG30 6BX, Berkshire, United Kingdom

R060/2000-GB1-2005.03
Single Ended Shear Beam (bending) strain gauge load cell

P.M. On Board Ltd., Airedale House, Canal Road, Bradford BD2 1AG, United Kingdom

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R060/2000-DE1-2005.01
Wägezelle - Type: 672

Revere Transducers Europe BV, Ramshoorn 7, NL-4824 AG Breda, The Netherlands

R060/2000-DE1-2005.02
Strain Gauge shear beam load cell

Gicam S.N.C Di Carrara Danilo & Co, Piazza XI Febbraio 2, I-22015 Gravedona (CO), Italy

▶ Issuing Authority / *Autorité de délivrance*

Russian Research Institute for Metrological Service (VNIIMS) of Gosstandart of Russian Federation, Russian Federation

R060/2000-RU1-2005.01
Type LT 5C

Puls Electronik Sistemleri, MAK. SAN. IC VE DIS TIC. LTD. STI., Adnan Kahvecl Cad. Kos Koop, Sanayi Sitesi 2, Blok N° 9, Omerli - Hadimköy - Catalca, Istanbul, Turkey

R060/2000-RU1-2005.02
Type ST-2W

Puls Electronik Sistemleri, MAK. SAN. IC VE DIS TIC. LTD. STI., Adnan Kahvecl Cad. Kos Koop, Sanayi Sitesi 2, Blok N° 9, Omerli - Hadimköy - Catalca, Istanbul, Turkey

R060/2000-RU1-2005.03
Type RT-3C

Puls Electronik Sistemleri, MAK. SAN. IC VE DIS TIC. LTD. STI., Adnan Kahvecl Cad. Kos Koop, Sanayi Sitesi 2, Blok N° 9, Omerli - Hadimköy - Catalca, Istanbul, Turkey

R060/2000-RU1-2005.04
Type PS-4X

Puls Electronik Sistemleri, MAK. SAN. IC VE DIS TIC. LTD. STI., Adnan Kahvecl Cad. Kos Koop, Sanayi Sitesi 2, Blok N° 9, Omerli - Hadimköy - Catalca, Istanbul, Turkey

▶ Issuing Authority / *Autorité de délivrance*

DANAK The Danish Accreditation and Metrology Fund, Denmark

R060/2000-DK1-2004.05
Single Point, strain gauge load cell Type TSSP-200KGW

Cardinal Scale Manufacturing Co., 203 East Daugherty St., 64870 Missouri, Webb City, Missouri, United States

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Automatic gravimetric filling instruments
Doseuses pondérales à fonctionnement automatique

R 61 (1996)

▶ Issuing Authority / *Autorité de délivrance*

Centro Español de Metrologia, Spain

R061/1996-ES1-2004.01
Automatic gravimetric filling instrument, type "EWC+"

Payper S.A., Pol. ind. "El Segre", par. 115 (Apdo. 380), 25080 LLeida, Spain

R061/1996-ES1-2004.02
Automatic gravimetric filling instrument, type "PD"

Roda Packing S.A., Camino Albalat. s/n; Apartado 89, 46600 Alzira-Valencia, Spain

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R061/1996-DE1-2004.06 Rev. 1
Automatic Gravimetric Filling Instrument Type VELOTRONIK HS IV

Greif-Velox Maschinenfabrik GmbH, Kronsforder Landstr. 177, D-23560 Lübeck, Germany

R061/2004-DE1-2005.01
Automatic Gravimetric Filling Instrument

Feige GmbH Abfülltechnik, Rögen 6a, D-23843 Bad Oldesloe, 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*

Netherlands Measurement Institute (NMi) Certin B.V., The Netherlands

R076/1992-NL1-2005.01
Type NE-Series
SNOWREX International Co., Ltd., 2F No. 9, Lane 50, Sec. 3, Nan-Kang Road, Taipei, Chinese Taipei

R076/1992-NL1-2005.02
Type: XC..L/C..L series and XC.. M series
Mettler-Toledo (Changzhou) Scale & System Ltd., 111 Changxi Road, Changzhou, Jiangsu 213001, China

R076/1992-NL1-2005.03
Type HL-3000...WP
A&D Instruments Ltd., 24 Blacklands Way, Abingdon Business Park, Abingdon OX14 1DY, Oxfordshire, United Kingdom

R076/1992-NL1-2005.04
Type: MS2xxx
Metrologic Instruments Inc., 90 Coles Road, NJ 08012-4683 Blackwood, United States

R076/1992-NL1-2005.05
Type: HL122, L122, H205, H303, H305 & H400
Avery Weigh-Tronix, Foundry Lane, Smethwick B66 2LP, West Midlands, United Kingdom

R076/1992-NL1-2005.06
Type: XS... or XP...
Mettler-Toledo GmbH, Im Langacher, CH-8606 Greifensee, Switzerland

R076/1992-NL1-2005.07
Type: SW-1S/1C
CAS Corporation, CAS Factory # 19 Kanap-ri, Kwangjuk-Myon, Yangju-kun, Kyungki-Do, Korea (R.)

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R076/1992-DE1-04.07
Non-automatic electromechanical weighing instrument Type AV...
Ohaus Corporation, 19A Chapin Road, 07058 New Jersey, Pine Brook, New Jersey, United States

R076/1992-DE1-1998.01
Non-automatic electromechanical weighing instrument - Type: SAW ...C/II
IRD Inc., International Road Dynamics, 702-43 rd Street East, S7K 3T9 Saskatoon, Saskatchewan, Canada

R076/1992-DE1-1998.01 Rev. 1
Non-automatic electromechanical weighing instrument Type SAW ... C/II
IRD Inc., International Road Dynamics, 702-43 rd Street East, S7K 3T9 Saskatoon, Saskatchewan, Canada

R076/1992-DE1-2000.04 Rev.1
Non-automatic electromechanical weighing instrument Type DISOMAT B plus
Schenk Process GmbH, Landwehrstraße 55, D-64293 Darmstadt, Germany

R076/1992-DE1-2003.03 Rev. 2
Non-automatic electromechanical weighing instrument with or without lever works - Type: PL...-S, JL-C/JL-G
Mettler-Toledo GmbH, Im Langacher, CH-8606 Greifensee, Switzerland

R076/1992-DE1-2004.08
Non-automatic platform-, hopper-, wall-mounted- or overhead track scale, Type F805
A.S.T. Angewandte System-Technik GmbH, Marschnerstrasse 26, D-01307 Dresden, Germany

R076/1992-DE1-2004.08
Non-automatic platform-, hopper-, wall-mounted- or overhead track scale, with or without lever system - Type: F805
A.S.T. Angewandte System-Technik GmbH, Marschnerstrasse 26, D-01307 Dresden, Germany

R076/1992-DE1-2005.02
Non-Automatic weighing Instrument with or without lever system, also as multi-interval or multiple range instrument - Type 30xx
Soehnle-Waagen GmbH + Co., Wilhelm-Soehnle-Straße 2, D-71540 Murrhardt, Germany

R076/1992-DE1-2005.03
Non-automatic electromechanical weighing instrument without lever system - Types: SLSC2/SLSC2MR
Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45, D-64293 Darmstadt, Germany

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Automatic level gauges for measuring the level of liquid in fixed storage tanks
Jaugeurs automatiques pour le mesurage des niveaux de liquide dans les réservoirs de stockage fixes

R 85 (1998)

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

R085/1998-NL1-2005.01
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 530 DN 150
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.02
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 530 DN 200
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.03
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 530 DN 250
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.04
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 532 DN 450
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.05
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 533 DN 150
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.06
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 531 DN 150
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.07
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 531 DN 200
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.08
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 531 DN 250
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

R085/1998-NL1-2005.09
Automatic level gauge for measuring the level of liquid in fixed storage tanks, model Micropilot S FMR 531 DN 3050
Endress + Hauser GmbH + Co., Haupstraße 1, D-79689 Maulburg, Germany

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

R117/1995-GB1-2005.01
Fuel dispenser for motor vehicles, Gilbarco China Endeavor series dispensers
Gilbarco-China, Binhe Industrial Zone, Jianshi Rd W, PingGu, 101200 Beijing, China

▶ Issuing Authority / *Autorité de délivrance*

Netherlands Measurement Institute (NMi) Certin B.V., The Netherlands

R117/1995-NL1-2004.04
Fuel Dispenser for Motor Vehicles, model SK700
Gilbarco GmbH & Co. KG, Ferdinand-Henze-Straße 9, D-33154 Salzkotten, Germany

R117/1995-NL1-2005.01
Fuel Dispensers for Motor Vehicles, model QUANTIUM-xxxT (with PAS V2 gas elimination device)
Tokheim RPS, Unit 6320, Industrieweg 5, NL-5531 AD Bladel, The Netherlands

R117/1995-NL1-2005.02
Fuel Dispensers for Motor Vehicles, model QUANTIUM-wwT (with EPZ gas elimination device)
Tokheim RPS, Unit 6320, Industrieweg 5, NL-5531 AD Bladel, The Netherlands

▶ Issuing Authority / *Autorité de délivrance*

Russian Research Institute for Metrological Service (VNIIMS) of Gosstandart of Russian Federation, Russian Federation

R117/1995-RU1-2004.01
L&T Fuel Dispensing Pump SPRINT series/Z-line series PaceMaker-IV series
Larsen & Toubro Ltd, Petrol Dispensing Pumps & Systems, Gate N° 1 "C" Building 1st Floor, Powai works, 400072 Mumbai, India

R117/1995-RU1-2004.02
L&T Flow meters type A for Fuel Dispensing Pump series SPRINT, Z-line and PaceMaker-IV
Larsen & Toubro Ltd, Petrol Dispensing Pumps & Systems, Gate N° 1 "C" Building 1st Floor, Powai works, 400072 Mumbai, India

R117/1995-RU1-2004.03
L&T Flow meters type B for Fuel Dispensing Pump series SPRINT, Z-line and PaceMaker-IV
Larsen & Toubro Ltd, Petrol Dispensing Pumps & Systems, Gate N° 1 "C" Building 1st Floor, Powai works, 400072 Mumbai, India

Updated information on OIML certificates:

www.oiml.org

Assessment of OIML Activities

2004

Contents

Assessment of OIML Activities 2004

1 OIML Member States and Corresponding Members

Member States:	59	(– 1)
Corresponding Members:	50	(+ 1)
Total:	**109**	**(=)**

2 New and revised OIML Recommendations and Documents issued

New Recommendations issued:	2	R 134-2, R 135
Revised Recommendations issued:	5	R 48, R 49-2 & R 49-3, R 52, R 61-1 & R 61-2, R 87
Revised Documents issued:	3	D 8, D 11, D 14
Revised and new Basic Publications issued:	1	B 7, B 8, B 10-1 & B 10-2, B 11, B 12
Other Publications issued:	2	E 3, E 4

	2001	2002	2003	2004
Total number of Recommendations:	114	115	116	116
Total number of Documents:	27	27	27	27
Total number of Vocabularies:	3	3	3	3
Total number of Basic Publications:	-	-	-	12
Total number of other publications:	17	17	19	19

Note : In 2004 all OIML Publications other than R's and D's were reclassified

3 OIML Technical Committees and Subcommittees: Meetings and degree of participation of OIML Members

TC 12 (WG)	29-31 March 2004	Copenhagen	16 P-Members present out of 24 + three O-Members
TC 3/ SC 4	15-16 September 2004	Braunschweig	6 P-Members present out of 13
TC 8/SC 8	11 October 2004	Dordrecht	9 P-Members present out of 21 + two O-Members
TC 8/SC 5	5 October 2004	Paris	11 P-Members present out of 23
TC 17/SC 8 (WG)	25-26 May 2004	Sydney	4 P-Members present out of 10
TC 17/SC 1	20-21 September 2004	Paris	5 P-Members present out of 14

4 Liaisons with other international and regional bodies

BIML representatives participated in the following meetings in 2004:

CIPM - ILAC - OIML	March	BIPM	Annual Joint Meeting
JCDCMAS	March	Geneva	Joint Committee Meeting
WTO TBT Committee	March & November	Geneva	Seminar & Committee Meeting
SADCMEL	April	Mauritius	Committee Meeting
COOMET	May	Varna	Committee Meeting
WELMEC	May	Bratislava	Committee Meeting
EMLMF	June	Malta	Committee Meeting + Legal Metrology Seminar
PTB Workshop	June	Ouagadougou	West Africa Workshop
China Metrology Forum	July	Boao	First Metrology Forum
NCSLI	July	Salt Lake City	Annual Metrology Conference
ISO DEVCO	September	Geneva	Annual Meeting
ISO CASCO	November	Amsterdam	Annual Meeting
UN-ECE WG6	November	Geneva	Annual Meeting

In addition, the CIML President, Vice-President and certain CIML Members represented the OIML at meetings of:

APLMF - EMLMF - EUROMET - ILAC - ISO - SIM - WELMEC

Concerning the various technical activities of ISO, IEC, CEN, CENELEC and the European Commission, OIML experts participated in meetings and/or reports were given for the following fields:

- Water meters
- Acoustic measurements
- Petroleum products
- Electricity meters
- Vehicle exhaust gases

5 Degree of implementation of OIML Recommendations by OIML Members

An inquiry on the implementation of OIML Recommendations was carried out in 2000. In comparison with the previous inquiries (in 1992 and 1996) there was a significant increase in the number of countries implementing individual Recommendations and in the degree of their implementation by individual OIML Members. Based on the inquiry, on additional information and on corrections received from Member States in 2001, the highest performing OIML Recommendations in 2001 were:

R 76, R 35, R 111, R 50, R 31, R 117 and R 51.

A new inquiry on the implementation of OIML Recommendations by Member States and Corresponding Members was carried out in 2004. Unfortunately, replies were only received from 28 Member States which is insufficient to be able to compare results of the degree of implementation of the Recommendations.

6 Categories of measuring instruments covered by the OIML Certificate System

40 categories of measuring instruments are covered by the following OIML Recommendations:

R 16-1 & R 16-2	R 84	R 107	R 126
R 31	R 85	R 110	R 127
R 49	R 88	R 112	R 128
R 50	R 93	R 113	R 129
R 51	R 97	R 114	R 130
R 58	R 98	R 115	R 131
R 60	R 102	R 116	R 132
R 61	R 104	R 117/R 118	R 133
R 65	R 105	R 122	R 134
R 76	R 106	R 123	R 135

Total number of Recommendations applicable within the Certificate System	1999	2000	2001	2002	2003	2004
	28	31	34	38	39	42
		+ 11 %	+ 10 %	+ 12 %	+ 2.6 %	+ 7.7 %

7 Cumulative number of registered OIML Certificates (as at the end of 2004)

Category:			
	Nonautomatic weighing instruments (R 76)	615	≈ 46.2 %
	Load cells (R 60/1991 *Note: Certificates may no longer be issued*)	226	≈ 17.0 %
	Load cells (R 60/2000)	186	≈ 14.0 %
	Automatic catchweighing instruments (R 51)	110	≈ 8.2 %
	Automatic gravimetric filling instruments (R 61)	56	≈ 4.2 %
	Fuel dispensers for motor vehicles (R's 117/118)	47	≈ 3.5 %
	Gas meters (R 31)	24	≈ 1.8 %
	Automatic level gauges (R 85)	24	≈ 1.8 %
	Automatic weighing instruments (R 107)	12	≈ 0.9 %
	Continuous totalizing automatic weighing instruments (R 50)	10	≈ 0.7 %
	Direct mass flow measurement systems (R 106)	9	≈ 0.7 %
	Evidential breath analyzers (R 126)	1	≈ 0.1 %
	Clinical electrical thermometers (R 115)	1	≈ 0.1 %
	Multi-dimensional measuring instruments (R 129)	11	≈ 0.8 %
	Cumulative total, as at the end of 2004	**1331**	

Cumulative number of registered OIML Certificates

1999	2000	2001	2002	2003	2004
582	736	881	1030	1198	1331
	+ 26 %	+ 20 %	+ 17 %	+ 16 %	+ 11 %

360 manufacturers and applicants of measuring instruments from 40 countries have been granted OIML Certificates

8 Degree of acceptance of OIML Certificates by OIML Members

The most recent inquiry on the acceptance of OIML Certificates by OIML Members was carried out by the BIML in 2004 among Issuing Authorities, Member States, Corresponding Members and Manufacturers.

Replies from 26 Member States and five Corresponding Members showed an increase in the voluntary utilization of OIML Certificates for issuing National Type Approvals (11 Member States indicated that they had issued over 330 National Type Approvals for 11 categories of measuring instruments over the past 4-year period utilizing OIML Certificates).

Replies from 48 Manufacturers (15 % of all applicants having received OIML Certificates) showed a good level of Manufacturer satisfaction and an increasing degree of acceptance and/or taking into consideration of OIML Certificates by Member States and Corresponding Members. Those Manufacturers that replied indicated that over 190 Certificates were accepted and over 260 were taken into consideration for issuing National Type Approvals).

9 Distribution of the OIML Bulletin and revenue from the sale of OIML Publications

	2001	2002	2003	2004
Average number of **Bulletins** distributed quarterly	1050	1038	1018	998
		– 1.1 %	– 1.9 %	– 2.0 %
... of which **Bulletin** subscribers	153	161	144	140
		+ 5.2 %	– 10.6 %	– 2.7 %
Sales of **Publications** (EUR)	38 021*	41 500	25 130	16 460**
		+ 9.2 %	– 39.4 %	– 34.5 %

** The figure for 2001 has been converted into Euros*

*** In November 2004 all OIML Publications were made free of charge*

10 Connections to and development of the OIML web site (www.oiml.org)

- 2002: 251 736 pages viewed
- 2003: 380 868 pages viewed
- 2004: 550 165 pages viewed

Note: All figures are per year

11 Activities in support of development

Main activities:

- Forum: Metrology – Trade facilitator? (24 October 2004, Berlin) with 150 participants and associated poster session presenting around 60 posters of metrology needs and offers of assistance;
- OIML Development Council Meeting (25 October 2004, Berlin) with 67 participants;
- OIML Permanent Working Group on Developing Countries (PWGDC) – meetings held:
  - 26 March 2004, Geneva (working group only) – planning activities and Forum;
  - 24 October 2004, Berlin – planning of 2004/5 work program;
  - 27 October 2004, Berlin – finalization of 2004/5 work program;.
- Participation in the Joint Committee on coordination of assistance to Developing Countries in Metrology, Accreditation and Standardization (JCDCMAS) meeting 26 March 2004, Geneva;
- Contacts with international organizations (WTO TBT Committee, ISO DEVCO, UNIDO, etc.), and regional metrology and legal metrology organizations;
- Contacts with the bodies in a number of countries which provide assistance to developing countries (PTB Germany, NWML UK, SdM France, etc.);
- Ongoing participation in a PTB/UNIDO/OIML project in West Africa concerning the development of metrology in the region and participation in a planning workshop held from 15-18 June 2004, Ouagadougou

BIML, June 2005

MAA REPORT

The implementation of the OIML MAA

RÉGINE GAUCHER
MAA Project Leader
BIML

Introduction

The framework of the OIML Mutual Acceptance Arrangement (MAA) is defined in OIML Publications B 10-1 *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations (MAA)* and B 10-2 *Checklists for Issuing Authorities and Testing Laboratories carrying out OIML Type Evaluations* which may both be freely downloaded from the OIML web site.

The aim of the OIML MAA is to develop a voluntary system for mutual confidence and recognition of test results between OIML Members States and Corresponding Members by providing accepted means for assessing competence and test capabilities of testing laboratories such as accreditations or peer assessments.

The MAA is an additional system to the existing OIML Certificate System which, for more than ten years, has facilitated and harmonized the work of national and regional type evaluation bodies and which is helping manufacturers of instruments who are required to obtain type evaluations in various countries in which they intend to sell their products. Manufacturers benefit from OIML Certificates of Conformity which provide evidence that their products comply with the requirements of the relevant OIML Recommendation(s).

The MAA aims to guarantee a higher level of harmonization related to test procedures implemented by testing laboratories which are designated by Issuing Authorities. As an additional system to that of the Certificate System, it may be implemented for categories of measuring instruments whose relevant OIML Recommendations are integrated in the OIML Certificate System, namely OIML Recommendations which specify:

- The applicable metrological and technical requirements;
- The applicable detailed test and examination procedures; and
- The OIML Test Report Format.

Implementation

The implementation of the MAA began in January 2005 and currently covers measuring instruments related to OIML R 60 (Load cells) and OIML R 76 (Nonautomatic weighing instruments) - fields in which a large number of OIML Certificates of Conformity are issued.

The conclusion of the implementation of the MAA for the first category of measuring instruments will lead to the signature of a Declaration of Mutual Confidence (DoMC) which will be signed by all the participants who have to declare whether they are participating either as Issuing Participants or as Utilizing Participants.

An Issuing Participant is an OIML Issuing Authority which issues OIML Certificates. These OIML Certificates validate OIML Test Reports which are issued by the Issuing Participant or by its principal Testing Laboratory. An Issuing Participant is also a Utilizing Participant.

A Utilizing Participant will accept OIML Test Reports validated by OIML Certificates but will not issue any OIML Test Reports or OIML Certificates under the DoMC. A Utilizing Participant may be either a National Issuing Authority, a National Responsible Body, or an OIML Issuing Authority.

The MAA includes an evaluation of the competence and testing facilities of Issuing Authorities and of their subcontracting testing laboratories according to international standards ISO/IEC Guide 65 and ISO/IEC 17025. This evaluation may be carried out either by accreditation or by peer assessments.

Application files for participation are received by the BIML and studied by the Committee on Participation Review (CPR) which decides on how the evaluation of participants shall be conducted.

The CPR is composed of one representative from each participating country (Issuing Participants and Utilizing Participants). CIML Members of participating countries designate their representative in the CPR and the BIML holds the CPR Secretariat. One CPR is normally established per DoMC.

Subcontracting Testing Laboratories (of an Issuing Authority) which perform type evaluation examinations and/or testing, and which are not accredited for those type evaluation tests and examinations as specified by the identified clauses of the applicable OIML Recommendations, shall be assessed by peer assessments

performed by a team of experts. The team shall be composed of at least:

- One expert in quality systems; and
- One expert in legal metrology for the relevant category of measuring instrument.

The experts in legal metrology will be chosen from the list of qualified experts validated by the CPR.

The quality systems experts will be chosen through the National Accreditation Bodies which participate in the ILAC MRA (International Laboratory Accreditation Cooperation Mutual Recognition Arrangement). Discussions have already started between the BIML and ILAC on this matter.

If the accreditations cover the scope of the applicable OIML Recommendations and if an accreditation body which is a full member of ILAC (and which is an ILAC MRA Signatory) has delivered those accreditations, they will be used as the means of assessing the conformance to ISO/IEC 17025 requirements.

Another important issue is that the MAA may take into account national requirements in addition to those of the relevant OIML Recommendations. To be included in the scope of a DoMC, these national requirements have to be evaluated and accepted by the CPR.

Ongoing progress

Nineteen countries have to date requested to participate in the first two Declarations of Mutual Confidence as follows:

	Issuing Participants	Utilizing Participants
R 60 DoMC	6	13
R 76 DoMC	8	11

The CPR has been established and it has been decided to establish only one CPR for these first two DoMCs as their scopes are very similar.

The first meeting of this CPR was held on 15 and 16 June 2005, immediately prior to the 40th CIML Meeting and the conclusions have been posted on the OIML web site: http://www.oiml.org/maa ■

MAA implementation timetable

Date	Step
20/10/2003	Adoption of the MAA by the CIML
20/10/2004	Adoption of complementary provisions by the OIML Conference and the CIML
15/11/2004	Circular to CIML Members and Issuing Authorities
01/03/2005	Deadline for applications
15/04/2005	Constitution of the provisional CPR
30/04/2005	Finalization of the proposed list of technical experts
01/05/2005	Sending of the first meeting's agenda to the provisional CPR's members
15/06/2005	First meeting of the provisional CPR (Two-day meeting to be held on June 15 and 16, 2005)
01/09/2005	Peer assessments process
05/09/2005	Two-day Seminar for assessors in Paris (September 5 and 6, 2005)
15/12/2005	End of peer assessments
15/01/2006	Second meeting of the provisional CPR
31/01/2006	Expected signature of the DoMCs (R 60 and R 76)
15/02/2006	Constitution of the definitive CPR

TC/SC NEWS

OIML TC 8/SC 1 Meeting

Vienna, Austria

21–22 April 2005

GEP ENGLER, Verispect B.V., The Netherlands

Initially, the meeting of OIML TC 8/SC 1 *Static Volume Measurement* was planned for December 2004, but due to the death of Mr. Aart Kooiman from The Netherlands, convener of WG2, it was postponed to 21–22 April 2005.

Before starting discussions, the participants held a minute of silence in commemoration of Aart. Despite his severe illness, he had still managed to prepare new drafts of R 71 and R 85, and he had started to work on the new projects.

This meeting of TC 8/SC 1 was attended by 19 participants: specialists from Austria, China, France, Germany, South Africa, Slovakia, Slovenia, Sweden, The Netherlands, and the United States of America representing 8 P- and 2 O-Members and the BIML. Besides representatives from the National Authorities, a substantial number of industrials were also present and Gep Engler chaired the meeting.

The agenda was quite ambitious, as in just two days the drafts of the revisions of three Recommendations (projects p1, p3, and p4) were discussed:

- R 71 *Fixed storage tanks - General requirements*;
- R 85 *Automatic level gauges for measuring the level of liquid in fixed storage tanks - Part 1 Metrological and technical requirements* and *Part 2 Test report format*; and
- R 80 *Road and rail tankers - Part 1 Technical and metrological requirements*.

Furthermore, there was a discussion about possible future project proposals for new Recommendations in the field of tank measurement:

- "Measuring systems for the volume of liquids in fixed storage tanks"; and
- "Hybrid tank measuring systems for determination of volume, density and mass of liquefied hydrocarbons in vertical cylindrical fixed storage tanks".

Mr. Szilvássy mentioned the possibility of cooperation between TC 8/SC 1 and TC 8/SC 2 *Static mass measurement* (the Secretariat of which is currently vacant) and added that the Bureau would propose to revise R 125 combined with the proposed new project on the volume of liquids in storage tanks.

WG 2 (The Netherlands) had prepared the new Working Drafts of R 71 and R 85. In June 2004, WG 2 met in Delft and discussed a Working Draft for R 71 and general views with respect to R 85. Based on the outcome of that meeting, Mr. Kooiman did, in spite of his illness, a lot of work to prepare new drafts for both these Recommendations. After he passed away, this work was continued by his colleagues Hans van Wijngaarden and Jan van den Berg. This work resulted in two 1 CDs which were discussed in this meeting of TC 8/SC 1 together with the 33 and 61 comments, respectively, received from Subcommittee members and liaison organizations.

WG 3 (Slovakia/Germany) had prepared the new draft for R 80. The main purpose of this revision is to cover new technologies such as electronic "dipsticks" in road tankers, volume conversion, tank inclination, the static measuring system classification and adaptation to the requirements of the OIML Certificate System.

The first Working Draft was discussed in a meeting of the Working Group held on 12–13 August 2004 in Slovakia. This resulted in the 1 CD discussed in this plenary meeting of TC 8/SC 1 together with the 33 comments received. Discussions during this part of the meeting were led by Mr. Chren, Convenor of WG 3.

In particular with respect to the revision of all three Recommendations (R 71, R 80, and R 85) good progress was made and it was decided that 2 CDs for all the three revisions would be drawn up by the WGs concerned and circulated in 2005.

The fourth Project of TC 8/SC 1 (p5 revision of R 95 *Ships' tanks - General requirements*) was not discussed in this meeting.

The participants were not sure whether it would be necessary to discuss the three drafts again in a future meeting, but a provisional date of 9–10 March 2005 in Vienna or 11–12 May in Vienna or in The Netherlands was decided on. ■

TC/SC NEWS

OIML TC 17/SC 7 Meeting

Paris, France

9–10 May 2005

ESTELLE MOËNS
LNE, France
Department for Certification
of Measuring Instruments

TC 17/SC 7 Secretariat

OIML TC 17/SC 7, which is responsible for the revision of OIML R 126 *Evidential breath analyzers*, held a one and a half day meeting on 9 and 10 May 2005 in Paris, France.

Seventeen delegates from six countries, all P-Members, attended the meeting which was hosted by the LNE (Laboratoire National de Métrologie et d'Essais). Participants were legal metrology institutes, manufacturers, users and testing laboratories.

Before discussions started, Jean-François Magaña (BIML Director) gave a detailed introduction on the development of the First Committee Draft (1 CD) of the revision of R 126. He explained that this 1 CD not only now reflected the views of the Secretariat but also those of the Bureau and that he supported all the major changes proposed.

Taking into account this position, Mr. Magana proposed to chair the Meeting; this was accepted by all the Participants.

R 126 was published in 1998 after several years of intense work on the part of the various interested parties (legal metrology institutes, chemists, police departments, etc.).

The aim of the new 1 CD is to improve the existing Recommendation by building on the experience of seven years of application and to render the text more independent from the technology itself. In addition, the 1 CD has been reviewed and divided up into three parts according to the OIML *Directives for technical work*:

- Metrological and technical requirements;
- Test requirements; and
- The Test Report Format (to be developed at a later stage in the work).

For European countries, another issue is to draw up an International Recommendation which will be able to become a Normative Document in the sense of the European Directive on Measuring Instruments (MID) in order to have this category included in a future revision of the Directive.

In November 2004, the 1 CD was sent out for comments; by the end of March 2005, more than 200 comments had been received from 9 countries.

Due to the review of the content of the Recommendation, it was not possible to produce the 1 CD as a marked up document based on the current OIML Recommendation. The Secretariat is aware that this did not facilitate the examination of the 1 CD and some of the comments were related to that point.

The first general issue discussed related to terminology and, in particular, to the title and scope of the Recommendation. It was proposed to delete the word "evidential" since this notion is actually not related to legal metrology but to law court decisions. The majority of the participants agreed on this proposal and the new title of the Recommendation will be: "Breath alcohol analyzers".

Then the most noteworthy comments on the 1 CD were discussed and the following issues were agreed upon:

- Implementation of a requirement which guarantees that the measurement result is representative of the end-expiratory air independently from the analysis technology;
- Only one accuracy class is retained;
- Maximum permissible errors (MPE) related to type evaluation, initial verification and those recommended for in-service use have been decreased;
- Uncertainties of test facilities have been decreased to one third of the MPEs;
- Test gases have been reviewed according to the legal limits applicable in various countries which are more or less harmonized; and
- Performance tests have been modified in accordance with the recommended severity levels and procedures in OIML D 11.

Discussions during the meeting were vivid and constructive. There was a broad exchange of points of view and the participants thanked the BIML Director for chairing the meeting. OIML TC 17/SC 7 would like to express its thanks to the participants for their many useful comments.

The next step will be the development of a second Committee Draft which it is planned to circulate in December 2005 for comments before April 15, 2006.

According to the comments received, the Secretariat will decide whether or not to hold a second meeting and if so the date and venue will be advised in due course. ■

RLMO MEETING

17th SADCMEL Meeting

Maputo, Mozambique

3 May 2005

STUART CARSTENS
SABS, SOUTH AFRICA

Introduction

The SADCMEL meeting was attended by all member states except Zambia who unfortunately could not attend. Representatives from the following international bodies and donor organisations also attended:

- Mr Dunmill (BIML)
- Dr Stoll-Malke (PTB)
- Mr Kaiser (PTB Consultant)
- Dr Otto Loesener (UNIDO)

There were also members of the SADC Secretariat and observers from Egypt, Madagascar, Nigeria and the other SADC structures.

Annual report

The Chairperson highlighted several items from his annual report, namely:

- Study visit to Berlin, Germany at the same time as the CIML Meeting;
- Attendance at the ILAC/IAF General Assembly in Cape Town, South Africa;
- SADCMEL/SADCMET workshop on OIML D 1 "Elements for a Law on Metrology" held in Walvis Bay, Namibia.

Country reports

The country reports highlighted the following:

- Mauritius and South Africa are in the process of aligning their legislation on prepacked goods to the harmonised SADCMEL requirements;
- The assistance given to Angola and Mozambique by INMETRO was extremely helpful to both countries. In Mozambique, the consultants drafted a Law on Metrology in Portuguese that is being reviewed for adoption into legislation. The SADCMEL harmonised documents were also translated into Portuguese by the consultants.
- The SADCMEL harmonised documents on beam and counter scales have been published by South Africa as National Standards and will be transformed into technical regulations in the near future.

OIML report

Mr Ian Dunmill, BIML Assistant Director, presented an update on important OIML activities. The various issues highlighted are indicated below:

- OIML Mutual Acceptance Arrangement (MAA);
- Permanent Working Group on Developing Countries;
- Expert Reports;
- JCDCMAS;
- Forum on developing countries;
- Progress on OIML technical work;
- General developments and information;
- Liaison with the WTO/TBT Committee.

Reports from Technical Committees

The chairpersons of the various technical committees gave a report on the developments over the last six months as well as the decisions taken in the meetings held on 1 May 2005.

■ *TC 1 Sale of goods*

The SADCMEL document 4 entitled *"Tolerances permitted for the accuracy of measurements made in terms of legal metrology legislation including the measurement of goods when prepackaged or when measured at the time of sale or in pursuance of a sale, and requirements for the inspection of prepackages"* was finalised by confirming the inclusion of the amendments that were identified in Walvis Bay in November 2004. It was decided to submit the document to SADCSTAN for adoption as a Regional Standard.

TC 2 Instruments

Mr Zulu, TC 2 chairperson, was tasked at the meeting in Walvis Bay to identify instruments for which there were no international requirements and for which SADCMEL would need to draft requirements. He evaluated various OIML and other national documents dealing with length measures and liquor dispensing measures.

The research showed that there were no international documents dealing with liquor dispensing measures but that there were Indian regulations covering "Special Measures for Liquor" which also covered beaker and peg measures.

After the report was discussed, a plan of action was proposed as follows:

- That OIML R 35, currently being revised to include latest technologies, is fairly comprehensive for measures used in trade and should be adopted by member countries without the need for a SADCMEL equivalent. It was decided that the regional coordinator should send the latest version of R 35 to members with a request that they send comments about the adoption or need for a separate SADCMEL document to Mr Zulu by 30 June 2005 for his decision on the matter or further consultation with members.

- That requirements for verification standards are a national issue with guidance from the other OIML Recommendations mentioned in the report which deal with higher precision instruments used as verification or inspection standards. This will remove the need for SADCMEL harmonised requirements. These standards could be in various forms as long as they are accurate enough to verify trade use measures.

- That each country having legislation dealing with liquor dispensing measures should forward these to Mr Zulu by 30 June 2005 to enable him to draft proposals for a SADCMEL harmonised document in the absence of an international equivalent. This would be the next TC 2 project.

TC 4 Training

A list of short courses offered by the National Laboratory Association and the National Weights and Measures Laboratory (NWML) had been distributed to members so that those with the necessary resources could take the opportunity and train their staff.

PTB funding project

Dr Stoll-Malke of the PTB gave a short report on the status of the funding project. A list of courses required has been prepared and the PTB would be willing to assist with translation into Portuguese and French if necessary.

The plan of operation agreed to with the PTB and which contains the capacity building that will be funded was then discussed to set dates for actions:

- *Least developed countries (Angola, Lesotho and Mozambique)*

Angola and Mozambique were requested to make a combined proposal for assistance from Brazil (training and legislation) to the regional coordinator as soon as possible. This proposal should be more specific and include if possible training on nonautomatic weighing instruments (OIML R 76), mechanical counter scales (SADCMEL Document 2), beam scales and balances (SADCMEL Document 3) and liquid fuel dispensers (Part of OIML R 117 requirements). If necessary, new terms of reference for the Brazilian contract will be drafted.

- *Training on verification/calibration of instruments*

Courses on presentation skills, on verification of self-indicating weighing instruments, non self-indicating counter scales and beam scales would run back to back for 13 days in Pretoria starting on 27 June 2005. All course costs would be funded by the PTB. Countries sending delegates would need to commit to presenting a similar course in their countries in order to fulfil the success criteria of the PTB/German government funded project.

A course on liquid fuel dispensers is not yet available in the region and it was agreed to determine if DAM (Germany) could provide such a course. If the PTB cannot fund all trainers nominated for this course, selected trainers will attend and present a course locally thereafter.

It was agreed to convert the courses on verification of volume measures to a calibration course with requirements in each of the selected documents being dealt with briefly. This will be arranged in South Africa after consulting with SADCMET. A similar course for calibration of verification standards of length will also be arranged by the regional coordinator, possibly early in 2006.

Mr Dunmill mentioned that a course on OIML R 111 dealing with masspieces was to be arranged in Sweden. The calibration of masspieces had not been identified as a need in the current project and would only be considered if funds were available.

Only selected countries had identified the need for training on automatic weighing instruments of which there are four discrete types excluding in-motion weighbridges. A questionnaire will be circulated for members to indicate the types of instruments they had in their countries and nominate trainers. Once training had been completed, a training course using these instruments for practical experience would need to be given to other members. The initial training would most probably be given by DAM.

As storage tank calibration would require the supply of equipment before practical work can be done, the regional coordinator was requested to establish what such equipment would cost. It was reported that equipment for the strapping method was relatively inexpensive but the Democratic Republic of Congo indicated that optical methods are preferred and they were in the process of obtaining the equipment. The regional coordinator would deal with the countries that indicated that they needed this training and if any other country wishes to participate they should contact the regional coordinator.

- Requirement for the sale of goods

A course in September 2005 in Mauritius on the two SADCMEL documents dealing with labelling and tolerances on goods was proposed but the general feeling was that it should be extended into a second week to ensure that all participants would receive hands-on practical experience. It was agreed that Mrs Bagha discuss the matter with those involved and report back to the regional coordinator.

- General training

It was agreed that courses on the understanding of ISO 17020 and ISO 17025 would be arranged in consultation with SANAS of South Africa.

Tanzania agreed to request the Tanzanian College of Business Education to develop a short course of about a week on general inspection methodology including dealing with the public, investigation of complaints and giving evidence in court.

Topic for the 18th SADCMEL meeting

It was decided that the November 2005 workshop should deal with "Effective management of a legal metrology service." It should cover important aspects from the following documents:

- OIML D 9 *Principles of metrological supervision*
- OIML D 20 *Initial and subsequent verification of measuring instruments*
- OIML D 27 *Initial verification of measuring instruments utilising the manufacturers quality system*

Angola undertook to host the meeting.

SADCMEL Project Management Committee ToR

Tanzania distributed draft terms of reference for the proposed SADCMEL management committee and members were requested to consider these and forward comments to the regional coordinator by 30 June 2005. The matter will be finalised at the next meeting of SADCMEL.

Conclusion

The meeting once again proved to be productive and progress towards achieving the goals of the SADC trade protocol seems to be on track. Some countries are already in the process of adopting the harmonised regional standards into national legislation and others have once again undertaken to do likewise. ■

RLMO MEETING

COOMET TC 2 *Legal Metrology*

6th Meeting Moscow, 27 – 28 April 2005

HARTMUT APEL
Presidential Sector, PTB, Germany

The Regional Organization for European-Asian Cooperation of National Metrological Institutions (COOMET) presently comprises 14 Member Countries and is composed of four Committees, one of which is TC 2 *Legal Metrology*.

The sixth international meeting of TC 2 was held on 27–28 April 2005 at the All-Russian Scientific Research Institute of Metrology Service (VNIIMS), Moscow.

The meeting was organized by VNIIMS staff under the leadership of COOMET's Vice-President, Dr. V. Belotserkovsky. More than 19 delegates attended, representing the following COOMET Member Countries: Belarus, Germany, Kazakhstan, Moldova, Russia, Slovakia, Uzbekistan and Ukraine.

The session was led by the Chairman of TC 2, Mr. Hartmut Apel (PTB, Germany), who had invited his deputy, Mr. R. Hahnewald (LME-Brandenburg), the representative of the Federal States of Germany responsible for the execution of legal metrology in that country. Mr. Grottker (PTB) also attended to provide the latest information on developments in Software Guides to be elaborated within the framework of WELMEC and OIML.

COOMET has traditionally focused its activities on cooperation in scientific and industrial metrology by performing intercomparisons of measurement standards within 11 Technical Committees. However, in recent years legal metrology and (inter-) related issues such as quality management systems and conformity assessment have gained importance in connection with the facilitation of free trade. A particular impact will be that in 2004 the European Union adopted the Directive on Measuring Instruments (MID) which will also serve totally or partially as a model to be implemented in countries outside the EU.

For this reason topics related to the European policy of a single market economy and based on the principles of the so called New and the Global Approach were of high interest. In particular the question was raised whether there will be an added value when accreditation of laboratories is applied in the field of legal metrology.

When giving an overview of changes implemented and activities both planned and ongoing in their national economics, all delegates reported on the revisions of their regulations in the field of legal metrology. The existing MID as such does not provide ideal parameters which could serve as a point of orientation because the EU Commission itself is in the process of revising the basis for the MID. The situation might even worsen as a large number of EU countries try to delegate legal metrology activities, such as initial verification and conformity assessments (type evaluations), to private bodies with prevailing commercial interests.

The relevant international ISO Standards and Guides do not sufficiently clarify the ongoing discussions because they open a wide field of sometimes different interpretations.

CIML Vice-President and Vice-Director of VNIIMS, Mr. L.K. Issaev, gave a presentation on the decisions of the 39th CIML Meeting and 12th International OIML Conference. Together with the Deputy Director of VNIIMS, Mr. V. Skovorodnikov, he also informed delegates about structural changes in the area of legal metrology at national level, with up to now unpredictable consequences for the policy and the future level of consumer protection. The new legislation in Russia as well as in nearly all the other participating countries follows the principle of the New Approach by delegating certain responsibilities such as the declaration of conformity to manufacturers.

Mr. Apel gave a presentation on recent developments of the legal metrology system in Germany on the basis of an ongoing revision of the Law on Measurement and Legal Metrology and its corresponding ordinance (by-law); Mr. R. Hahnewald presented concrete results of market surveillance activities of the German Verification offices in the weighing sector. The figures presented underlined the urgent necessity to strengthen particularly working units within the legal metrology system dedicated to performing conformity assessments of measuring instruments as early as possible when put into use and after fixed time intervals (reverifications).

Software

The coordinator of SC 2.2 *Software Requirements and Testing*, Mr. M. Shabanov (BelGIM – Belarus) informed delegates about the completed or planned activities of this working group.

During the last SC 2.2 meeting in Bratislava in 2004 it was agreed that the following key issues should be dealt with by the participants:

- Development and implementation of a national standard based on requirements for the software specified in COOMET Recommendation R\LM\10:2004 (WELMEC Guide 7.1) or on an alternative one;
- Studying of the possibility of registration (with corresponding reference in the type approval certificate) of software supplied with an approved type of measuring instruments or developed separately for processing measuring data generated by a measuring instrument; and
- Performing practical testing of software and reporting on the results.

However, only BelGIM and VNIIMS were able to elaborate these subjects by developing relevant documents besides the PTB as a legal metrology entity which has been developing software requirements and carrying out software testing for almost two decades.

Belarus

BelGIM: a national standard exists on "Software for measuring instruments – General requirements"which is at final approval stage. The draft document was reviewed by more than 60 organizations of Belarus. A proposal has been submitted to the national GOSSTANDART for consideration and approval that the software versions of measuring instruments will have to be registered.

Russia

VNIIMS: The document "General requirements on software of measuring instruments" has the status of a metrological recommendation and is presently under consideration by the authorities.

Both the above-mentioned documents are built upon WELMEC Guide 7.1.

The next plan of action foresees:

- Starting routine practical work on the basis of approved documents;
- Studying requirements of an OIML Recommendation on software for measuring instruments for further amendment of existing standards; and
- Launching a COOMET project "On-line testing of a sample software for measuring instruments".

This project assumes testing of a sample software by SC participants via e-mail. The objective is to work out a uniform test report for different types of measuring instruments (starting with those listed in the MID).

With the objective of harmonizing the software requirements and tests, all the participants welcomed the proposal to disseminate procedures within COOMET.

Mr. Grottker (PTB) gave a presentation about "New Developments in Software Regulations" based on WELMEC Guide 7.2. This document was recently adopted by the WELMEC Committee and will also influence the elaboration of the corresponding OIML Recommendation on software requirements.

Projects

Various Project Leaders and Coordinators presented the results of seven ongoing COOMET projects, some of which could be finalized. After each presentation lively discussions took place and demonstrated the great interest within TC 2 to analyze upcoming problems with the aim of finding appropriate solutions.

Within this spirit of cooperation and on the basis of two previously distributed questionnaires the elements for a workshop on the control of prepackages were discussed. The training seminar will take place from 27 to 30 September 2005 in Minsk with experts from the German Verification Offices.

A second seminar has been offered by PTB in 2006 assigned for regulators working in legal metrology.

If interest exists there will be a further workshop on software requirements and testing in 2006, organized by BelGIM and supported by PTB experts.

The Legal Metrology TC agreed on the forthcoming workplan. The items will be presented at the 15th COOMET Committee Meeting in Vilnius, Lithuania on 8 and 9 September 2005.

There was a general consensus to meet again in Belarus in 2006. ■

Third International Conference on METROLOGY

Trends and Applications in Calibration and Testing Laboratories

First Announcement and Call for Papers

Third International Conference on

METROLOGY

Trends and Applications in Calibration and Testing Laboratories

Tel Aviv, Israel ✦ November 14 - 16, 2006

ORGANIZED BY:

The National Conference of Standard Laboratories (NCSL International)

The Cooperation on International Traceability in Analytical Chemistry (CITAC)

The Israeli Metrological Society (IMS)

CO-SPONSORED BY:

The International Measurement Confederation (IMEKO)

The Israel Society for Quality (ISQ)

The Israel Society for Analytical Chemistry (IACS)

The National Physical Laboratory of Israel (INPL)

Tel Aviv, Israel

November 14 - 16, 2006

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Dear Colleague,

The 3rd International Conference on Metrology – Trends and Applications in Calibration and Testing Laboratories will take place November 14-16, 2006 in Tel Aviv. It is being organized, as were the previous two (May 2000 in Jerusalem and November 2003 in Eilat), by the National Conference of Standard Laboratories (NCSL International), Co-operation on International Traceability in Analytical Chemistry (CITAC) and the Israeli Metrological Society (IMS).

The International Measurement Confederation (IMEKO), the Israel Society for Quality (ISQ), the Israel Society for Analytical Chemistry (IASC) and the National Physical Laboratory of Israel (INPL) are the conference co-sponsors.

The conference will be held in conjunction with the sixth International Conference of the Israel Society for Quality. Since the Society's biannual international conferences are very popular and generally attract 1500-2000 participants, both specialists in metrology (measurement, calibration and testing, including chemical analysis) and quality professionals will have a unique opportunity to network with each other, interact with senior management and learn how to bring the "message" to as many people as possible.

In addition, a combined commercial exhibition within the framework of the two conferences on Metrology and Quality will be attractive for numerous participants and for producers of measuring instruments and quality products.

This 3rd International Conference is aimed at helping participants learn and develop new tools and techniques that will improve accuracy/quality of measurement, calibration and testing/analytical results. Thus the conference will have a strong practical focus.

It is my pleasure and privilege to invite you to take part in the 3rd International Conference on Metrology in Israel, to be an active partner in a challenging and fruitful endeavor and to contribute to its success.

Joining us at the conference will also enable you to enjoy exploring the Land of Israel, birthplace of the three great monotheistic religions.

We look forward to a peaceful 2006 and to welcoming you and your colleagues to Tel Aviv.

Dr. Ilya Kuselman
Conference Chair

Topics

- Trends in metrology
- Metrology as a business
- Measurement methods and their validation
- Measuring instruments and their qualification
- Measurement standards (etalons) and reference materials (RMs)
- Uncertainty estimation in measurement and testing/chemical analysis
- Traceability
- Inter-laboratory comparisons and proficiency testing (PT)
- Conformity assessment
- Accreditation of calibration and testing/analytical laboratories
- Accreditation of RM producers and PT providers
- Legal metrology
- Metrology in chemistry, petrochemistry, pharmaceuticals and environmental & clinical analysis
- Software for metrology
- Ethical problems in metrology
- Education

Abstracts of 200 words are invited on all the suggested topics.
Abstracts must be submitted in MS WORD format by e-mail to confer@isas.co.il and a fax copy to +972-2-6520558.
Final Submission Date: April 1, 2006
Authors will be notified regarding the acceptance of their presentation and the guidelines for publication.

The OIML is pleased to welcome the following new

Member State

- **Turkey**

CIML Members

- **Japan:**
  Mr. Yukinobu Miki
- **Pakistan:**
  Mr. Abdul Ghaffar Soomro

OIML Meeting

4 October 2005 (Date & venue to be confirmed)

TC 8/SC 5 Water meters
Revision of R 49-1 and R 49-2 including hot water meters

9–10 March 2006 - BEV, Vienna, Austria (to be confirmed)

TC 8/SC 1 Static volume measurement
Drafts of revisions of R 71, R 80 and R 81
Note: Possible alternative dates are 11–12 May 2006 in Vienna

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Committee Drafts

Received by the BIML, 2005.02 – 2005.05

Revision R 59: Moisture meters for cereal grain and oilseeds	**E**	**3 CD**	**TC 17/SC 1**	**CN**
Revision R 21: Taximeter systems **Part 1: Metrological and technical requirements - Tests**	**E**	**2 CD**	**TC 7/SC 4**	**UK**
Revision R 80: Road and rail tankers. **Part 1: Technical and metrological requirements**	**E**	**1 CD**	**TC 8/SC 1**	**AT**
Revision R 71: Fixed storage tanks. General requirements	**E**	**1 CD**	**TC 8/SC 1**	**AT**
Revision R 85: Automatic level gauges for measuring the level of liquid in fixed storage tanks. **Part 1: Metrological and technical requirements - Tests** **Part 2: Test report format**	**E**	**1 CD**	**TC 8/SC 1**	**AT**

Call for papers

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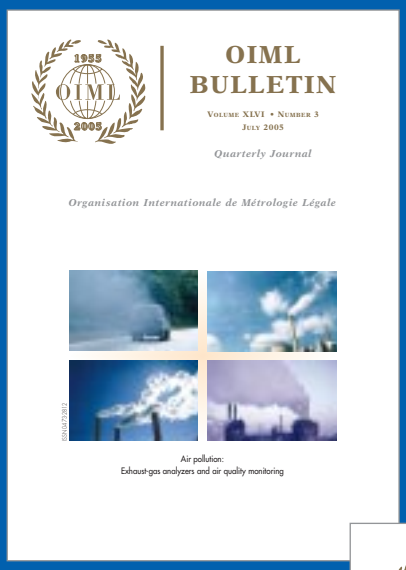

- Technical articles on legal metrology related subjects
- Features on metrology in your country
- Accounts of Seminars, Meetings, Conferences
- Announcements of forthcoming events, etc.

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- 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.

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