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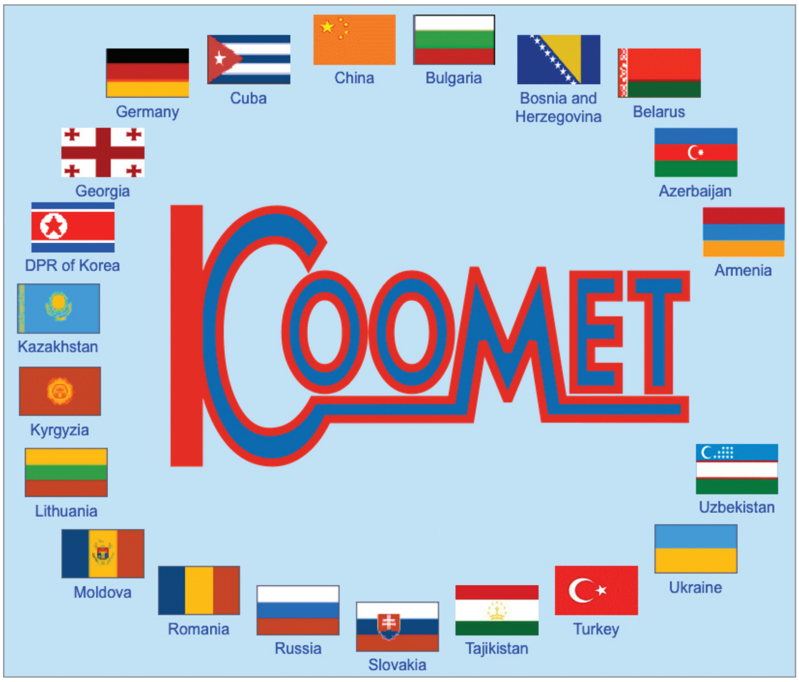

COOMET celebrates its 25th Anniversary

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Editorial

Chris Pulham
Editor/Webmaster, BIML

World Metrology Day 2016: A quarter of a million website hits!

The theme of this year's World Metrology Day was *Measurements in a dynamic world*. The 2016 poster was designed and produced by VNIIMS, the All-Russian Research Institute of Metrological Service of the Russian Federation. It illustrated various concepts and allowed for a certain degree of creativity and imagination, as "dynamic" can mean either "motion" or "change", covering a very wide spectrum of activities.

For the metrology community, the theme reflects both the challenge of accurately measuring dynamic quantities and the rapid pace of change in measurement science today. Even though metrology is the oldest of physical sciences, it continues to change and evolve at a very fast pace; the key is how metrology reacts and adapts to that change and how effective the tools are that we put in place today.

Every year, NMIs are invited to adapt the poster into their own national languages and these versions are posted on the World Metrology Day website, together with announcements of national World Metrology Day events that are organized on or around 20 May. This year there were 23 variants of the poster and 32 national events – a new record which is extremely encouraging.

The number of distinct visitors to the website on 20 May alone was also higher than in any previous year, standing at 5500. And the website had almost a *quarter of a million hits* over the month of May in total which is also very encouraging because this means that it is becoming a normalized awareness-building event, which is beneficial not only to the BIPM and the OIML but also to all the National Metrology Institutes and other metrology related institutions throughout the world who can then leverage it as a public event, opening up their laboratory doors, holding seminars and spreading the word. The scope of the events organized around the globe was again remarkably broad this year, and each and every one was a resounding success thus contributing to the overall success of the commemoration.

It is our hope that in the future, WMD will continue to be an opportunity to unite the metrology community around the world, giving us an opportunity to show the world what we do and how important this work is for the wellbeing and future of our planet and those who live on it. We are already working for 2017 and hope to have an even bigger impact. It is our intention to encourage even more partners to join in celebrating this key event and thus continue to add value to our community's work in developing the science of metrology and its applications. ■

ELECTRICITY METERS

Portable test equipment for residential utility meters

Part 3: Wireless portable test equipment with load generator for electricity meters

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1 General

Electricity meters are used to measure the amount of electrical energy consumed by an electrical power system where electricity is transmitted and distributed from power stations to demand areas. The accuracy of electricity meters is crucial for the electrical power system which must generate just enough power to match supply with demand.

The IEC has already established the relevant industry standards, such as IEC 62052-11, 6203-21, 22, and 23, in order to provide general requirements, type approval testing and verification requirements in accordance with meter types and accuracy classes.

When an abnormal situation occurs in an electricity meter that is being operated, checking the performance of the meter directly on site is restricted. For this reason, most performance tests for meters, including electricity meters, are generally carried out in a laboratory.

In particular, when testing with an active load is impossible, an electricity meter needs to be removed from its installation location, and thus power outlets and load supplying apparatus are required.

However, due to the huge physical size of the apparatus, it is hard to carry out an inspection of electricity meters on site.

In general, when a resident files a complaint concerning the performance of a meter, or a field inspector suspects a malfunction in the meter, he/she will request a performance evaluation. Then, the management agency retrieves the electricity meter, sends it for a performance evaluation, and the results are reported back to the user.

In such cases, significant time and cost may be incurred, depending on the administrative procedures.

To reduce such inconveniences, an inspection device capable of carrying out on-site inspection of electricity meters has been developed to address the problems that used to occur as well as to reduce distrust in electricity meters used for commercial transactions.

2 Application technique

The components of the on-site test equipment for electricity meters are shown in Figures 1 and 2 in accordance with their testing methods.

The equipment includes:

- a pulse detector to detect output pulses from digital electricity meters,
- a current transformer (CT) to measure electrical current with clamps,
- a sensor that comprises a potential transformer (PT) to measure voltage with voltage cables,
- a calculator to measure the amount of electrical energy and error values by receiving and processing signals from the sensor, and
- a display to show the test results.

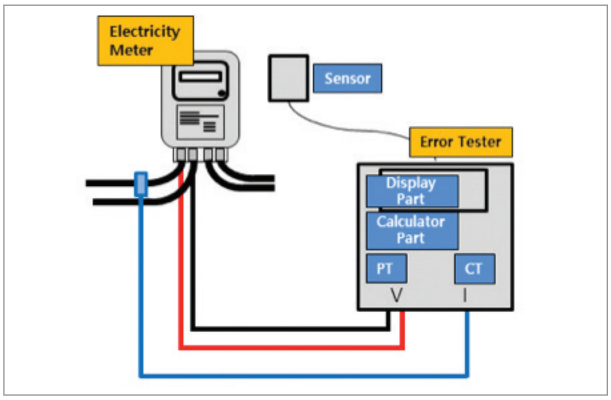

Figure 1 Components of the portable test equipment (error tester)

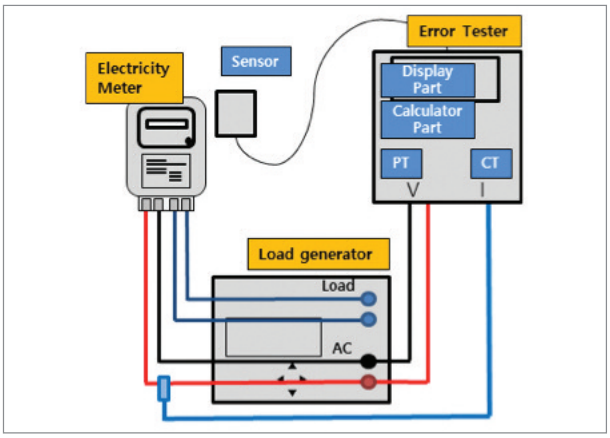

Figure 2 Components of the portable test equipment (error tester and load generator included)

The load generator of the testing equipment allows electricity meters to be removed from their installed areas and provides a power source and a load, thus making it possible to test and verify meters.

The specifications of the portable test equipment for electricity meters are given in Tables 1 and 2. The measurement capacity of the error tester ranges from 80 V to 300 V for voltage and from 50 mA to 120 A for current, which is suitable for a single-phase electricity meter. Precise measurement of DC influence with an accuracy of Class 0.2 is possible.

With a load generator, a tester can set the load as desired for on-site tests with a maximum capacity of 100 VA. The error tester and its components for portable electricity meters are shown in Figure 3.

The error tester is designed separately, and its data are transmitted via Bluetooth. The advantages are:

i) Safety – Bluetooth power source isolation;
ii) Lightweight and compact size – Enhanced portability.

The error tester has a built-in program that measures energy and thereby indicates error rates by measuring under the same conditions and period as the electricity meter.

Figure 3 Error tester of the portable test equipment

Table 1 Specifications for the error tester

Basic specifications	
Power supply	100 V – 300 V AC
Voltage measurement range	100 V – 300 V
Current measurement range	100 mA – 120 A
Frequency measurement range	45 Hz – 65 Hz
Accuracy	Class 0.2 (active/reactive/apparent)
Harmonics measurement	Up to 21 rounds

Table 2 Specifications for the load generator

Basic specifications	
Input power	220 V / 60 Hz
Output power	110 V – 220 V 1 A – 40 A 1 – 360 degrees
Control function	Adjustable settings for voltage, current, and phase angle

The measuring unit includes a calculator and a sensor (pulse detector, PT, and CT). Users can check incoming data in the display transmitted from the measuring unit via Bluetooth.

The error tester, equipped with a switching power supply (SMPS), is immune to external noise and power surges in compliance with the IEC's standards.

Table 3 shows the accuracy test results of a single electricity meter conforming to the test standards, which satisfies an accuracy of Class 0.2 or higher.

The equipment also eliminates the negative effects of DC and even-numbered harmonics, which has failed to be resolved by traditional technologies. It is designed to prevent measurement errors due to the pick-ups of DC components, with its tolerance level of ±2 % or less, which is a crucial value from the perspective of reliability.

Figure 4 shows the load generator of the portable test equipment for electricity meters.

Light weight and portability have been the top priorities for the designers of this equipment since this device has to be constantly carried around in the field.

For this, the inverter with a high frequency-based design drastically reduces and minimizes the weight of the voltage/current source. The weight of the entire equipment, including its body frame, is just 19 kg, all contained in one frame.

The electricity meter field testing device includes operating software designed to be user-friendly by making it easy to manage and handle data from the portable error tester.

Table 3 Accuracy test results of an error tester

Load current (A)	Power factor	Test reference (%)	Test result (%)
0.01 I_n	1.0	±0.4 %	–0.142
0.02 I_n			0.044
0.05 I_n		±0.2 %	0.008
I_n			0.004
I_{max}			0.010
0.02 I_n	0.5 (lag)	±0.5 %	0.170
0.05 I_n			0.071
0.1 I_n		±0.3 %	0.047
I_n			0.018
I_{max}			0.014
0.02 I_n	0.8 (lead)	±0.5 %	0.041
0.05 I_n			0.002
0.1 I_n		±0.3 %	–0.005
I_n			0.011
I_{max}			0.022
0.1 I_n	0.25 (lag)	±0.5 %	0.090
I_n			0.008
I_{max}			0.006
0.1 I_n	0.5 (lead)	±0.5 %	0.006
I_n			0.023
I_{max}			0.025

Table 4 DCT measurements

Measured current (A)	Power factor	Test reference (%)	Test result
120 A	1.0	±2%	–0.37
	0.5 (lag)		–0.35
	0.8 (lead)		–0.40
80 A	1.0		0.12
	0.5 (lag)		0.16
	0.8 (lead)		–0.09
20 A	1.0		0.05
	0.5 (lag)		0.16
	0.8 (lead)		0.10
1 A	1.0		–0.02
	0.5 (lag)		–0.01
	0.8 (lead)		–0.01
100 mA	1.0		–0.01
	0.5 (lag)		0.24
	0.8 (lead)		–0.11

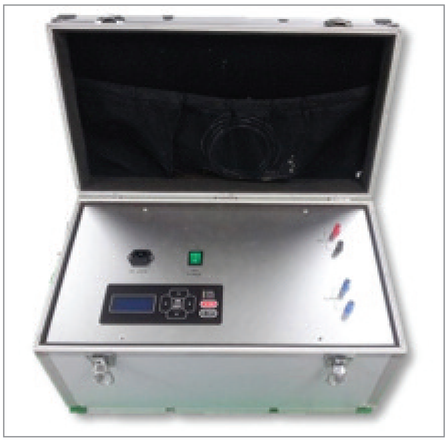

Figure 4 Portable test equipment for electricity meters (load generator)

Figure 5 Data viewer

The error tester can store up to 400 individual inspection results and send the data to a PC through a cable or wireless communication via Bluetooth. Inspectors can manage their inspection history via a data viewer and easily look up the inspection data.

3 Concluding remarks

The portable test equipment for electricity meters is easy to use. The sensor is simply mounted on the meter, and is an accurate way to evaluate the performance of the meter.

First, for safety reasons the electricity meter is installed in a specific area so as to prevent unauthorized access and fraudulent use of electricity. Under such circumstances, it is not easy to perform the on-site inspection for the electricity meter. With the portable test equipment, however, the inspector can mount the sensor on the electricity meter on-site more easily. The inspector can then obtain the results for the inspection.

Second, when the inspection is performed on-site, actual load is used for testing. The inspectors are able to carry out the test with a limited load range instead of the full range. If the inspection is executed using this portable test equipment and load generator, it is possible to evaluate the error performance for various load ranges. As a result, the inspectors can obtain data for various ranges.

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WEIGHING

Continuous totalizing weighing instruments of the arched chute type

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Vice President, CECIP

Summary

Innovative techniques employed in automatic weighing that provide an accuracy of weighing results comparable to that specified in OIML R 50 may require an amendment to this Recommendation or that a new similar Recommendation be produced that is specific to this type of instrument, because such techniques are unintentionally excluded from its scope.

Introduction

Quite recently (in the last decennia) a new type of continuous totalizing weighing instrument which does not use belt conveyors as part of its weighing module became available on the market.

The high accuracy subset of this type fulfils the requirements concerning maximum permissible errors as stipulated in OIML R 50, 2.2, Tables 1 and 2.

Most OIML Recommendations describe the required performance characteristics of a measuring instrument, of which accuracy may be the most essential. These Recommendations include the related test procedures for the (group of) measuring instruments as defined in the scope. Restrictions in the scope are generally only made when the evaluation techniques are quite different or where e.g. the accuracy of the measuring technique allows for legal use. Generally speaking, it is not the intention to restrict the scope of a Recommendation to only the specific techniques applied.

However, the scope of the current R 50 for continuous totalizing automatic weighing instruments is restricted to a specific technique, since it is only applicable to the so called “beltweigher” types. The reasons for this are probably:

- the belt conveyor type of continuous totalizing weighing instruments was considered to be the only type able to fulfil the minimum metrological requirements stated in OIML R 50; and
- the beltweigher mechanical construction requirements, especially those for the conveyor, had to be incorporated in the required performance and testing procedures since these are essential in ensuring measurement accuracy.

Through the restrictive scope of OIML R 50, other types of continuous totalizing weighing instruments are now excluded even if these instruments are capable of successfully passing an evaluation based on the essential metrological and technical requirements described in this Recommendation.

Unfortunately, due to the strict definition, R 50 cannot be applied for the evaluation of this innovative type of measuring instruments. So unintentionally, even the revised Recommendation restricts this innovation.

Description of the arched chute type

The new innovative type of continuous totalizing automatic weighing instrument, the so called chute type continuous totalizing weighing instrument, has the typical layout of which an example is presented in Figure 1. The essential components are:

1 Tapered product entry, guiding the bulk material
2 Arched plate (chute), causing the flow of bulk material to be subject to a centripetal force
3 Load sensing device, supporting the plate and “converting” the centripetal force into a measurable signal
4 Product exit

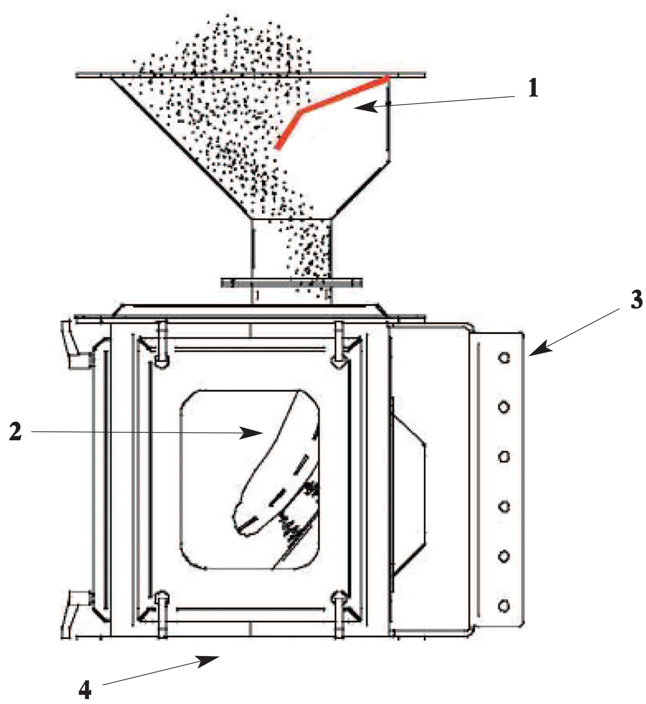

Figure 1: Arched chute type continuous totalizing weighing instrument

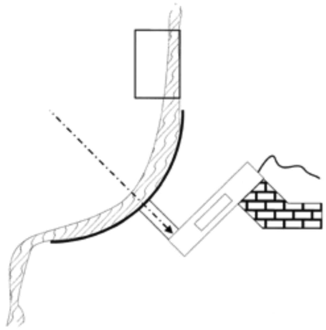

Figure 2: Counteracting force being transferred to the loadcell

Figure 4: Applying an ACT while loading a truck

The weighing principle of this chute type weighing instrument is based on the measurement of the force that changes the momentum of the bulk material.

The principle facilitates an accurate, bulk density independent, friction compensated process. An accuracy of up to 0.1 % can be achieved even with completely different properties of the bulk goods.

Bulk goods fed through a special intake with optimum feed point are diverted over a circular arc shaped force sensing surface. This mass flow across this guiding means is subject to a centripetal force caused by this circular movement keeping the bulk product on its circular path which is proportional to the moving mass and causes a counteracting force in the opposite direction. (See Figure 2) In the case of the optimum arrangement of the force sensing part, the counteracting force corresponds to the centripetal force and has a linear relationship with the throughput. The force is measured by means of a special friction compensated force sensor (FCT). In particular, effects caused by friction between the mass particles and the guiding means are compensated.

This objective is attained by the development of a system in which the guiding means are pivotally supported via the force sensor, and that the support occurs on a straight line which extends through an endpoint of a radius vector of a resulting friction force operating on the mass flow and in the same direction as the resulting friction force. The point where the guiding means are supported is therefore determined depending on the friction force. The friction force can then be compensated so that the force measurement of the centripetal force is unaffected by the friction force and the mass flow can then be determined.

Material-dependent quantities, such as the friction coefficient, are taken into consideration when computing the friction force.

The resulting friction force represents the entirety of the friction forces generated when the mass particles flow along the surface shaped as a circular arc. These partial forces are added and yield the resulting friction force.

If the support point is located on the line of the effective force and if the direction in which the force sensor is able to measure forces is perpendicular to the resulting friction force, then the resulting friction force has no effect on the measurement by the force sensor. The resulting friction force is therefore irrelevant for this measurement.

The mass quantity of different kinds of bulk materials with different densities can be totalized without reducing the measurement accuracy.

Figure 3: Bulk material flowing along the chute

Figure 5: Inner and outher view of a arced chute type weighing instrument

Especially with regard to very light bulk materials such as powder or granulates, this type of solid flow meter allows for a continuous and exact weighing.

Compared with the beltweigher the advantages of this type of weigher are its compact size and its static structure; since there are no moving parts there is no wear and tear.

Stable mechanics and the dustproof enclosure make the chute type weigher a reliable flow meter with short maintenance cycles. The low height allows for a quick installation even in existing and narrow conveyors. Due to the separation of the sensor (load cell) part and the electronics, use in dusty and hazardous areas is possible.

A typical application requiring approval in accordance with the (as yet inexistent) OIML Recommendation is the loading of road trucks with solids, powders or granulates. Compared with the current way of loading via a weigh bridge a time saving of 20 to 30 minutes per truck can be achieved. Keeping in mind the fact that a truck has to pass over the weigh bridge at least twice, the number of trips around the building and the resulting environmental pollution that can be saved is considerable. ■

Read more:
http://www.faqs.org/patents/app/20100011881

OIML R 126

Measuring facilities for testing breath analyzers in Poland

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Abstract

In 2011–2014, a measuring facilities prototype for testing breath analyzers by wet and dry ethanol standard methods was designed, constructed and validated in the Central Office of Measures. The objective was to ensure metrological traceability to the International System of Units (SI) and for use by accredited laboratories in Poland.

1 Introduction

Breath analyzers are instruments for measuring the ethanol mass concentration in exhaled human breath, and play an important role in state policy in the field of public order, road safety and health. Analyzers are divided into:

- evidential devices,
- testers for preliminary measurements,
- alcohol interlocks used in vehicles, and
- indicators for personal use.

All these instruments are widely used in Poland, and indeed all over the world for measuring the mass concentration of ethanol in human breath. Analyzers are most commonly used by the police, military and emergency services, detoxication centers, fire brigades, border guards, security agencies, workplaces, alcohol rehabilitation clinics and hospitals. In Poland, traceability in this field is provided by the Central Office of Measures (GUM). Breath analyzers are calibrated by means of wet and dry ethanol standards according to OIML R 126:2012 [1].

To ensure the technical competence of GUM in the field of breath analyzer calibration by means of wet gas standards, produced *in situ* from aqueous ethanol standard solutions, GUM participated in the EURAMET 1112 "Ethanol standards" international comparisons in 2011.

2 Measuring facilities for breath analyzer testing by means of wet gas ethanol standards

The test rig consists of two cylinders with gas mixtures, an air compressor, an artificial lung, a mass flow controller, and a system generating test gases – wet ethanol standards with different mass concentrations.

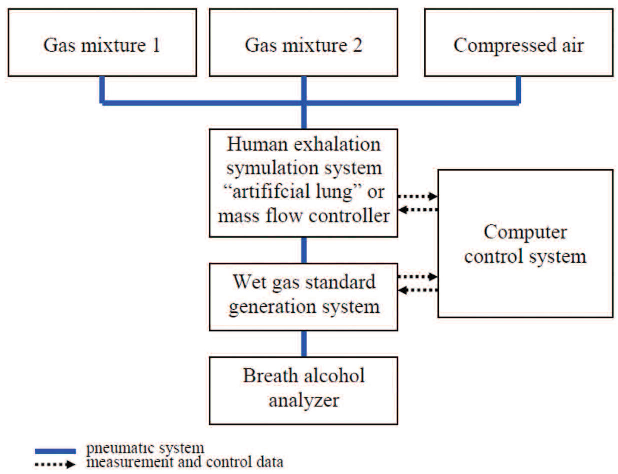

Fig. 1: Scheme of the test rig for testing breath analyzers by means of wet ethanol standards

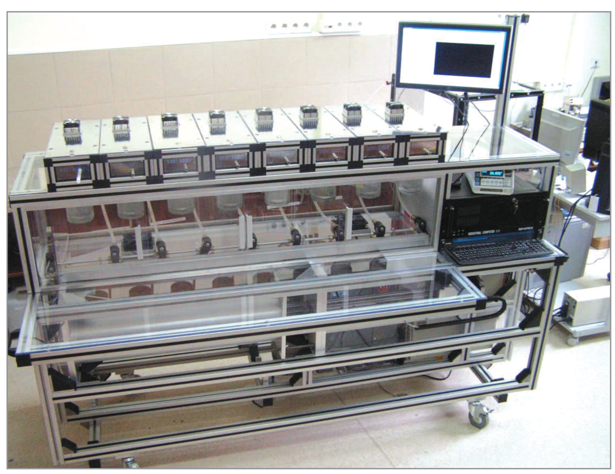

Fig. 2: Test rig for testing breath analyzers by means of wet gas ethanol standards

The system generating wet ethanol standards consists of eight individual units – measurement channels. Each unit consists of three simulators connected in series. The vessels filled with ethanol aqueous solution of well known ethanol mass fraction w are maintained at the constant temperature of 34 °C. Air flowing through a vessel is saturated with water and ethanol vapors. The ethanol mass concentration value in the gas standard $C_{et(g)}$ in equilibrium with the liquid phase obeys Henry's law and may be quantitatively described by the Dubowski formula [1]

$$C_{et(g)} = 0{,}04145 \cdot 10^{-3} \cdot w \cdot \rho_s^t \cdot e^{(0{,}06583 \cdot t)}$$

where:

ρ_s^t is the density of the solution at temperature t (calculated according to [2]).

The measuring facility is equipped with an additional mobile unit which allows physical influence factor and disturbance tests to be performed in other GUM laboratories.

The system for simulating an exhalation, the "artificial lung", allows different profiles of exhalation to be generated. Alternatively, a mass flow controller may also be used for this purpose. The whole process is supervised by means of a computer control system.

3 Facilities for aqueous ethanol standards preparation

Ethanol aqueous standard solutions are prepared gravimetrically. Ethanol of verified purity w_{et} is weighed in a closed glass vial to avoid evaporation and to reduce the effect of ethanol hygroscopicity. An appropriate mass of distilled water, necessary to obtain the required mass fraction of ethanol, is weighed in an HDPE canister. The whole process is controlled by a computer program for data acquisition (from two balances and a thermo-hygro-barometer) and calculations. The vial with ethanol is placed in the canister with water in such a way as to enable it to be opened inside the tightly closed canister, thus the loss of ethanol due to its volatility is eliminated. The mass fraction of ethanol w in the resulting solution is calculated from the formula:

$$w = \frac{m_{et} \cdot w_{et}}{m_{et} + m_w} = \frac{w_{et}}{\left(1 + \dfrac{m'_w \cdot \left(1 - \dfrac{\rho_a}{\rho_{et}}\right)}{m'_{et} \cdot \left(1 - \dfrac{\rho_a}{\rho_w}\right)}\right)}$$

where:

m_{et} – ethanol mass,
m'_{et} – result of ethanol weighing in air,
m_w – water mass,
m'_w – result of water weighing in air,
w_{et} – mass fraction of ethanol in reagent grade ethanol,
ρ_{et} – density of ethanol (calculated according to [2]),
ρ_a – density of air (calculated according to [3]),
ρ_w – density of water (calculated according to [4]).

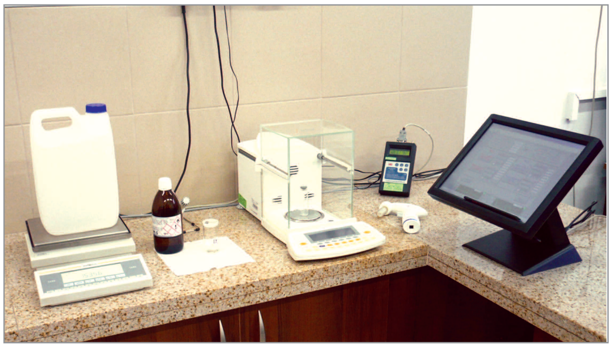

Fig 3: Stand for preparing aqueous ethanol standard solutions

4 Measuring facilities for testing breath analyzers by means of dry ethanol standards

The Dubowski formula includes empirically determined factors, therefore GUM designed, built and started operating two measuring facilities to apply alternative methods of dry gas standards: for gas standard preparation and for breath analyzer testing.

The test rig consists of nine cylinders with test gases, one of them with pure nitrogen, pressure and temperature sensors, valve manifold, mass flow controller, by-pass system and computer control system.

5 Facilities for dry ethanol standards preparation

Dry gas standards – ethanol and nitrogen mixtures of different mass concentration – are prepared gravimetrically in internally treated aluminum cylinders [5]. An appropriate amount of anhydrous ethanol in the liquid phase is injected by micro-syringe into the evacuated cylinder with a high vacuum (about 10^{-6} mbar). Ethanol under low pressure in the cylinder is decompressed into the gas phase. Then an appropriate amount of pure nitrogen is introduced into the cylinder. Nitrogen also washes the ethanol injection system. The whole process is assisted by a computer control system [6].

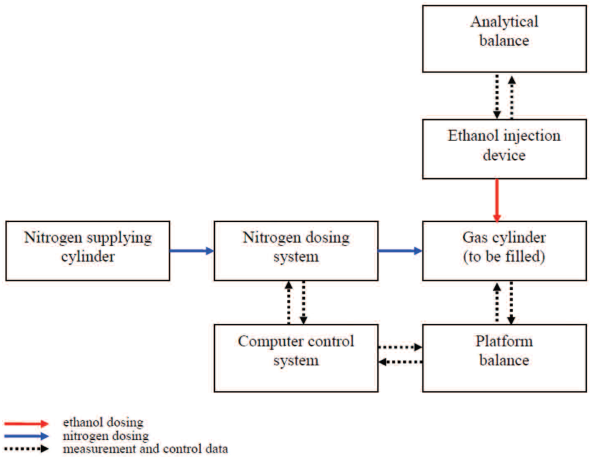

Fig. 4: Scheme of the stand for preparing ethanol in nitrogen mixtures (dry ethanol standards)

Fig 5: Stand for preparing ethanol in nitrogen mixtures (dry ethanol standards)

The ethanol mole fraction in the gas standard is given by equation [7]:

$$x_{et} = \frac{\frac{m_{et}}{M_{et}}}{\frac{m_{et}}{M_{et}} + \frac{m_{N_2}}{M_{N_2}}}$$

where:

m_{et} – ethanol mass,
M_{et} – ethanol molar mass,
m_{N2} – nitrogen mass,
M_{N2} – nitrogen molar mass.

One of the gas mixtures prepared on the new stand, of mass concentration (0.400 ± 0.004) mg/L, was validated at the NPL in 2014. The amount of ethanol determined by the NPL was equal to (0.398 ± 0.004) mg/L.

OIML R 126:2012 [1] requires testing for the influence of at least four interfering substances. Therefore, three-component mixtures (nitrogen, ethanol and an interferent) are necessary. A procedure for preparing an ethanol-interferent in nitrogen mixtures has been developed. In cases of three interferents which are liquids (methanol, 2-propanol, acetone) this procedure consists of two steps. In the first step two-component liquid mixtures of the required mass ratio are prepared gravimetrically. The procedure is optimized to reduce the hygroscopicity and the volatility effects during weighing. In the second step gas mixtures are prepared in the same way as described above for ethanol standards, but the appropriate amount of two-component mixture is injected into the cylinder instead of pure ethanol.

The ethanol and interferent mole fractions in 3-component gas mixtures are given by the equations:

$$x_{et} = \frac{\frac{m_{et}}{M_{et}}}{\frac{m_{et}}{M_{et}} + \frac{m_{int}}{M_{int}} + \frac{m_{N_2}}{M_{N_2}}}; \; x_{int} = \frac{\frac{m_{int}}{M_{int}}}{\frac{m_{et}}{M_{et}} + \frac{m_{int}}{M_{int}} + \frac{m_{N_2}}{M_{N_2}}}$$

The filled cylinders are placed in the test rig for breath analyzer testing by means of dry ethanol standards.

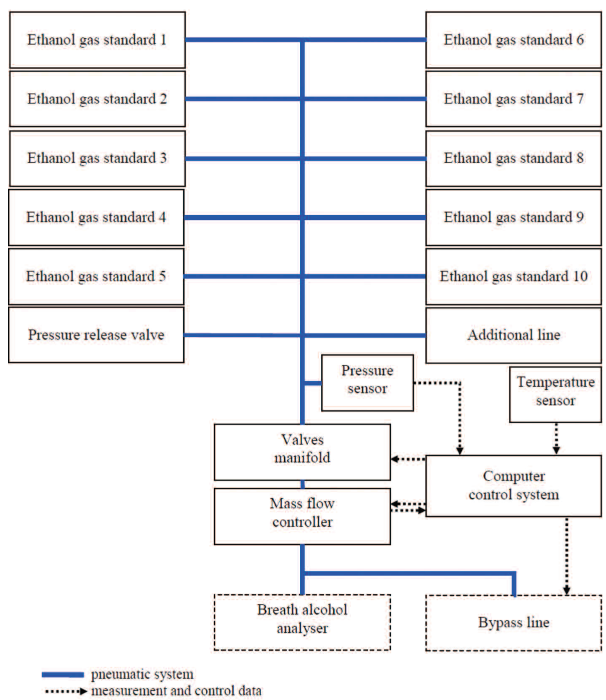

Fig. 6: Scheme of the test rig for testing breath analyzers by means of dry ethanol standards

Fig. 7: Test rig for testing breath analyzers by means of dry ethanol standards

The calibration gas delivery process consists of:

- pre-reducing pressure to approx. 2 bar,
- heating to the chosen temperature,
- generating an exhalation (with a chosen flow profile).

The value of the mass concentration of ethanol (and the interferent if present) in the gas standard under measurement conditions C is calculated according to the formula:

$$C = \frac{x \cdot M \cdot T_n \cdot P_p \cdot Z_n}{Z_p \cdot V_n \cdot P_n \cdot T_p}$$

where:

x – mole fraction of ethanol or interferent in the gas standard,
M – ethanol or interferent molar mass,
T_n – absolute temperature under standard conditions, equal to 273,15 K,
T_p – temperature under measuring conditions (K),
P_n – pressure under standard conditions, equal to 1013,25 hPa,
P_p – pressure under measuring conditions (hPa),
V_n – molar volume of gas under standard conditions, equal to 22,4138 dm^3,
Z_n – gas compressibility factor under standard conditions (dm^3),
Z_p – compressibility factor under measurement conditions.

Conclusions

The Central Office of Measures has the necessary equipment and the confirmed technical competence for testing breath analyzers. GUM is capable of performing tests and calibrations using two independent methods, i.e. by means of dry and wet ethanol gas standards, to organize national comparisons and to participate in international comparisons. In 2015, ten Polish calibration laboratories (accredited or applying for accreditation) participated in the national comparisons in the field of breath analyzers, conducted by GUM. All measurements were performed by means of wet gas standards using the test rig described above.

The development and improvement of the self-designed GUM facilities enables cooperation with other national metrological institutes (NMIs) in the field of breath analyzer testing and calibration. ■

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HISTORY OF SCALES

Part 19: Consumer protection and fair competition – rules for prepackages

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1 Prepackages and bulk products

Today, nearly all everyday goods are supplied both to private and to industrial end users in the form of prepackages. Most are foodstuffs, detergents, cosmetics or chemical and pharmaceutical products (see Fig. 1).

In contrast, fresh produce (such as fruit, vegetables and potatoes, but also meat, fish and products made of these) is often portioned and weighed in front of the customer.

In general, these products are sold using verified non-automatic weighing instruments (NAWIs), some of which are equipped with an integrated price computer and printer. Whereas in this form of retail, the customer can observe how goods are weighed, this is not possible when buying prepackages. With prepackages, the customer must be able to rely on the quantity stated on the package.

In numerous countries, prepackages must comply with certain rules that are legally binding. These rules mainly address the indication of the nominal quantity and of the manufacturer, and the accuracy of the nominal quantity stated. This is done, on the one hand, to inform and protect individual customers and, on the other hand, to efficiently contribute to fair competition between manufacturers.

Concerning the text below, readers are invited to explore Parts 17 and 18 again, which dealt with (automatic) checkweighers.

The fully automated industrial manufacturing of prepackages mainly relies on checkweighers which are usually placed at the end of the production line to monitor compliance with the legally required net quantity and record it traceably. Within the European Union, all checking facilities used for the packing of prepackages (i.e. also checkweighers) must have been granted type approval and must have been verified. The only exception is the United Kingdom, where check-weighers are not subject to verification.

2 International publications

Two OIML Recommendations and two Directives of the (former) European Economic Community (EEC) (later European Community (EC), and now European Union (EU)) contain essential requirements for prepackages:

OIML R 79:	Labeling requirements for prepackages, 2015
OIML R 87:	Quantity of product in prepackages, 2004, 2008 (currently under revision)
76/211/EEC:	Labelling of prepacked products (consolidated text), 2007
2007/45/EC:	Rules on nominal quantities for prepacked products, 2007

Figure 1: Different types of prepackages of the same nominal quantity

Figure 2: Automatic checkweighing machine in a fully automated industrial production line for prepackages (here: tinned fish)

OIML publications are **Recommendations** whose transposition into national legislation is a moral obligation for the Member States. The European Directives, however, are **binding** for the Member States of the European Union, of which there are now 28, and must be transposed into national legislation within a certain time.

OIML Recommendations and EU Directives may be formulated slightly differently and may even contain different requirements, but they pursue the same goals. By the term “prepackages”, both institutions understand roughly the same thing, namely any kind of packing material (e.g. tins, jars, bottles, bags, boxes, containers, foils) which is filled and sealed in the absence of the purchaser; in addition, the quantity of product contained in prepackages has a pre-determined value which cannot be changed without opening or perceptibly modifying the packing material. This pre-determined value is the so-called “nominal quantity”.

OIML R 87 applies to prepackages of the same nominal quantity with a weight or volume indication from 0 g (or ml) to 50 kg (or L) or with an indication stating the number of pieces, the length or the square footage of product contained. In contrast, the scope of Directive 76/211/EEC is limited to prepackages of the same nominal quantity with a weight or volume indication from 5 g (or ml) to 10 kg (or L).

2.1 International Recommendations OIML R 79 and OIML R 87

The main requirements apply to:

- the indication of the nominal quantity in defined measurement units as follows: in units of volume for liquid products, in mass units for solid products, and either in volume or mass units, depending on national provisions or commercial usage, for pasty goods;
- the indication of the manufacturer, packer or retailer;
- the accuracy of the actual quantities (i.e. compliance with the average requirement and with the tolerable deficiency which depends on the nominal quantity);
- the prohibition of prepackages that may mislead the consumer about the quantity of contents that they contain; and
- the control processes to be used by the competent bodies:
  - to monitor the actual quantities by random sampling;
  - to take tare weights into account; and
  - to check products packed in a liquid medium and frozen or ice-glazed products.

However, no requirements exist concerning the quality assurance measures to be applied by the prepackage manufacturer in order to comply with the requirements placed on the actual quantity. Nor are there any rules concerning the procedures for determining the density which are to be used for the gravimetric testing of prepackages with a volume indication.

2.2 European Directives 76/211/EEC and 2007/45/EC

The main requirements concern:

- the indication of the nominal quantity in defined measurement units as follows: in units of volume for liquid products, in mass units for solid products, and either in volume or mass units, depending on national/European provisions or commercial usage, for pasty goods;
- the minimum type sizes to be complied with when indicating the actual quantity;
- the identification of the EU-based filling plant, the customer or the importer;
- the accuracy of the actual quantities (i.e. compliance with the average requirement and with the maximum tolerable deficiency which depends on the nominal quantity);
- test measurements to be carried out by the filling plant using legal measuring instruments, and recording of the measurement results;
- binding values for nominal quantities of prepackages containing wine, sparkling wine and spirits in the range of actual quantities from 100 ml to 2000 ml;
- the optional use of the ***European conformity mark “e”***, with which the filling plant *or the importer confirms that the prepackage concerned complies with the provisions of the Directive (see Fig. 3); and*
- the control processes to be used by the competent bodies to monitor the actual quantities by random sampling.

The Directives contain neither provisions with regard to the processes to be used to test products packed in a liquid medium and frozen or ice-glazed products, nor rules on how to account for tare weights or on how to determine density. They also lack a rule to prohibit prepackages that may mislead a consumer about the quantity of contents that they contain.

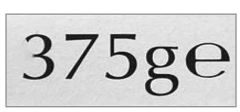


Figure 3: Marking with the “e” symbol (example)

3 Accuracy requirements

The accuracy requirements contained in the OIML Recommendations and the European Directives are practically identical. In principle, three independent requirements for the accuracy of the actual quantity can be distinguished: the average requirement and the two requirements placed on compliance with the tolerable deficiency.

The most important of these requirements is the average requirement. It specifies that the average actual quantity μ may not be smaller than the nominal quantity Q_N which is indicated on the prepackages in question, i.e. $\mu \geq Q_N$.

Average means the arithmetic average, which is the sum of all individual weight values or individual volume values divided by the number of prepackages taken into consideration. The average requirement refers to prepackages manufactured under the same conditions (same manufacturer, same filling material, same nominal quantity, same type of packaging).

The average requirement aims, on the one hand, to protect consumers and, on the other hand, to prevent competitive advantage due to the systematic underfilling of prepackages. It cannot, however, rule out the possibility that an individual consumer will purchase prepackages that are underfilled at an unacceptable level when compared to their nominal quantity. For this reason, in addition to the average requirement, maximum tolerable deficiencies which depend on the nominal quantity must be complied with. A distinction is made between the statistical negative errors T (see Fig. 4) – which a maximum of 2.5 % of the prepackages belonging to one inspection lot may violate – and the absolute lowest negative errors 2 T.

An inspection lot is a defined number of prepackages which were manufactured under uniform conditions. The tolerable value of 2.5 % is specified directly in OIML R 87. The same value is obtained from 76/211/EEC – however not directly, but from the sampling plan on which the acceptable quality limit of 2.5 % (AQL 2.5) is based. In this case, inspection lots which have passed the decisive sampling test contain, with a probability of 95 %, no more than 2.5 % of prepackages whose actual quantity exceeds the tolerable deficiency.

It is often more appropriate to work with tolerance limits rather than with negative errors. With Q_N as the nominal quantity and T as the tolerable deficiency (expressed in g or ml) depending on the nominal quantity, the following relation is obtained:

$$T_{u1} = Q_N - T$$

The absolute tolerance limit requirement T_{u2} is a complement to this statistical tolerance limit requirement which permits the manufacturing of a certain proportion of prepackages containing lower actual quantities. No prepackage may exhibit a negative error larger than twice the tolerable deficiency.

The following formula applies:

$$T_{u2} = Q_N - 2\,T$$

Example: The inspection lot considered consists of 6 000 prepackages with the nominal quantity Q_N = 500 g.

The following requirements are placed on the actual quantities:

Average requirement:	μ	≥ 500 g
T_{u1} requirement:	$T_{u1} = 500 - 0.03 \cdot 500$ g	= 485 g
T_{u2} requirement:	$T_{u2} = 500 - 2 \cdot 0.03 \cdot 500$ g	= 470 g

In this case, a maximum of 2.5 % of the prepackages (i.e. 150 prepackages) may have an actual quantity amounting to less than 485 g, but no prepackage may have an actual quantity smaller than 470 g.

The actual quantities of prepackages are statistically distributed, whereby the majority (at least 80 %) of all filling processes can be described by means of a normal

Nominal quantity Q_N in g or ml	**Tolerable deficiency T**	
	in % of Q_N	**in g or ml**
5 to 50	9	-
50 to 100	-	4.5
100 to 200	4.5	-
200 to 300	-	9
300 to 500	3	-
500 to 1 000	-	15
1 000 to 10 000	1.5	-

Figure 4: Tolerable deficiency for nominal quantities from 5 g (or ml) to 10 000 g (or ml) according to OIML R 87 and 76/211/EEC

distribution as a mathematical model. Such a distribution is clearly described by the mean value μ and the standard deviation σ as the measure for the scattering around the mean value. If the average requirement is only just compliant with ($\mu = Q_N$), the maximum admissible standard deviation σ_{max} (which allows a maximum of 2.5 % of all prepackages to exceed the T_{u1} limit) can be calculated by approximation for each package size:

$$\sigma_{max} = (Q_N - T_{u1}) / 1.96$$

If the actual standard deviation of the filling process σ_{tats} is larger than σ_{max}, the prepackages must be overfilled to some extent, i.e. the average must be larger than the nominal quantity. The approximated target weight Q_s is thus:

$$Q_s = T_{u1} + 1.96 \cdot \sigma_{tats}$$

The factor 1.96 is taken from a table for the sum function of the normal distribution. If σ_{tats} is smaller than σ_{max}, overfilling is not necessary.

Manufacturing a prepackage consists in combining a product and the packing material in which it is prepacked, and sealing the prepackage. The manufacturing process cannot always be considered completed when these activities have been completed themselves. If the filling material and the package must first undergo subsequent processing to become "suitable for sale", the manufacturing of the prepackage can only be considered completed once the subsequent processing has been completed. This is particularly true of cases where the actual quantity changes due to the subsequent processing.

4 Checking by competent authorities

Compliance with the actual-quantity requirements can be checked by means of random sampling, which can, by its nature, only be representative of a relatively short period of production. Sample prepackages are chosen randomly (i.e. they all have the same probability to be included in the sample). The inspection lot usually consists of the prepackages produced in one hour; it is, however, limited to 10 000 pieces.

Both OIML R 87 and 76/211/EEC contain specifications concerning the procedures to be used by the competent authorities to test the actual quantity. This test mainly consists of:

- determining the sample size (see Fig. 5);
- taking the corresponding random sample;
- determining the tare weight (if necessary);
- determining the density of the product (if necessary);
- determining the sample mean value $\bar{x}$, and, if it is smaller than the nominal quantity, determining the sample standard deviation s; and
- stating the number of prepackages contained in the random sample which exceed the tolerance limit T_{u1}.

The average requirement is complied with

$$\text{if } \bar{x} \geq Q_N \text{ or if } \bar{x} < Q_N,$$
$$\text{if } \bar{x} + k \cdot s \geq Q_N$$

With the correction factor k (see Fig. 5), which is obtained from the decisive random variable of Student's distribution (t-distribution) and from the sample size, and the standard deviation of the sample values, the confidence interval $k \cdot s$ is calculated for the mean value. This is intended to ensure that a possible violation of the average requirement is detected with 99.5 % certainty.

The requirements placed on the compliance with the tolerable deficiencies are met if the number of prepackages of the random sample which may violate the tolerance limit T_{u1} – as laid down in the test schedule – is not exceeded (see Fig. 6). In this case as well, it is guaranteed with an exceptionally high probability (of usually more than 95 %) that a potential objection is correct.

The test schedule, which is part of 76/211/EEC, contains a particularity which can hardly still be considered topical. For the non-destructive testing of an

Lot size	Sample size OIML R 87	Correction factor OIML R 87	Sample size 76/211/EEC	Correction factor 76/211/EEC
	n	*k*	*n*	*k*
100 to 500	50	0.379	30	0.503
501 to 3 200	80	0.295	50	0.379
more than 3 200	125	0.234	50	0.379

Figure 5: Sampling plans for the non-destructive mean value testing according to OIML R 87 and 76/211/EEC (n sample size and k sample correction factor)

Lot size	Sample according to OIML R 87	Prepackages with $Q < T_{u1}$ according to OIML R 87		Sample according to 76/211/EEC			Prepackages with $Q < T_{u1}$ according to 76/211/EEC	
	n	c	d	No.	n	n_k	c_1 , c_k	d_1 , d_k
100 to 500	50	3	4	1st	30		1	3
				2nd	30	60	4	5
501 to 3 200	80	5	6	1st	50		2	5
				2nd	50	100	6	7
more than 3 200	125	7	8	1st	80		3	7
				2nd	80	160	8	9

Figure 6: Sampling plans for non-destructive T_{u1} testing according to OIML R 87 and 76/211/EEC

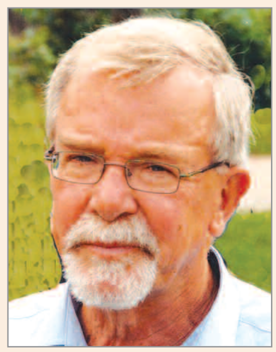
inspection lot, the sample size for testing compliance with the average requirement may be considerably smaller than for testing compliance with the tolerable deficiencies (see Fig. 5). In addition, compliance with the tolerable deficiencies is assessed on the basis of a double-test plan which, most of the time, is too complex for practical application.

Q actual quantity
n sample size
n_1, n_2 sample size of the 1st or 2nd random sample
n_k cumulated sample size from the 1st and the 2nd random samples
c number of accepted pieces
c_1, c_k number of accepted pieces from the 1st or from the cumulated random sample
d number of rejected pieces
c_1, c_k number of rejected pieces from the 1st or from the cumulated random sample

5 Outlook

The importance of prepackages will increase rather than decrease. It can be expected that essential parts of Directive 76/211/EEC, which is now 40 years old, will be revised in the near future. It will probably be adapted to OIML R 79 and R 87 (currently under revision). It would also be desirable for the requirements placed on the manufacturers' quality management system to be formulated more precisely, for the measurement procedures that depend on the sampling plan to be regulated, and for the European mark of conformity "e" to achieve greater significance. ■

Sigurd Reinhard (M. Eng), Kiel



After studying at the Technical University of Hannover, Sigurd Reinhard spent several years at the PTB in Braunschweig, Germany. He went on to become Director of verification management of the County of Schleswig-Holstein (Germany). He was also a Consultant and Advisor in matters of legal metrology in numerous East Asian, South American and East European countries. He is co-author of the regularly updated commentary "Pre-package right" (Kommentar Fertigpackungsrecht) published by B. Behr's Verlag, Hamburg.

The biographies of Bernd Zinke and Wolfgang Euler were published in the April 2016 Bulletin.

CONTAINER WEIGHING

Change and uncertainty in the container logistics supply chain

Mis-declaration leads to changes in container shipping

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Cargo has been shipped in freight containers for over 60 years. The "Ideal X" sailed from Houston on 26 April 1956 from Port Newark in the USA with 58 containers. Today, by some estimates there are over 37 million TEUs circulating across the globe with many more actual movements of those containers.

The SOLAS (Safety of Life at Sea Convention) Amendment to make shippers responsible for verifying the gross mass of a packed container and its contents has sent reverberations around the industry with many saying they were not ready, or not even aware of the new requirements that came into force on 1 July this year.

Many in the industry say this was an unnecessary step that will distort trade and at least add cost to the freight journey of a container at a time when certain players in the industry, notably ocean carriers, are facing something of a crisis in uncertain trade and financial markets.

It is true that SOLAS which was mandated and then amended many times by the IMO (International Maritime Organisation) since its original inception following the "Titanic" sinking, has for many years included a mandatory requirement for shippers to declare the gross mass of their cargo correctly. So why has this new requirement to verify gross mass when that cargo is packed into a freight container come as such a shock?

Sixty years on, should we not know what the weight of the container and its cargo is? Is estimation of same such a bad thing? Evidence presented to IMO delegates showed that it can indeed be a significant problem and has led to many incidents of collapsing container stacks, damaged containers, overturned vehicles and equipment and even whole vessels capsizing.

The WSC (World Shipping Council) led calls at IMO for this new legislation following extensive research carried out by the MARIN Research Institute in the Netherlands. This research, titled "lashing@sea", was carried out by various liner shipping companies and interested organisations over several years into the loss of containers overboard across the globe. Of its many findings and recommendations, the one that IMO decided to tackle first was the "mis-declaration of container weights".

Evidence from several serious marine casualties showed that there can be a large variance in what shippers declare the weight to be and the actual weight. As one example, Figure 1 shows the safety load cell indicator on a top-lifting container fork lift indicating a weight of 42 t. Such cells are generally calibrated to give a reading to +/- 5 % as they are designed to protect the equipment from being overloaded. So the actual mass being lifted may have been anything from 39.9 t to 44.1 t.

What is clear though is that the particular container was grossly overloaded with paving blocks (Figure 2) and in fact was only a standard 20-foot dry van (the basis for a TEU) which probably had a maximum cargo

Fig 1: Load cell weight indication on reach stacker

Fig. 2: 20-foot dry van filled with paving blocks

carrying capacity in the region of 28 t. Imagine the consequences of stowing this container high up in a vessel's stow; it is easy to imagine what could go wrong.

New SOLAS legislation

This, then, is the essence of the new legislation. Shippers have a history of, if not wholeheartedly mis-declaring container weights, then certainly "estimating" them, in some cases because of the complexities of the contractual relationships and who is actually packing the container. However, the industry has said enough is enough, and it is clear that this is a request from the industry and not from governments, as this is where initial calls came from and the IMO would not make legislation for its own sake. That said, of course all government signatories to the SOLAS convention have accepted the new legislation; however, this is adding to uncertainty and confusion as very few of those governments have actually issued their own national legislation and/or guidelines on how the matter will be handled in that particular nation.

So if the industry called for this, why so much confusion and dismay? Much of this springs from uncertainty of where the physical act of weighing will take place and on what equipment.

How can the cargo and container be weighed?

We know the VGM must be obtained using one of two methods:

- Method 1: Weigh the packed container in in its entirety; or
- Method 2: Weigh all the cargo items, packaging, dunnage and lashing and securing materials and then add the tare weight of the container.

This was a "compromise" solution as many argued that the world was not quite ready for full implementation of Method 1 only.

Whichever method is used the equipment has to be "certified" and "calibrated" to the standards approved by the competent authority in the nation where the packing takes place. Sounds simple in practice? Well let's consider the options.

Method 1 necessarily implies weighing the whole packed container, but in almost all cases the container will be on the back of some kind of trailer or chassis. This suggests utilising a weighbridge. Certification and calibration of weighbridges is generally well established, there are many in use for trade today and accuracy levels across a range of weights are well established.

However, the question is where are these weighbridges? Are they well positioned along container logistics supply chain routes? Are they sufficient in number? Will they necessitate multiple journeys as the vehicle itself will need taring off to reach an accurate VGM unless a piece of lifting equipment is positioned at the weighbridge to lift the container off the vehicle? Some also say that "estimates" of vehicle weights and variables such as fuel, etc. throw the whole requirement for greater accuracy into doubt.

What about two TEUs on one chassis, what about road trains? No doubt weighbridges will be an effective solution for many but the industry needs a range of solutions. During recent ICHCA and other events we have seen a range of new technologies emerge that provide weighing opportunities at other points in the supply chain.

It has long been recognised that weighing as the container is lifted onto the vessel at the quayside is far too late in the process; this was recognised in the SOLAS amendment wording which states "VGM shall be communicated in sufficient time to enable effective stow planning". So if weighing is to take place at the port, and many argued this was the best place, as all containers must pass through there, then some kind of weighing capability on the receiving equipment, be that a top lift, RTG, RMG, etc. seems a sensible option.

However, SOLAS stopped short of making it mandatory to weigh at the port, the safety argument being that the container should be weighed as close to its packing point as possible – i.e. the shippers' premises, warehouse, etc. However, SOLAS has made terminals jointly responsible with ocean carriers for not "loading" the container onto a ship without first having received, or themselves obtaining that VGM.

Solutions and certification

This is where one of the problems lies; many manufacturers have offered solutions but terminals were loath to buy and install until they were sure someone was going to pay them to receive financial return on their considerable investment. Terminals usually have contracts with ocean carriers (i.e. the shipping lines), but the responsibility for obtaining VGM is that of the shipper who generally does not have any form of contractual relationship with terminals.

To add to the complexity, certainly in the early days, terminals were also looking at buying systems that were not yet "certified and calibrated" to the competent authority approval and this was seen as a major stumbling block and one that manufacturers of new technology, such as twist lock sensors fitted to the port receiving equipment, had not paid much attention to in

Fig 3: Twistlock sensor technology allows weighing of at least two containers simultaneously

Fig 4: New technology can prevent this type of accident

their efforts in concentrating on getting the technology itself right first.

Add to this the fact that nations were slow in issuing guidelines – the UK was the first to do so – many still have not, and it can be seen why there had been very little uptake. Manufacturers confirm there has been a recent surge in orders and this situation will continue for some time as industry adjusts.

The issue of certification has been helped enormously by the involvement of the OIML. Sadly, the OIML was not consulted by IMO or any of the national governments or industry bodies in the build-up to the adoption of this legislation. It was only when Ian Dunmill attended ICHCA's conference on the subject in September 2015 that the organisation became aware, formally, of the requirement and we have been engaged with each other since.

The OIML's extensive network of Member States and Corresponding Members across the globe is now assisting manufacturers to obtain approval for their systems using established OIML standards and methodology and this will enable the industry to meet its obligations.

To conclude, many manufacturers are now providing solutions for the container logistics supply industry to help them meet their new requirement to obtain VGM. Weighbridges and similar technology such as platform scales (for Method 2) and conveyor weighing systems exist and are well developed but will only provide some of the capability.

New technological solutions are being developed that have a significant added value, for example dynamic or "weigh in motion" weighbridges can detect differences between vehicle axle weights. Some sensitive weighbridges are being developed to detect container weight distribution "eccentricity". Container spreader twist lock sensors can also detect such eccentricity and furthermore can detect snag loads, i.e. lifting the container with the vehicle still attached.

What will happen next?

As stated, Method 2 was an industry and IMO compromise and there are fears that accuracy levels will not improve significantly as shippers may continue to just "estimate" gross mass. If that is the case, then in a few years, if containers continue to be lost overboard then IMO may call for removal of this option and leave just the "gold" standard of having every packed container physically weighed.

What about that "eccentricity" issue? The new *Code of Practice for Packing Cargo Transport Units* issued by the IMO, ILO and UNECE certainly addresses this along with other packing and securing issues, but not mandatorily. Some argue that knowing the accurate weight is not enough, particularly the rail operators, and this could be the next logical step.

Whatever happens, the industry will now move forward, albeit with perhaps a bumpy few months as the "New Operational Reality" (as the WSC calls it) settles in. However, the industry must work in close liaison with the OIML in order to ensure that the gross mass of a packed container can be calculated as accurately as possible to ensure the safety of loading and subsequent transport. ■

RUSSIAN FEDERATION

The Russian Academy of Metrology

Prof. Dr. Vladimir Okrepilov
President of the Russian Academy of Metrology,
General Director of the State Centre
"Test - St. Petersburg",
Full Member of the Russian Academy of Sciences

The Russian Academy of Metrology is Russia's, and perhaps the world's largest association of leading scientists and experts in the field of ensuring the uniformity of measurements, dedicated to advancing science and technology, modernizing the economy and improving the quality of goods and services.

The Academy was established in May 1992 at the initiative of the leading Russian metrologists at the time. Currently, the Academy is constituted by eight regional offices and eight Coordinating Scientific Councils, incorporating about 1,000 specialists from 75 regions of Russia and some foreign countries.

At the recent plenary meeting of the All-Russian Convention of Metrologists and the Instrument-Making Industry Professionals (see page 30) I was able to provide a detailed description of the activities of the Academy.

The main tasks of the Academy are focused on:

- identifying and substantiating priority fundamental and applied problems of metrology and measurement theory,
- facilitating the consideration of the relevant issues at the state authorities' level,
- promoting the development of concepts, principles, new methods and technical means of reproduction, maintenance, storage and transfer of units of the physical quantities to the working measuring instruments, and
- enhancing the metrological culture and ensuring the uniformity of measurements carried out in the process of implementing national projects, product testing, etc.

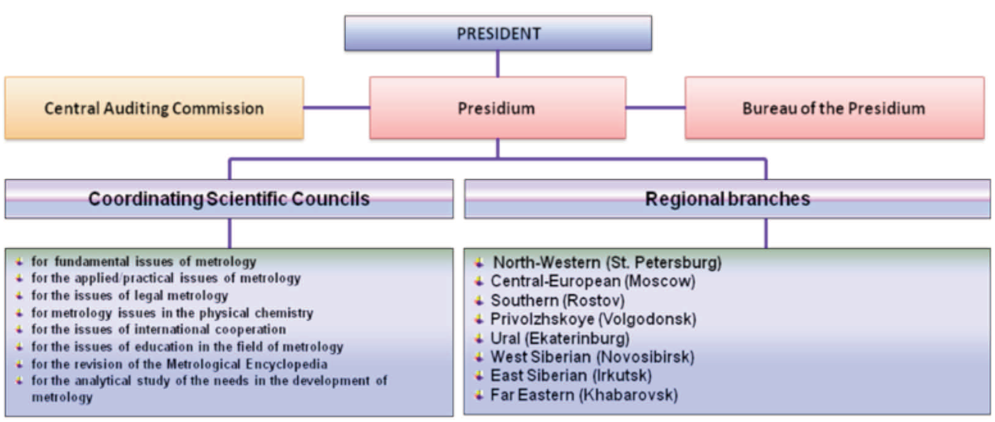
At the same time the Russian Academy of Metrology actively contributes to:

- improving the professional skills of experts in the field of measuring technologies and metrology,
- enhancing the qualification and measurement culture of measuring instrument users,
- promoting the theoretical, practical and social importance of measuring technologies and metrology, and
- protecting the intellectual property of the Academy members.

Activities of the Academy include researching the impact of metrology on the development of Russia's economy, assessing the measuring needs of industry and optimizing the reference standards collection of Russia. Considerable attention is paid to improving the system of professional training in the field of ensuring measurement uniformity.

At the same time, the Academy actively contributes to organizing events on the popularization of metrology such as scientific and practical conferences, seminars and symposia.

Among the largest projects implemented by the Academy in recent years is the publication of the Metrological Encyclopedia, the elaboration of the



Structure of the Russian Academy of Metrology

Federal Target Program "Reference Standards of Russia" and the fundamental law FZ 102 "On Ensuring Uniformity of Measurements", establishing the key directions of metrological activities.

The Academy has actively participated in organizing various scientific and practical all-Russia and international conferences such as the "Metrological Provision of the National Economy of Russia", "International and National Aspects of Environmental Monitoring" and "Metrological Provision of the Economy in Current Conditions". The latter was held in September 2015, and was dedicated to the 90th anniversary of the Federal Agency on Technical Regulating and Metrology (Rosstandart) and the 115th anniversary of the State Centre "Test-St.Petersburg".

Conference participants were welcomed by the Governor of St. Petersburg Mr. Georgiy Poltavchenko. Among the participants and speakers were the Head of Rosstandart Mr. Alexey Abramov, the Head of the Federal Accreditation Service of Russia (RusAccreditation) Mr. Savva Shipov, leading experts of the Russian metrology institutes, members of the Russian Academy of Metrology, representatives of the state legislative and executive authorities, public associations of entrepreneurs and consumers, industry professionals and students of the higher education institutions.

Main speakers of the Conference
Mr. P. Mason (CIML President) and Dr. B. Inglis (CIPM President)

Among the main speakers of the Conference were Mr. Peter Mason, President of the International Committee of Legal Metrology (CIML), and Dr. Barry Inglis, President of the International Committee for Weights and Measures (CIPM). Both were awarded the highest recognition of the Russian Academy of Metrology – D.I. Mendeleev Grand Gold Medal.

During his visit to the Conference in St. Petersburg Mr. Peter Mason also visited the Academy to meet with me and the Vice-Presidents of the Academy Dr. Lev Issaev and Dr. Nikolai Khanov. We discussed the activities of the Academy and the national metrological institutions of Russia and the UK, as well as the overall global situation in the field.

The Academy has also played an important role in organizing various events dedicated to the 180th anniversary of D.I. Mendeleyev, including the meeting of the Scientific and Technical Council of the State Centre "Test-St. Petersburg", the meeting of the Board of Directors of the State Centre for standardization and Metrology of the North-West Federal District of Russia, meetings of the Presidium of the Russian Academy of Metrology and the International Scientific and Practical Conference "D.I. Mendeleyev - the founder of the State Metrological Service of Russia".

Metrological Encyclopedia

The ***Metrological Encyclopedia*** is a unique edition that covers the history and the current state of domestic metrology.

The first volume contains thematic articles on the history and the present state of metrology, focusing on the theoretical, fundamental and applied issues of science, as well as legal, technical and organizational bases of metrological activities.

The second volume covers the biographic data on the leading experts of the branch, for whom metrology became both a vocation and the main sphere of activities.

In addition, an information booklet containing brief data on the contents and structure of the edition in Russian and English languages has been published, and a CD version of the Metrological Encyclopedia is available.

The Academy was one of the key developers of the *Strategy on Ensuring Uniformity of Measurements in the*

Meeting in the HO of the Russian Academy of Metrology.
From left to the right: Dr. Nikolai Khanov, Mr. Peter Mason,
Prof. Dr. Vladimir Okrepilov, Dr. Lev Issaev

Russian Federation up to 2025. This is a major document for long-term planning that covers a set of target programs, projects and activities aimed at ensuring the fullest development of capacities of the current metrological infrastructure in Russia.

The organizations and scientific research institutes which contributed to the elaboration of the Strategy are shown in the diagram below.

Recently experts of the Academy carried out an analysis of the valid regulatory legal acts related to ensuring the uniformity of measurements in the Russian Federation, as well as the results of implementing the previous Strategy on Ensuring Uniformity of Measurements in the Russian Federation for the period up to 2015.

This analysis of documents allowed the current situation in the field of measurement traceability to be identified, including the state of the reference standards collection, measuring instruments in use, financial support and the level of integration into the international system of metrology. Russia currently holds second place across the world in terms of the volume of calibration and measurement capability.

It should be emphasized that the existence of a direct correlation between the state of affairs in the sphere of metrology and basic economic development indicators of a country has been proved.

Thus, one of the research works carried out by the Academy focused on analyzing the impact of the metrological system on various branches of the national economy. This research has confirmed a positive impact of metrology on the activities of people and society as a whole.

Today, the science of measurements and methods for ensuring their uniformity provide foundations of effectiveness of human activities in most major spheres and branches such as production management, diagnostics and treatment of diseases, reliable control over material and energy resources, product quality control, occupational health and safety, environmental protection, reliable operation of communication and transportation means, and even national defense.

Both in Russia and abroad, practical scientific studies were carried out to identify interrelations between the quality of life and the development level of the metrology system. In particular the calculations were based on indicators of investments into a measurement infrastructure and the budgets of the NMIs considered in relation with the indicators of the quality of life ratings. An apparent correlation between the relevant indicators was found.

Based on the recent achievements and research of the Academy, a number of priority actions were proposed that aimed at solving systemic problems in the field of ensuring uniformity of measurement.

These actions include creating a mechanism for forecasting the economy's and society's needs in measurements, ensuring the advanced development of metrological support of the priority directions of science and technology, as well as enhancing the collection of standards in the Russian Federation. Among the other important tasks are: update of the legislation in the field of measurement traceability aimed at meeting the needs of society and the state, improvement of the effectiveness of the federal government's metrological supervision and provision of national metrology with the qualified personnel. ■

Organizations and research institutes which contributed to development of the Strategy

RLMO NEWS

COOMET's 25th Anniversary

The Memorandum establishing the foundation of COOMET, a new regional metrological organization, was signed on June 12, 1991 in Warsaw. It was a result of the desire of metrologists from Central and Eastern Europe to continue the multilateral co-operation of many years in the changing geopolitical situation of the time.

Twenty-five years have passed since that memorable day!

On this very important occasion we, the COOMET veterans who were part of its foundation, rise and development, congratulate everyone working in support of COOMET's cause, who are involved in resolving metrological issues in the name of progress and economic development on the international and national levels in the globalized market.

Many of the COOMET veterans are now retired; others work outside of COOMET, but all of us keep track of COOMET's activities with great interest and pride.

Working together, within the twenty-five years, COOMET has become a universal regional metrological organization devoted to scientific, legal, and applied metrology. COOMET is now an international authority and, largely because its full and associate members have equal rights, it was able to bring together experts from 21 countries on three continents.

In the 25 years of COOMET's devoted work, several points are of special note:

- efficient management of the cooperation, quick information exchange, and objective assessment of the members' input in the job of achieving the goals faced by COOMET;
- improvement of the member-countries' measurement standard base and international recognition of calibration and measurement capacity of their national standards;
- a high level of administration and methodology, as well as highly effective work on educating the younger generation of metrologists.

We hereby congratulate the multinational team of COOMET metrologists on the Anniversary and wish them to keep up the success they have achieved in strengthening the role of metrology in the most significant areas of science, industry, and trade on the global and regional levels, as well as within each and every one of the member countries! ■

COOMET Honoured Metrologists:

Zhagora N. (Belarus)
Kochsiek M. (Germany)
Hahnewald R. (Germany)
Velfe H.-D. (Germany)
Staugaitis O. (Lithuania)
Hanganu E. (Moldova)
Belotserkovskiy V. (Russia)
Gorshkov B. (Russia)
Korostin S. (Russia)
Kuznetsov V. (Russia)
Leonov V. (Russia)
Durish S. (Slovakia)
Kromkova E. (Slovakia)
Musil S. (Slovakia)

TC/SC NEWS

Meeting of OIML TC 12 *Instruments for measuring electrical quantities*

30–31 May 2016 Dordrecht, The Netherlands

PHILLIP MITCHELL
OIML TC 12 Secretariat
Legal Metrology,
National Measurement Institute Australia

Introduction

An OIML TC 12 meeting was held on 30–31 May in Dordrecht, Netherlands. There were 18 participants representing 13 P-members. This TC most recently developed OIML R 46 *Active electrical energy meters*, and there are currently no active projects.

The purpose of the meeting was to review the role and potential new projects of OIML TC 12. This was particularly important to address the existence of multiple standard-setting bodies in the field of electricity metering, and advances and changes to metering technology and applications.


INTERNATIONAL RECOMMENDATION
OIML R 46-1/-2
Edition 2012 (E)

Active electrical energy meters.
Part 1: Metrological and technical requirements
Part 2: Metrological controls and performance tests

Compteurs actifs d'énergie électrique.
Partie 1: Exigences métrologiques et techniques
Partie 2: Contrôles métrologiques et essais de performance

OIML R 46-1/-2 Edition 2012 (E)

OIML
ORGANISATION INTERNATIONALE DE MÉTROLOGIE LÉGALE
INTERNATIONAL ORGANIZATION OF LEGAL METROLOGY

Multiple standard-setting bodies

OIML TC 12 is responsible for "Instruments for measuring electrical quantities". There is also an International Electrotechnical Commission (IEC) committee, IEC TC 13, which is responsible for "Electrical energy measurement and control", with a working group (WG 11) responsible for "Electricity metering equipment". Similarly, the American National Standards Institute (ANSI) produces standards covering electricity metering equipment (ANSI C 12 standards). Further, the European Commission has the Measuring Instrument Directive (MID) which provides the framework for measuring instrument standards in Europe. IEC standards provide a pathway for approval under the MID and OIML is an alternative pathway.

Considering the existence and extensive adoption of IEC, ANSI and other standards in the market, the meeting discussed the role of OIML TC 12 and the future of OIML R 46. Joint committee projects with IEC and ANSI were also discussed, but this will not be pursued at this time due to incongruous project timelines.

Adoption versus adaption

The secretariat sought feedback from attendees on the use and adoption of OIML R 46 by Member States. There are no reports of mandatory adoption of OIML R 46, but Member States did report either partially adopting aspects of it, or are moving towards adopting it.

There was an interesting discussion regarding adoption and adaption. If a Member State takes the useful parts from an OIML Recommendation, it may be more appropriately called adaption, rather than adoption. This is important for the Technical Committee to consider, because perhaps adaptability is more beneficial than full harmonisation. At the recent "Milestones in Metrology V" in Amsterdam, Stephen Patoray spoke about adapting, rather than harmonising. The analogy given was a power adaptor that allows devices to be used anywhere in the world.

Scope, technology and interpretations

The meeting discussed several issues with OIML R 46, which may be broadly categorised into scope, technology and interpretations.

The issue of scope is related to technology and use of the meter. For instance, is OIML R 46 intended to cover all levels of metering in the distribution chain? What about data centre metering? Electric vehicle charging stations? Individual street light metering, or individual appliance metering?

On the theme of adaptability, the meeting discussed that a review of OIML R 46 could look at creating a standard that provides greater flexibility or options for different technologies or applications.

There was also a discussion on the interpretation of whether OIML R 46 considers only fundamental power or harmonic power. Some members had different interpretations and further work is required in this area.

Outcomes

The committee discussed a project proposal to revise OIML R 46, which received strong support from members present at the meeting; the secretariat (Australia) is coordinating feedback from OIML TC 12 members on the support for a revision. With appropriate support, a project proposal will be submitted to the BIML for consideration at the upcoming CIML meeting. ■

The Secretariat of OIML TC 12 expresses its thanks to NMi, The Netherlands, for providing the venue for the meeting

RUSSIAN FEDERATION

International exhibition of measuring instruments, testing equipment and metrological provision "MetrolExpo-2016"

17–19 May 2016 Moscow, Russian Federation

ANDREY GRIDASOV, Press-office
State Regional Centre for Standardization, Metrology and Testing in St. Petersburg and Leningrad Region
(State Centre "Test - St. Petersburg")

Introduction and opening

On 17 May 2016 Mr. Gleb Nikitin, First Deputy Minister of Industry and Trade of the Russian Federation and Alexey Abramov, Head of the Federal Agency on Technical Regulating and Metrology (Rosstandart), officially opened the *International exhibition of measuring instruments, testing equipment and metrological provision* "MetrolExpo-2016" in the VDNH pavilion (Moscow).

In his opening speech Mr. Nikitin emphasized that all aspects of Russia's industrial development are dependent on measuring matters. Industrial dynamics are impossible without the establishment of a strong infrastructure for ensuring the accuracy of measurements, the foundation of trust between the parties, and only trust will allow accurate technology transfer and implementation of new developments. Mr. Nikitin also stressed that today the main driver of industrial development in Russia lies in reducing imports by encouraging the use of domestic products, which must be of high quality and equal to that of globally available competitive products. Improving product quality is impossible without accurate measurements and metrological provision.

"MetrolExpo" is the largest annual specialized event in the field of ensuring the accuracy, quality and safety of technological manufacturing processes and finished goods. Each year the largest Russian and foreign companies, manufacturers and consumers in the sphere of instrument manufacture, as well as the leading metrological organizations of the country, take part in this forum.

May 17

The first day of the exhibition included a plenary meeting of the First All-Russian Convention of Metrologists and the Instrument-Making Industry Professionals ("the Convention"). The main speech of the plenary session of the Convention was made by the Deputy Chief of Rosstandart Mr. Sergey Golubev, who gave an extensive report on the ***Strategy on Ensuring Uniformity of Measurements in the Russian Federation for the period up to 2025***. The purpose of the Strategy is to create a system corresponding to the level of the leaders among industrially advanced countries, based on domestic import-independent technologies and instrumentation, ensuring full uniformity of measurements and availability of the relevant services.

May 18

On May 18, during the exhibition, the Head of Rosstandart Mr. Abramov and the General Director of the Russian Export Center (REC) Mr. Petr Fradkov signed an Agreement on cooperation in the field of certification and patenting.

This Agreement provides for mutual efforts aimed at eliminating technical barriers in foreign trade, harmonization of national requirements and procedures with international ones, participation in the development of national and international standards, creation of conditions facilitating improvements in the quality and competitiveness of Russian goods, works and services, introduction of advanced technologies in export productions, development of joint laboratory facilities and the practice of testing various products, as well as the establishment of international centers for certification in the Russian Federation.

May 19

On May 19, the final day of "MetrolExpo-2016", the Awards ceremony of the winners in the All-Russian exhibition-competition program "For measuring unity -

2016" was held. The main purpose of the contest was the certification of devices and equipment relating to various means of measurement, diagnostics, testing and analysis for compliance with high metrological characteristics and quality. The winners were awarded with Quality Marks, Gold and Platinum Exhibition Medals, and the most interactive exhibitions and active participants of the Convention were awarded Honorary Diplomas.

Objectives

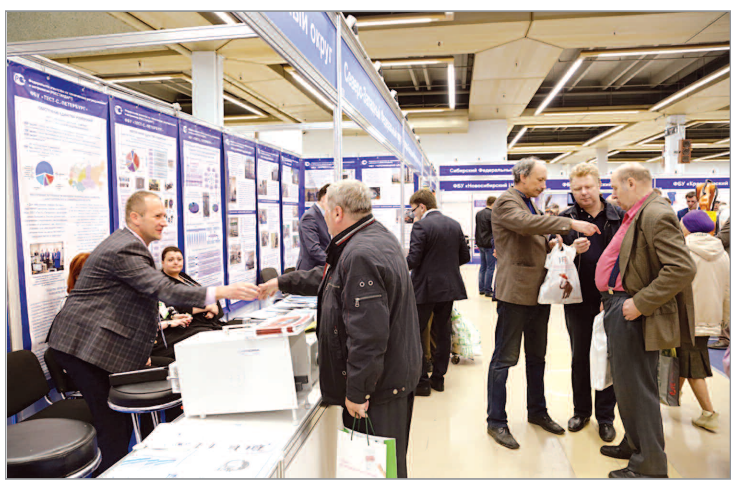
The organizers of the exhibition – the Russian Federation Ministry of Industry and Trade and the Federal Agency on Technical Regulating and Metrology (Rosstandart) – see as their main tasks the establishment of an international communication platform and the promotion of internal cooperation in the field of instrument manufacturing, in order to bring together representatives of the federal executive authorities in science and business. Achieving this objective should contribute to meeting the needs of the country and of society in high-precision measurements, and the establishment of financial mechanisms to support and promote innovation. It should also attract investments on the part of international and Russian economic development institutions.

The above tasks are being undertaken through the activities of all the organizations within the Rosstandart system, as well as by professional associations of experts in the field of ensuring the uniformity of measurements, which widely demonstrated their capacities at the exhibition.

Visitors also showed great interest in the exhibitions of the Centers for standardization and metrology of the North-West Federal District of Russia and the Russian Academy of Metrology, which is the subject of a separate article (see page 24).

Official opening ceremony of the International Exhibition of measuring instruments, testing equipment and metrological provision "MetrolExpo-2016"

Plenary meeting of the First All-Russian Convention of Metrologists and Instrument-Making Industry Professionals



Exhibitions of the Centers for standardization and metrology at "MetrolExpo-2016"

SLOVAKIA

46th Metrology Forum

Awards for Stephen Patoray

Stephen Patoray, Director of the BIML, recently visited Slovakia to participate in the 46th Metrology Forum, during which he was awarded two prizes.

Every year, the Jan Andrej Segner Prize for metrology is awarded as part of the Metrology Forum. Its aim is to acknowledge individuals who have significantly contributed to the development of metrology or who have helped to spread information about metrology to the general public.

On behalf of the Slovak Office for Normalization, Metrology and Testing, Mr. Jozef Mihok, the Chairman, awarded the prize to Mr. Stephen Patoray for his active work and long-standing contribution to metrology as well as for his work as a lecturer.

Another significant moment during the conference was the awarding of plaques on the occasion of the 25th anniversary of the founding of the *Association of Slovak Scientific and Technological Societies*. One of the plaques was also given to Mr. Patoray, who was awarded this prize together with the Chairman of SOSMT Mr. Jozef Mihok and the General Director of SLM Mr. Jaromir Markovic.

The Metrology Forum is an annual event organized by the Slovak Metrological Society on the occasion of World Metrology Day. Professionals from the world of science and technology regularly attend and actively contribute with presentations on specific topics. The main aim of the conference is to underline the importance of measurement and metrology in a global context and also to discuss the problematics of the chosen field of industry. This 46th year's event was dedicated to the topic *Measurement management system in the automotive industry.*

CECIP

New Era of Cooperation for the global Weighing Industry

CECIP 66th General Assembly

1–4 June 2016 Vienna, Austria

Friedrich Trosse
CECIP Secretary General

Roland Nater
CECIP International Cooperation Group President

CECIP, the European Weighing Industry, representing the Weighing Industry of 14 European Countries, holds its General Assembly in a different member country each year. This year, we chose Vienna as our venue. The CECIP General Assembly is the biggest event of the year for the European Weighing Industry, serving the largest forum for exchange in expertise and experiences for CECIP Members. Over the course of three days, all CECIP expert working groups, the Business and Trade Group, the Legal Metrology Group, and the International Cooperation Group meet, holding seminars on current issues, including acclaimed guest speakers who speak about current issues in metrology. This year the topics at the Seminar were the latest changes in the European Commission's Blue Guide on the implementation of EU product rules, Software and Risk Assessment, as well as the challenges faced by the weighing industry regarding Container Weighing under the IMO/SOLAS Convention.

This year we were honoured to have Dr. Roman Schwartz, Vice President of the National Metrology Institute of the Federal Republic of Germany and CIML First Vice-President, Mr. Gerald Freistetter, Head of Unit Metrology for Measuring; Geoinformation and Standardization at the Federal Ministry of Science, Research and Economy of the Republic of Austria, as well as Mr. Van Schagen, Chairman of the Board of the Branche Industriële Elektronica of the Netherlands – FHI. In addition, CECIP was able to introduce a new aspect into the programme of its General Assembly. In the spirit of Metternich and the Congress of Vienna, we have also brought several countries together in a sense of cooperation and understanding (Picture 1).

For the first time, the newly founded CECIP Working Group for International Cooperation (ICG) brought together all major weighing instrument producing countries in the world. From China, the Chinese Weighing Instruments Association (CWIA) joined us. Japan was represented by the Japanese Measuring

Picture 1: CECIP General Assembly delegates

Picture 2: Signing Ceremony – Letter of Intent

Instruments Federation (JMIF), and last but not least the United States' Scale Manufacturers Association (SMA) was also present.

The International Cooperation Group, headed by CECIP Board member Mr. Roland Nater, had already established contacts with all of the countries. There had been previous bilateral discussions among the different associations, but never had there been a meeting with all of them in the same place.

The Weighing Industry is now a global market place with manufacturing and markets on all continents. It is becoming increasingly important to have harmonised standards and specifications across these different markets to ensure the easy and rapid movement of goods and market access. The OIML has a comprehensive framework of technical specifications and a developed system for mutual acceptance between states with the MAA Certificate System.

Picture 3:
CECIP President
Mr. Urs Widmer

Picture 4: CECIP International
Cooperation Group President
Mr. Roland Nater

Manufacturers have been active stakeholders in the development of OIML Recommendations and frameworks for many years. The goal of this cooperation is to have one voice of industry in the development of the standards and frameworks that will ease their implementation in many different markets.

The ICG plans to achieve this through more consistent responses and better coordination between the associations when it comes to globally relevant issues. This will enable manufacturers on all continents to manufacture and supply across the globe.

CECIP of course already has some experience in cooperation among weighing associations, since it currently represents 14 European Associations. It is therefore imperative that such a venture underlies clearly set guidelines. Therefore, CECIP has decided with its international partners to agree on the same Code of Conduct that it has implemented for several years. This Code clearly excludes any behaviour which may possibly be contrary to the idea of a competitive market. Furthermore, CECIP, CWIA and JMIF have signed a Letter of Intent which not only reinforces the importance of the Code of Conduct, but which also contains the goals and focus of the cooperation on global challenges in legal metrology.

This Letter of Intent had been worked on over the course of several bilateral meetings in Europe as well as in China and Japan. At the signing before the Gala Diner it was translated into the three working languages of the three associations: Chinese, English and Japanese (Picture 2).

For CECIP, the European Weighing Industry, Mr. Urs Widmer (Picture 3) and Mr. Roland Nater (Picture 4) signed the Letter of Intent. Both have been active within CECIP for a long time with Mr. Widmer being the President and Mr. Nater the newly elected President of the International Cooperation Group.

The signing duo of the Chinese Weighing Instruments Association (CWIA) were Mr. Liu Xiaohua, its President (Picture 5), as well as Mr. Gavin Sheng, Manager of the CWIA Exhibition Department (Picture 6), which organizes the interWEIGHING trade fair every year.

For the Japanese Measuring Instruments Federation (JMIF) the first signatory was its president Mr. Akira Nakamoto (Pictures 7 and 8), and also the JMIF Executive Director Mr. Shigeru Horii.

Of course the signing can only be the first step towards closer cooperation, and to achieve one voice for one industry.

The three associations that signed the Letter of Intent will now meet more regularly, and communicate thoroughly in order to create a process through which industry's opinion can be harmonized.

The International Cooperation Group is the framework in which we can work closely together in the Legal Metrology Groups of the different regions or countries. This can be a real counterpart to the OIML to find internationally valid solutions for the daily work in legal metrology.

This will not, however, mean that this cooperation will become a *passe-partout* solution for global problems. It will seek to ensure that the contact and exchange of ideas leads to a strong industry voice being heard in order to assist and facilitate the process of finding solutions within the OIML regarding urgent problems. It will focus on such matters as how we can coordinate the implementation of new industry trends and new technologies, and, for example, the work completed in OIML TC 5/SC 2 *Software*, looking at how the weighing industry can find software solutions for cloud computing, big data and the internet.

Finally, cooperation at the OIML level of all key players on a global scale must ultimately lead to one goal: that the future of legal metrology is organized more and more globally so that issued OIML certificates can be used globally.

Picture 5: CWIA President Mr. Liu Xiaohua

Picture 6: Mr. Gavin Sheng, CWIA

Picture 7: JMIF President Mr. Akira Nakamoto

Picture 8: Mr. Nakamoto speaking at the CECIP G.A.

Contact information:

CECIP • Comité Européen des Constructeurs d'Instruments de Pesage

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OIML CERTIFICATE SYSTEM

List of OIML Issuing Authorities

The list of OIML Issuing Authorities is published in each issue of the OIML Bulletin. For more details, please refer to our web site: www.oiml.org
There are no changes since the last issue of the Bulletin.

		R 16	R 21	R 31	R 35	R 46	R 49	R 50	R 51	R 58	R 60	R 61	R 75	R 76	R 81	R 85	R 88	R 93	R 97	R 98	R 99	R 102	R 104	R 105	R 106	R 107	R 110	R 112	R 113	R 114	R 115	R 117/118	R 122	R 126	R 128	R 129	R 133	R 134	R 136	R 137	R 139
AT1	Bundesamt für Eich- und Vermessungswesen (BEV)							■	■	■		■		■		■	■		■	■		■	■		■	■	■			■	■	■									
AU1	National Measurement Institute (NMI)						■	■	■		■			■		■									■	■						■		■		■					
BE1	SPF Economie, PME, Classes Moyennes et Energie													■					■	■																					
BG1	State Agency for Metrology and Technical Surveillance (SAMTS)													■						■																					
BR1	Instituto Nacional de Metrologia, Normalização e Qualidade Industrial (INMETRO)													■																											
CH1	Institut fédéral de métrologie METAS	■		■			■	■	■		■	■		■					■	■				■	■	■						■						■			
CN1	General Administration of Quality Supervision, Inspection and Quarantine of P. R. China (AQSIQ)			■		■		■	■		■	■		■					■	■						■						■						■			
CZ1	Czech Metrology Institute (CMI)						■							■	■	■								■								■						■			■
DE1	Physikalisch-Technische Bundesanstalt (PTB)			■	■		■	■	■	■	■	■		■		■	■		■	■	■	■	■	■	■	■	■			■	■	■		■	■	■	■		■		
DK1	The Danish Accreditation and Metrology Fund (DANAK)							■	■		■	■		■						■				■	■	■						■				■		■			
DK2	FORCE Certification A/S						■																																		
DK3	Dansk Elektronik, Lys & Akustik (DELTA)							■	■		■	■		■											■	■										■		■			
ES1	Centro Español de Metrología (CEM)						■		■		■	■		■					■	■														■							
FI1	Inspecta Oy							■	■		■	■		■		■									■	■						■									
FR1	Ministère de l'Economie, de l'Industrie et de l'Emploi (MEIE)	*All activities and responsibilities were transferred to FR2 in 2003*																																							
FR2	Laboratoire National de Métrologie et d'Essais (LNE)		■	■			■	■	■	■	■	■		■	■	■	■		■	■	■	■		■	■	■	■			■	■	■		■		■		■		■	
GB1	NMRO Certification Services (NMRO)		■		■		■	■	■		■	■	■	■		■				■				■	■	■						■				■		■			
HU1	Hungarian Trade Licensing Office (MKEH)													■																											
IT1	Ministero dello sviluppo economico - Direzione generale mercato, concorrenza, consumatori, vigilanza e normativa tecnica						■																																		
JP1	National Metrology Institute of Japan / National Institute of Advanced Industrial Science and Technology (NMIJ / AIST)						■				■			■																	■	■									
KR1	Metrology and Measurement Division (KATS)													■																											
NL1	NMi Certin B.V.		■	■		■	■	■	■		■	■		■	■	■			■		■			■	■	■						■		■	■	■		■		■	
NL2	KIWA Nederland B.V.						■																																		
NO1	Norwegian Metrology Service (Justervesenet)							■	■			■		■										■	■	■						■				■					
NZ1	Measurement and Product Safety Service (MAPSS Wellington)													■																											
PL1	Central Office of Measures (GUM)													■						■		■																			
RO1	Bureau Roumain de Métrologie Légale (B.R.M.L.)																		■	■							■			■	■										
RU1	Russian Research Institute for Metrological Service (VNIIMS)			■			■	■	■	■	■	■		■		■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		■	
SE1	Swedish National Testing and Research Institute AB (S.P.)							■	■		■	■		■		■				■					■	■						■									
SI1	Metrology Institute of the Republic of Slovenia (MIRS)													■																											
SK1	Slovak Legal Metrology						■							■																		■									
US1	NCWM, Inc.										■			■																											
VN1	Directorate for Standards and Quality (STAMEQ)													■																											

OIML Systems

Basic and MAA Certificates registered 2016.03–2016.05

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

The OIML Basic Certificate System

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

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

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

Other information on the System, particularly concerning the rules and conditions for the application, issue, and use of OIML Certificates, may be found in OIML Publication B 3 *OIML Basic Certificate System for OIML Type Evaluation of Measuring Instruments* (Edition 2011) which may be downloaded from the Publications page of the OIML web site. ■

The OIML MAA

In addition to the Basic System, the OIML has developed a *Mutual Acceptance Arrangement* (MAA) which is related to OIML Type Evaluations. This Arrangement - and its framework - are defined in OIML B 10 (Edition 2011) *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations*.

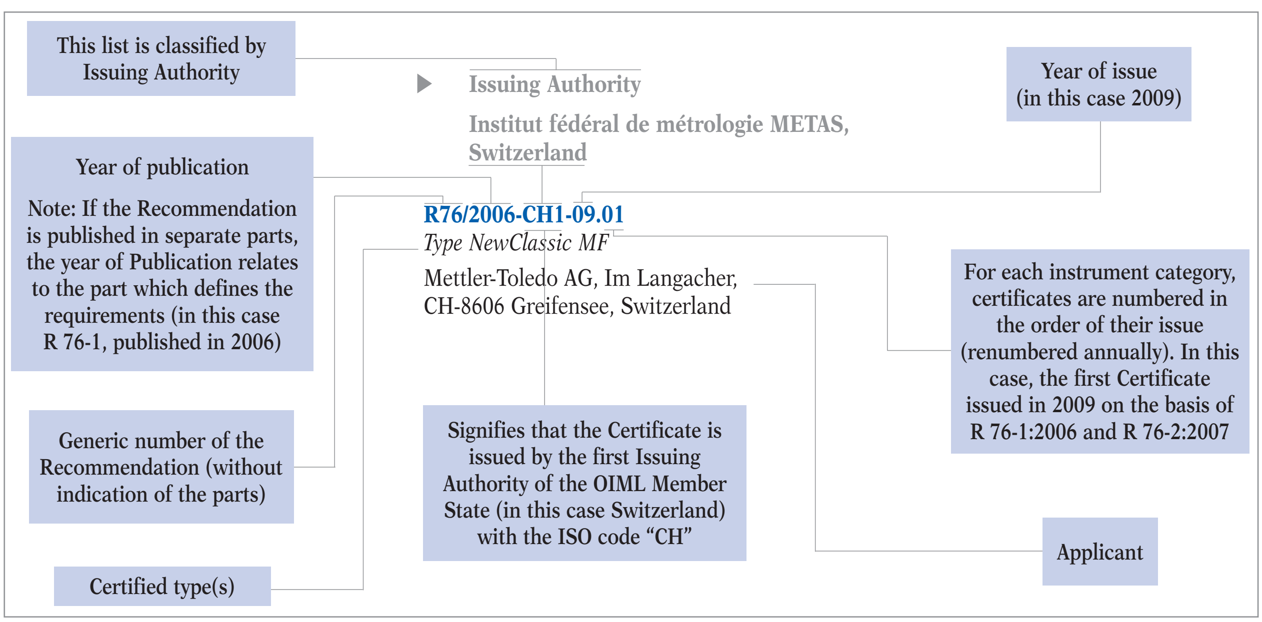
The OIML MAA is an additional tool to the OIML Basic Certificate System in particular to increase the existing mutual confidence through the System. It is still a voluntary system but with the following specific aspects:

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

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

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

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



INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Water meters intended for the metering of cold potable water and hot water
Compteurs d'eau pour le mesurage de l'eau potable froide et de l'eau chaude

R 49 (2006)

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

Czech Metrology Institute (CMI), Czech Republic

R049/2006-CZ1-2011.02
Multi jet water meter - Type: MJ-LFC and MJ-WDC
Ningbo Water Meter Co. Ltd., N° 99, Lane 268,
Beihai Road, CN-315033 Ningbo, P.R. China

R049/2006-CZ1-2011.03
Multi jet water meter - Type: MJ-SDC
Ningbo Water Meter Co. Ltd., N° 99, Lane 268,
Beihai Road, CN-315033 Ningbo, P.R. China

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

NMi Certin B.V., The Netherlands

R049/2006-NL1-2012.01 Rev. 7
Water meter intended for the metering of cold potable water and hot water, model "WATERFLUX 3070", class 1 and 2
Krohne Altometer, Kerkeplaat 12, NL-3313 LC Dordrecht,
Netherlands

R049/2006-NL1-2012.03 Rev. 2
Water meter - Type: WATERFLUX 3070
Krohne Altometer, Kerkeplaat 12, NL-3313 LC Dordrecht,
Netherlands

R049/2006-NL1-2012.04 Rev. 1
Water meter - Type: OPTIFLUX x300C; OPTIFLUX x000F + IFC300y
Krohne Altometer, Kerkeplaat 12, NL-3313 LC Dordrecht,
Netherlands

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Water meters for cold potable water and hot water
Compteurs d'eau potable froide et d'eau chaude

R 49 (2013)

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

NMi Certin B.V., The Netherlands

R049/2013-NL1-2016.01
Electromagnetic water meter - Type: M5000
Badger Meter Europa GmbH, Nurtinger Strasse 76,
DE-72639 Neuffen, Germany

R049/2013-NL1-2016.03
Electromagnetic water mater - Type: MUT 2300 with electronic converter MC406
Euromag International S.r.l., Via Torino 3,
IT-35035 Mestrino (PD), Italy

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

Slovak Legal Metrology (Banska Bystrica), Slovakia

R049/2013-SK1-2016.01
Mechanical multi-jet wet dial water meter type for metering of cold water - Type: ML-B, ML-BP
Ningbo Aimei Meter Manufacture Co. Ltd.,
68 West Town Road, Shangtian Town, Fenghua City,
CN-315511 Zhejiang, P.R. China

R049/2013-SK1-2016.02
Mechanical single-jet dry dial water meter type for metering of cold water - Type: SD-B, SD-B1, SD-BP, SD-BP1
Ningbo Aimei Meter Manufacture Co. Ltd.,
68 West Town Road, Shangtian Town, Fenghua City,
CN-315511 Zhejiang, P.R. China

R049/2013-SK1-2016.03
Mechanical single-jet dry dial water meter type for metering of cold water. Type: SD-A, SD-AP
Ningbo Aimei Meter Manufacture Co. Ltd.,
68 West Town Road, Shangtian Town, Fenghua City,
CN-315511 Zhejiang, P.R. China

R049/2013-SK1-2016.04
Mechanical volumetric dry dial water meter type for metering of cold water - Type: PD-C, PD-C1
Ningbo Aimei Meter Manufacture Co. Ltd.,
68 West Town Road, Shangtian Town, Fenghua City,
CN-315511 Zhejiang, P.R. China

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

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

R 51 (2006)

Issuing Authority / *Autorité de délivrance*

NMi Certin B.V.,
The Netherlands

R051/2006-NL1-2016.01
Automatic catchweighing instrument - Type: DYN,CHECK MP
Premier Tech, 1 avenue Premier, Rivière-du-Loup, CA-G5R 6C1 Quebec, Canada

Issuing Authority / *Autorité de délivrance*

NMRO Certification Services (NMRO),
United Kingdom

R051/2006-GB1-2014.02 Rev. 2
Type: MCheck2
Marel Ltd., Wyncolls Road, Severalls Industrial Park, Colchester CO4 9HW, United Kingdom

R051/2006-GB1-2016.01
Vehicle Data Hub (VDH)
AMCS Ltd., Fanningstown, Crecora, Co. Limerick, Ireland

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*

NMi Certin B.V.,
The Netherlands

R060/2000-NL1-2001.20 Rev. 1
Bending load cell, with strain gauges - Type: BCA
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

R060/2000-NL1-2016.04 (MAA)
Compression load cell, with strain gauges - Type: RTB-xx-xxx-xxx-xx Series
Schenk Process GmbH, Pallaswiesenstrasse 100, DE-64293 Darmstadt, Germany

R060/2000-NL1-2016.06 (MAA)
Double ended shear beam load cell, with strain gauges - Type: 102BS
Anyload Transducer Co. Ltd., 6994 Greenwood Street, Unit 102, V5A 1X8, Burnaby, BC, Canada

R060/2000-NL1-2016.09 (MAA)
Compression load cell, with strain gauge, equipped with electronics - Type: CRI
ASCELL SENSOR, S.L, Avda. Congost, 56, nave 3., Poligono Industrial Congost, ES-08760 Martorel, Spain

R060/2000-NL1-2016.10 (MAA)
Single point load cell, with strain gauges - Type: NA. . ., NA. . . M, or NA. . .F
Hope Technologic (Xiamen) Co. Ltd., 3FL Heng Sheng Building, Yue Hua E. RD., CN-361006 Hu-Li Xiamen, P.R. China

R060/2000-NL1-2016.12 (MAA)
Compression load cell, with strain gauges, equipped with electronics - Type: MTX
Mettler-Toledo GmbH, Im Langacher 44, CH-8606 Greifensee, Switzerland

R060/2000-NL1-2016.13
Compression load cell, with strain gauges, equipped with electronics - Type: 0760-1XXX
Mettler-Toledo GmbH, Im Langacher 44, CH-8606 Greifensee, Switzerland

R060/2000-NL1-2016.14 (MAA)
Compression load cell, with strain gauges, equipped with electronics - Type: SLC820
Mettler-Toledo Inc., 1150 Dearborn Drive, US-43085 Worthington, Ohio, United States

Issuing Authority / *Autorité de délivrance*

NMRO Certification Services (NMRO),
United Kingdom

R060/2000-GB1-2016.02
Type: T11
Thames Side Sensors Ltd., Unit 10, io Trade Center, Deacon Way, Reading RG30 6AZ, United Kingdom

R060/2000-GB1-2016.03
Type: T12
Thames Side Sensors Ltd., Unit 10, io Trade Center, Deacon Way, Reading RG30 6AZ, United Kingdom

R060/2000-GB1-2016.04
Type: 650
Tecnicas de Electronica Y Automatismos, S.A., C/Espronceda 176, ES -Barcelona, Spain

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

R060/2000-DE1-2015.01 Rev. 1 (MAA)
Load cell - Type: Z6R
Hottinger Baldwin Messtechnik GmbH, Im Tiefen See 45, DE-64293 Darmstadt, Germany

CATÉGORIE D'INSTRUMENT

Automatic gravimetric filling instruments
Doseuses pondérales à fonctionnement automatique

R 61 (2004)

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

R061/2004-NL1-2016.01
Automatic gravimetric filling instrument - Type: IT2000M AGFI
Premier Tech, 1 avenue Premier, Rivière-du-Loup, CA-G5R 6C1 Quebec, Canada

R061/2004-NL1-2016.02
Automatic gravimetric filling instrument - Type: ITx000E-. . . AGFI, ITx000ET-. . . AGFI, ITx000M-. . . AGFI. (x=3,4,6 or 8)
Premier Tech, 1 avenue Premier, Rivière-du-Loup, CA-G5R 6C1 Quebec, Canada

R061/2004-NL1-2016.03
Automatic gravimetric filling instrument - Type: ADW-A
Yamato Scale GmbH, Hanns-Martin-Schleyer Straße 13, DE-47877 Willich, 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*
NMi Certin B.V., The Netherlands

R076/1992-NL1-2016.17 (MAA)
Non-automatic weighing instrument - Type: XPE series, XSE series and XVE series
Mettler-Toledo GmbH, Im Langacher 44, CH-8606 Greifensee, Switzerland

▶ Issuing Authority / *Autorité de délivrance*
NMRO Certification Services (NMRO), United Kingdom

R076/1992-GB1-2010.06 Rev. 2 (MAA)
Type: CI-200 Series
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

R076/1992-GB1-2015.04 Rev. 1 (MAA)
Type: CL5200J Series
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

R076/1992-GB1-2016.01 (MAA)
Type: CL5200-xN Series
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

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

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

▶ Issuing Authority / *Autorité de délivrance*

Institut fédéral de métrologie METAS, Switzerland

R076/2006-CH1-2016.03 (MAA)
Non-automatic electromechanical weighing instrument - Type: NewClassic Jewelry / JS
Mettler-Toledo GmbH, Im Langacher 44, CH-8606 Greifensee, Switzerland

▶ Issuing Authority / *Autorité de délivrance*

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

R076/2006-FR2-2014.01 Rev. 2 (MAA)
Indicator - Type: X112B
Precia SA, BP 106, FR-07001 Privas Cedex, France

R076/2006-FR2-2016.02 Rev. 0 (MAA)
Non automatic weighing instrument - Type: P1401-A
Precia SA, BP 106, FR-07001 Privas Cedex, France

R076/2006-FR2-2016.03 Rev. 0 (MAA)
Module indicator type P1411-B for non-automatic weighing instrument
Precia SA, BP 106, FR-07001 Privas Cedex, France

▶ Issuing Authority / *Autorité de délivrance*

NMi Certin B.V., The Netherlands

R076/2006-NL1-2011.15 Rev. 1 (MAA)
Non automatic weighing instrument - Type: Navigator NV series - Valor 1500 V15P series
Ohaus Corporation, 7, Campus Drive, Suite 310, US-07054 Parsippany - NJ, United States

R076/2006-NL1-2015.42 (MAA)
Indicator - Type: IND141 or ACT350
Mettler-Toledo (Changzhou) Measurement Technology Ltd., N° 111, West TaiHu Road, ChangZhou XinBei District, CN-213125 Jiangsu, P.R. China

R076/2006-NL1-2016.04 (MAA)
Indicator - Type: 1280 Enterprise Series
Rice Lake Weighing Systems, 230 West Coleman Street, US-54868 Rice Lake, Wisconsin, United States

R076/2006-NL1-2016.07 (MAA)
Non-automatic weighing instrument
Premier Tech, 1 avenue Premier, Rivière-du-Loup, CA-G5R 6C1 Quebec, Canada

R076/2006-NL1-2016.08 (MAA)
Non-automatic weighing instrument - Type: EHC-PF
Nanjing Easthigh Measurement Co. Ltd., No. 77 Tangton Road, Hushu Town, Jiangning, Nanjing, P.R. China

R076/2006-NL1-2016.09 (MAA)
Non-automatic weighing instrument - Type: medical scales, platform scales
Nanjing Easthigh Measurement Co. Ltd., No. 77 Tangton Road, Hushu Town, Jiangning, Nanjing, P.R. China

R076/2006-NL1-2016.11 (MAA)
Non-automatic weighing instrument - Type: Maxi Twin, Minstrel, Tenor, Maxi 500, Maxi Sky 1000, Maxi Sky 2, Maxi Sky 600, Maxi Sky 400.
ArjoHuntleigh AB, Hans Michelsensgatan 10, SE-211 20 Malmö, Sweden

R076/2006-NL1-2016.12 (MAA)
Non-automatic weighing instrument - Type: CBS-1000 / CS-1000
Dibal S.A, Astinze Kalea,, 24-Pol. Ind. Neinver, ES-48160 Derio (Bilbao-Vizcaya), Spain

R076/2006-NL1-2016.13 (MAA)
Indicator - Type: 2100NU
Ravas Europe B.V., Toepadweg 7, NL-5201 KA Zaltbommel, Netherlands

R076/2006-NL1-2016.14 (MAA)
Non-automatic weighing instrument - Type: SM-320B or SM-320P
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, CN-201505 Shanghai, P.R. China

R076/2006-NL1-2016.15 (MAA)
Non-automatic weighing instrument - Type: Alenti, Miranti
ArjoHuntleigh AB, Hans Michelsensgatan 10, SE-211 20 Malmö, Sweden

R076/2006-NL1-2016.16 (MAA)
Non-automatic weighing instrument -Type: RM-5800
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, CN-201505 Shanghai, P.R. China

R076/2006-NL1-2016.18 (MAA)
Non-automatic weighing instrument - Type: DS-781, DS-781SS, DS-782.
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, CN-201505 Shanghai, P.R. China

R076/2006-NL1-2016.19 (MAA)
Non-automatic weighing instrument - Type: DS-688
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, CN-201505 Shanghai, P.R. China

R076/2006-NL1-2016.20 (MAA)
Non-automatic weighing instrument - Type: DS685
Shanghai Teraoka Electronic Co. Ltd., Tinglin Industry Developmental Zone, Jin Shan District, CN-201505 Shanghai, P.R. China

R076/2006-NL1-2016.21 (MAA)
Non-automatic weighing instrument - Type: BMX0, BMX1
Balancas Marques de Jose Pimienta Marques, Ltda., Parque Industrial de Celeiros (2a Fase), Apartado 2376, PT-4701-905 Braga, Portugal

R076/2006-NL1-2016.22
Non-automatic weighing instrument - Type: InBody J30 / 230 / 270 / 370S /470
InBody Co. Ltd., InBody Bldg., 54 Nonhyeon-ro 2-gil, Gangnam-gu, 135-960 Seoul, Korea (R.)

R076/2006-NL1-2016.23 (MAA)
Non-automatic weighing instrument - Type: ACS-RB
Chengdu Jiuzhou Electronic Information System Co. Ltd., A2 Building - Tianfu Software Park, No. 765 Mid Tianfu Street, Chengdu City, Sichuan Province, P.R. China

R076/2006-NL1-2016.30 (MAA)
Non-automatic weighing instrument - Type: FreshWay, FW.
Mettler-Toledo (Albstadt) GmbH, Unter dem Malesfelden 34, DE-72458 Albstadt, Germany

R076/2006-NL1-2016.32 (MAA)
Non-automatic weighing instrument - Type: WX-series
Mettler-Toledo GmbH, Im Langacher 44, CH-8606 Greifensee, Switzerland

R076/2006-NL1-2016.33 (MAA)
Indicator - Type: GAMMA-07, GAMMA-07C
Farasoo Towzin Eng Co., 11th Street, Mamoonieh Industrial City, Saveh, Iran

▶ Issuing Authority / *Autorité de délivrance*

NMRO Certification Services (NMRO), United Kingdom

R076/2006-GB1-2013.05 Rev. 1 (MAA)
Type: NCR 7812-5XXX series
NCR Corporation, 2651 Satellite Blvd, US-30096 Duluth, Georgia, United States

R076/2006-GB1-2016.02 (MAA)
Type: SWII and PRII
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

R076/2006-GB1-2016.05 (MAA)
Type: WTM Series
CAS Corporation, #262, Geurugogae-ro, Gwangjeok-myeon, Yangju-si, Gyenonggi-do, Korea (R.)

▶ Issuing Authority / *Autorité de délivrance*

Physikalisch-Technische Bundesanstalt (PTB), Germany

R076/2006-DE1-2010.02 Rev. 1
Non-automatic electromechanical weighing instrument for persons - Type: WMS01A
Seca GmbH & Co. kg., Hammer Steindamm 9-25, DE-22089 Hamburg, Germany

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

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

R 85 (2008)

▶ Issuing Authority / *Autorité de délivrance*

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

R085/2008-FR2-2013.01 Rev. 1
Level gauge SERAP - Type: First Level 2
Serap Industries, Route de Fougeres, FR-53120 Gorron, France

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

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

R 117 (1995) + R 118 (1995)

► Issuing Authority / *Autorité de délivrance*

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

R117/1995-JP1-2011.01 Rev. 4
Fuel dispenser for motor vehicles, A series
Hitachi Automotive Systems Measurement Ltd.,
3-9-27 Tsurumi Chuo, Tsurumi-ku, Yokohama City,
Kanagawa, Japan

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Multi-dimensional measuring instruments
Instruments de mesure multidimensionnels

R 129 (2000)

► Issuing Authority / *Autorité de délivrance*

NMi Certin B.V.,
The Netherlands

R129/2000-NL1-2016.01
Multi-dimensional measuring instrument -
Type: VIPAC D2-CCLS, VIPAC D2-CNLS.
Vitronic Dr.-Ing. Stein Bildverarbeitungssysteme GmbH,
Hasengartenstrasse 14, DE-65189 Wiesbaden, Germany

R129/2000-NL1-2016.02
Multi-dimensional measuring instrument -
Type: VIPAC-D2-BCPS
Vitronic Dr.-Ing. Stein Bildverarbeitungssysteme GmbH,
Hasengartenstrasse 14, DE-65189 Wiesbaden, Germany

R129/2000-NL1-2016.03
Multi-dimensional measuring instrument -
Type: VIPAC-D2-BNPS
Vitronic Dr.-Ing. Stein Bildverarbeitungssysteme GmbH,
Hasengartenstrasse 14, DE-65189 Wiesbaden, Germany

R129/2000-NL1-2016.04
Multi-dimensional measuring instrument -
Type: VIPAC D2-CCLS, VIPAC D2-CNLS
Vitronic Dr.-Ing. Stein Bildverarbeitungssysteme GmbH,
Hasengartenstrasse 14, DE-65189 Wiesbaden, Germany

INSTRUMENT CATEGORY
CATÉGORIE D'INSTRUMENT

Gas meters
Compteurs de gaz

R 137 (2012)

► Issuing Authority / *Autorité de délivrance*

NMi Certin B.V.,
The Netherlands

R137/2012-NL1-2015.06
Diaphragm gas meter - Type: Atmos xxS (steel) /
Atmos HP xxA (aluminium)
Zenner Metering Technology (Shanghai) Ltd.,
No. 6558 East Yinggang Road, Qingpu Industrial Zone,
Shanghai, P.R. China

R137/2012-NL1-2015.09 Rev. 1
Ultrasonic gas meter - Type: 3414 / 3415 / 3416 / 3417
Senior sonic
Emerson Process Management, 11100 Brittmoore
Park Drive, US-77041 Houston, Texas, United States

R137/2012-NL1-2016.01
Rotary piston gas meter - Type: RRM
Raychem RPG Private Ltd., Gat No 426/2B,
Chakan Takegaon Road, Mahalunga Village,
410 501 Taluka Khed - Pune, India

OIML

Database of all
OIML Certificates:

www.oiml.org/en/certificates/registered-certificates

The OIML is pleased to welcome the following new

Member State

- Thailand

Corresponding Member

- Angola

CIML Members

- China: Mr. WU Qinghai
- Cyprus: Mr. George Hajipapas
- Serbia: Mr. Čedomir Belić
- Thailand: Miss Wiboonlasana Ruamraksa

OIML meeting

October 2016

15th International Conference,
51st CIML Meeting and associated events

Week of 17 October 2016

Strasbourg, France

Committee Drafts

Received by the BIML, 2016.03 – 2016.05

Guidance for defining the system requirements for a certification system for prepackages	2 CD	TC 6/p 5	ZA	2016-06-21
Revision of R 81: Dynamic measuring devices and systems for cryogenic liquids	1 CD	TC 8/SC 6/p 1	US	2016-05-27
Revision of R 117: Dynamic measuring systems for liquids other than water	1 CD	TC 8/SC 3/p 4	US	2016-04-01
Revision of R 80: Road and rail tankers with level gauging.Part 2: Metrological controls and tests / Part 3: Test report format	2 CD	TC 8/SC 1/p 6	DE	2016-03-29

Call for papers

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

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

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

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