

Twining Project “Strengthening the capacities of the Bureau of Metrology for internal market integration”

Twining ref. MK 12 IPA EC 01 16 TWL



A Project funded by the European Union and Implemented and led by CMI

The Basics of European and National Legal Metrology

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What does **Legal Metrology** mean?



French word **LÉGALE**

STATUTORY

Laws
Acts
Statutes

TRUE

Real
Exact
Precise

FAIR

Honest
Impartial
Transparent



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LEGAL METROLOGY



Legal metrology is the application of legal requirements to measurements and measuring instruments.

Such statutory requirements may arise from the need for protection of health, public safety, the environment, enabling taxation, protection of consumers and fair trade.



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LEGAL METROLOGY

History



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LEGAL METROLOGY



Legal metrology in ancient Egypt, 2900 BC

Pharaohs used the legal metrology as a tool ensuring a fair trade and impartiality in tax charging.

The builder, who forgot to calibrate his copy of cubit every month, was executed !!!



Egyptian Cubit = the length of the Pharaoh's forearm plus the width of his hand



LEGAL METROLOGY



Medieval England

1196 - England established the Assize of Measures to create standards for length measurements

1215 - the Great Charter of the Liberties (Magna Carta) included a section for the measurement of wine and beer





The French Revolution (1789 – 1799)



Modern metrology has its roots in the French Revolution. With a political motivation to harmonise units throughout France, a length standard based on a natural source was proposed.

1791 - the metre was defined

1795 - the decimal-based metric system establishing standards for other types of measurements was defined

1795 – 1875 - Several other countries adopted the metric system

1875 - the Metre Convention was signed



International System of Units (SI) 1960

1875 - The **Metre Convention**

(French: *Convention du Mètre*), also known as the **Treaty of the Metre**, is an international treaty that was signed by representatives of 17 nations. (Argentina, Austria-Hungary, Belgium, Brazil, Denmark, France, Germany, Italy, Peru, Portugal, Russia, Spain, Sweden and Norway, Switzerland, Turkey, United States of America and Venezuela).

The metric system was modernized in 1960 with the creation of the International System of Units (SI).





LEGAL METROLOGY

BASIC PRINCIPLES

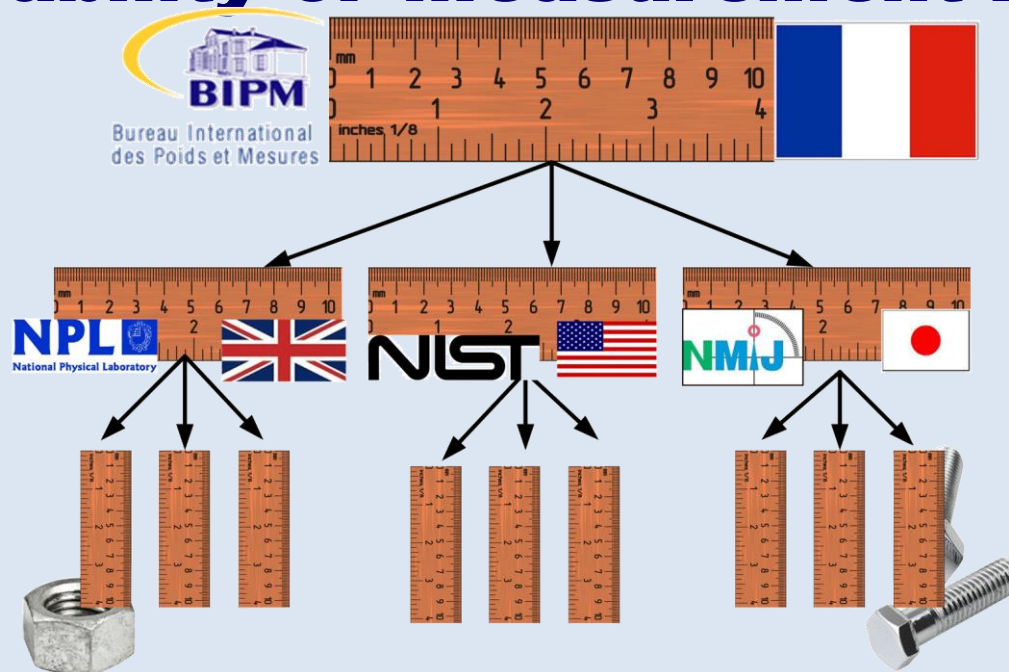
- ☐ ***Legal metrology is essential to fair trade***
- ☐ ***Legal metrology provides protection of public safety, the environment, consumers and traders***
- ☐ ***Measurement is transparent for consumers, businesses and regulators***
- ☐ ***The government gives society the means to establish confidence in measurement results***



LEGAL METROLOGY

BASIC PRINCIPLES

- ***Measuring instruments in different countries and at different times indicate the same value – metrological traceability of measurement results***





LEGAL METROLOGY



BASIC PROBLEMS - in history

Year 1200: 10 cubits of cloth, imported from China, had different length in Paris and different length in Brussels.





LEGAL METROLOGY



BASIC PROBLEMS - nowadays

Year 2006: Big amount of wheat were transported from Australia to the Middle East. The key parameter for determination of the price is percentage of protein in wheat. Australia 12.3 %, the Middle East 11.9 %



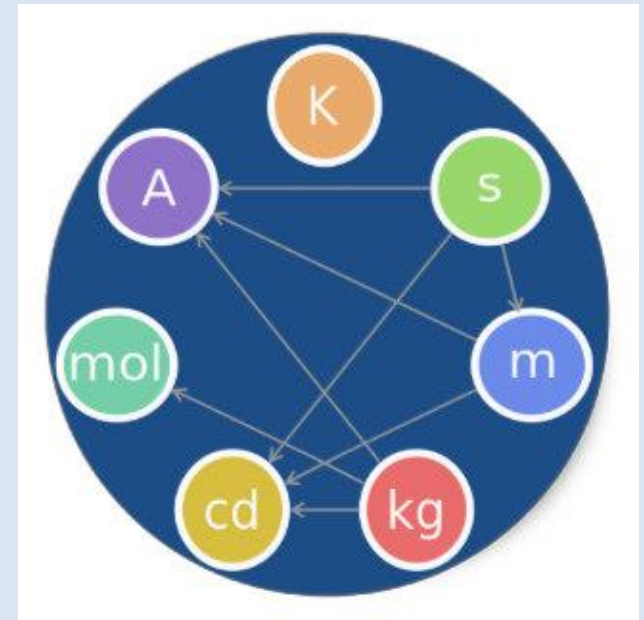


LEGAL METROLOGY



BASIC PROBLEMS - solution

- **we need uniform and globally implemented system of units of measurement: their definitions and physical realizations – today *SI system of units* adopted in 1960**





LEGAL METROLOGY



The Basics of Legal Metrology

- ☐ ***It was invisible to „common“ citizens***
- ☐ ***The global trade in goods and services would collapse without legal metrology***





LEGAL METROLOGY



The Basics of Legal Metrology

- nowadays **citizens are more and more aware** of the importance of legal metrology (complaints, high prices of energy, oil, gas, ...)***





LEGAL METROLOGY



The Basics of Legal Metrology

- measurements are used in most trade transactions with the aim to ensure fairness to all parties, they **must be able to be considered „acceptable“*****





LEGAL METROLOGY - today



Typical applications when regulation over measuring instruments (MIs) and measurements is used:

- ☐ ***protection of consumers in trade (weighing instruments) and similar transactions (thermal energy meters)***
- ☐ ***measurements in health (blood pressure monitors)***





LEGAL METROLOGY - today



Typical applications when regulation over measuring instruments (MIs) and measurements is used:

- ☐ ***collection of taxes, fees, tariffs and fines (speedometers)***
- ☐ ***protection of environment (quality of air and water)***



National and EU metrology

- ❑ **originally the regulations in terms of legal metrology were applied only *on the national level***
- ❑ **in recent years, a *higher-order structures* are arising to support trade in bigger areas by *harmonization* (elimination of technical barriers to trade), e.g. *the EU***





LEGAL METROLOGY in EU



- ❑ ***European legislation:***
 - ❑ ***harmonized – in metrology now exclusively so called new approach directives :***
 - ❑ ***NAWID: 2014/31/EU***
 - ❑ ***MID: 2014/32/EU***
 - ❑ ***non-harmonized (or partially harmonized) – concerns recognition of CA activities:***
 - ***originally: Cassis de Dijon***
 - ***now: EC Regulation 764/2008***



LEGAL METROLOGY in EU



Generally:

Before placing the measuring instruments on the market, manufacturer has obligation to arrange the conformity assessment with essential and specific requirements of the MID or NAWID.





LEGAL METROLOGY in EU



Generally:

***Measuring instruments regulated by MID/NAWID
may be place on the market of any member state
of EU***





LEGAL METROLOGY in EU



What is MID ?

Measuring ***I***nstruments ***D***irective



***DIRECTIVE 2014/32/EU OF THE EUROPEAN
PARLIAMENT AND OF THE COUNCIL***

of 26 February 2014

***on the harmonization of the laws of the Member
States relating to the making available on the
market of measuring instruments***



LEGAL METROLOGY in EU



What is NAWI/NAWID ?

Non-Automatic Weighing Instruments



***D*irective**

***DIRECTIVE 2014/31/EU OF THE EUROPEAN
PARLIAMENT AND OF THE COUNCIL***

of 26 February 2014

***on the harmonisation of the laws of the Member
States relating to the making available on the
market of non-automatic weighing instruments***



LEGAL METROLOGY in EU



Generally:

Directives covers non-automatic weighing instruments (NAWID) and measuring instruments (MID) which are:

- a) **new** to the Union market when they are placed on the market made by a manufacturer established in the Union or imported from a third country;***
- b) **second-hand**, imported from a third country.***



LEGAL METROLOGY in EU



Decision No 768/2008/EC establishes **MODULES** for conformity assessment procedures

The modules are defined in depending on:

- a) the level of risk involved***
- b) the level of safety required.***

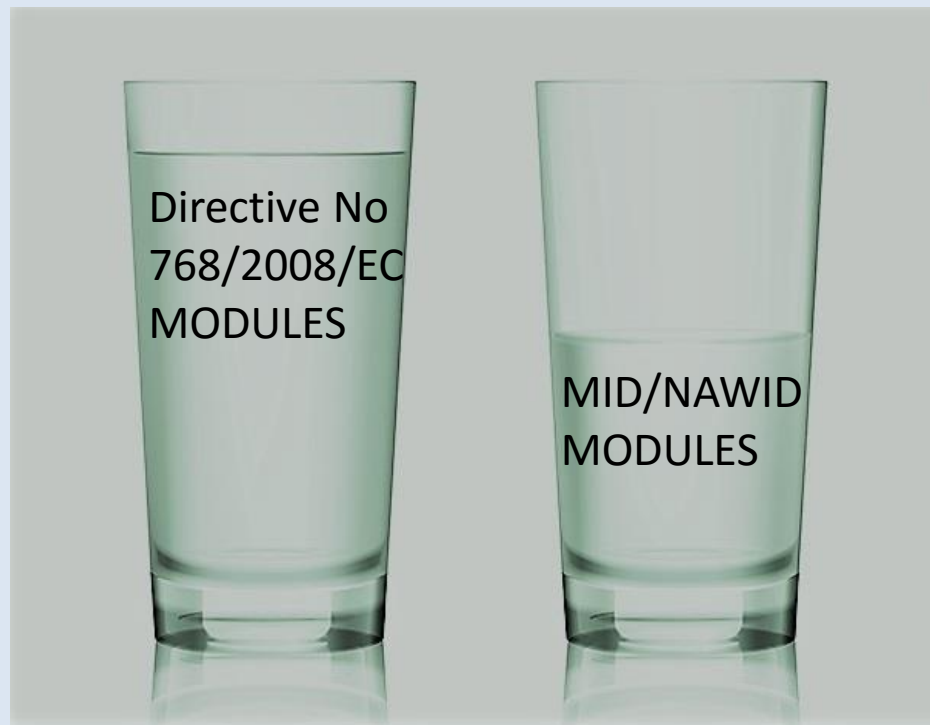
Conformity assessment procedures should be chosen **only** from those modules.



LEGAL METROLOGY in EU



Conformity assessment procedures that can be used in the conformity assessment of Measuring instruments/ Non-automatic weighing instruments are described in **Annex II** of MID/NAWI directives.





MID Modules

MODUL A: Internal production control (is not applicable for MI)

MODUL A2: Internal production control plus supervised instrument check at random intervals

MODUL B: EU - Type examination

MODUL C: Conformity to type based on internal production control (is not applicable for MI)

MODUL C2: Declaration of conformity to type based on internal production control plus supervised instrument checks at random intervals (it is not applicable for MI)



MID Modules

MODUL D: Conformity to type based on quality assurance of the production process

MODUL D1: Quality assurance of the production process

MODUL E: Conformity to type based on instrument quality assurance

MODUL E1: Quality assurance of final instrument inspection and testing

MODUL F: Conformity to type based on product verification

MODUL F1: Conformity based on product verification



MID Modules

MODUL G: Conformity based on unit verification

MODUL H: Conformity based on full quality assurance

MODUL H1: Conformity based on full quality assurance plus design examination





MID Modules – possible combinations

■ water meters	B+F	B+D	H1			
■ gas meters	B+F	B+D	H1			
■ active electrical energy meters	B+F	B+D	H1			
■ thermal energy meters	B+F	B+D	H1			
■ measuring sys. for continuous and dynamic measurement of quantities of liquids other than water	B+F	B+D	H1	G		
■ automatic weighing instruments						
mechanical system	B+D	B+E	B+F	D1	F1	G
electromechanical sys.	B+D	B+E	B+F	G		H1
electronic system or sys. with SW		B+D	B+F	G		H1

MID Modules – possible combinations

■ taximeters	B+F	B+D	H1		
■ material measures					
– material measures of length	F1	D1	B+D	H	G
– Capacity serving measures	A2	F1	D1	E1	
	B+E	B+D	H		
■ dimensional MI (length MI, area MI, multidimensional MI)					
mechanical or electromechanical	F1	E1	D1	B+F	
	B+E	B+D	H	H1	G
electronic or electronic with SW	B+F	B+D	H1	G	
■ exhaust gas analyser	B+F	B+D	H1		



NAWID Modules

Module B - EU type-examination

Module D – Conformity to type based on quality assurance of the process

Module D1 – Quality assurance of the production process

Module F - Conformity to EU type based on product verification

Module F1 - Conformity based on product verification

Module G - Conformity based on unit verification



NAWID Modules – possible combinations



B+F, B+D, D1, F1, G



LEGAL METROLOGY – in EU



- ❑ ***WELMEC (European Legal Metrology Cooperation) – prepares various guidance documents for implementation of European directives in metrology – see www.welmec.org***





LEGAL METROLOGY in the world

- ☐ ***there is no single system of legal metrology all over the globe***
- ☐ ***even in Europe, the approaches to national (non-harmonized) metrology infrastructure are different***



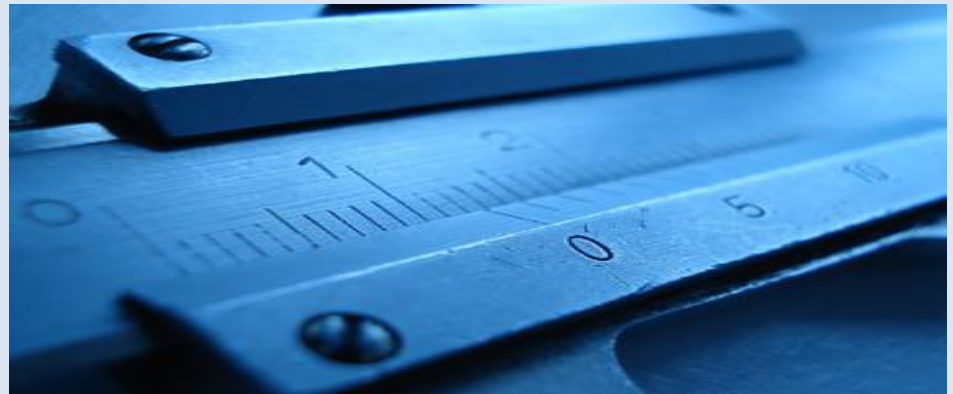


LEGAL METROLOGY in the world



- ❑ **International Organization of Legal Metrology (OIML) – prepares recommendations and documents to promote harmonization of legal metrology in the world (the most important: **D1 – Law on Metrology, D9, D16**)**

- ❑ **www.oiml.org**



Organisation Internationale de Métrologie Légale

International Organization of Legal Metrology

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Summary

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Thank you for your attention

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