

Legal metrology system in Germany

General aspects - special aspects of utility meters

- Introduction
- legal basis
- responsibilities
- future aspects

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Introduction

- System of legal metrology has a long tradition in Germany more than 100 years
- a lot of different meters are verified or under legal control
 - balances
 - utility meters, like gas and electricity meters ,
 - fuel dispensers
 - measuring container for beer / wine (for instance glasses in restaurants)
- Germany is a federal state
 - 15 states
- Responsibilities are divided
 - verification is task of federal states
 - federal government is responsible for unity of legal metrology
- European Measurement Instrument Directive (MID) have to be implemented in Verification act until April of 2006

General Information about PTB

- PTB is the federal institute for metrology in Germany belonging to the Federal Ministry for Economics and Labour
- PTB has two branches (Braunschweig and Berlin), around 1500 staff
- annual budget of 130 million Euro (mainly taxes)
- PTB is responsible for units, traceability of measurements (DKD), approvals in the field of legal metrology, national unity in the field of legal metrology, improvement of international unity in metrology (and many other services)
- 9 technical division and around 400 working groups
- often a working group deals with one measurement unit

working group for gas meters

tasks:

- the realisation of the unit volume and mass of flowing gas (air and natural gas under high pressure)
- national and European approval of gas meters and conversion devices
- participation in national and international organisation work
- research in the field of gas measurement

Staff : 2 scientist, 3 engineers, 2 workers

Basis of PTB work in legal metrology

- Unit act
- Verification act
- Verification Ordinance (**EO**)
- EMC act (electromagnetic environment compatibility)
- different acts concerning governmental activities and costs

Verification act (main content in respect to utility meters)

- aim of the act
 - protection of consumers
 - safeguarding of a fair trade
 - safeguarding of correct measurements in health protection, environment protection etc.
 - improvement of trust in official measurements
(for instance traffic measurements)
- verification duty (which meters have to be verified)
- permission to issue ordinances in respect of verification
- responsibilities (state governments , duties of PTB)
- costs ordinances
- information duties
- penalties

Verification Ordinance

divided in general part and appendices

general part (main content in respect to utility meters) :

- duties during
 - placing on the market
 - using
 - having meters ready for use
- exception from verification
- values used in legal metrology
- reverification period
- approval (general requirements, kinds of approvals, procedures, tasks of PTB)
- verification (procedures, seals, MPE, reverification, investigations of MPE in service)
- general requirements on meters for approval and verification
- state approved test laboratories (acceptance, management, duties)

appendices

Appendices of verification ordinance include basic requirements for different kinds meter

- Maximum permissible errors
- inscriptions
- sealing

- Appendix 5 (EO 5) meters for flowing liquids other than water
- Appendix 7 (EO 7) gas meters

EO 7-1 gas meters

EO 7-2 Orifice meters

EO 7-3 auxiliary equipment

EO 7-4 conversion devices

EO 7-5 gas-pressure regulators

EO 7-6 gas quality measurement (caloric value)

EO 7-7 meter for CO₂- fraction in burn gases

General Assembly of all Parties involved in verification

participants:

- PTB working groups,
- authorities responsible in the federal states,
- representatives of state approved test laboratories

Tasks:

- safeguarding of unity in legal metrology
- discussion of important issues in respect of verification
- foundation of working groups for different tasks (like WG gas meters)
- responsible for the approval of provision of lower order,
- approval of the “state of art in respect to the verification act”

Provisions of lower order

PTB-requirements

- description of technical solutions which are acceptable for approved meters
- for instance requirements for electronic interfaces and software aspects

European directives (until MID)

- only for the most important meter types, basis for European approvals

PTB test instructions

- guarantee an uniform verification praxis in all states
- include description of test facilities and test procedures for verification

Technical instructions

- regulation of application issues like installation of turbine gas meters

Approval for verification (until MID)

- different kinds:
national approval, European approval, general approval
- approved meter type has to fulfil general requirements and the „state of the art in respect to the verification ordinance”
- national approvals only by PTB

Verification

- conducted by local verification offices (balances, fuel dispensers)
- utility meters by state approved test laboratories under supervision of the verification authorities of the states
- verification authorities work currently cost neutral (expenses are equal to income)

Parts of verified meters

- metering sensor
- display
- computer and/or auxiliary equipment
- auxiliary equipment is treated as verified meters

results of verified meters must be clearly distinctive from results of not verified meters or functions

Procedure of Verification:

- inspection concerning the correct construction of a meter
(Is the instrument identical to the approved type?)
- metrological test
(MPE's have to be fulfilled, adjustment may happen during verification procedure)
- Sealing

Verification may be carried out in different steps
(example: test of a conversion device is carried out in a state approved test laboratory of a manufacturer, sealing happens after the installation)

requirements on test facilities are approved by general assembly of all involved parties in verification

verification fee is fixed in cost ordinance

verification for gas meter costs 2 Euro and is economic

Accredited testing laboratories

„state approved test laboratories“

- most of the utility instruments are verified by "accredited testing laboratories".
- support the State in the implementation of the Verification Act
- Holders: public utilities supplying water and energy, and manufacturers
- Sections 47 to 63 of the Verification Ordinance specify the conditions for recognition as a testing laboratory
(staff, suitable rooms, test equipment traceable to PTB)
- holder of the testing laboratory must establish and maintain the testing laboratory as an organisationally independent unit so that proper operation is guaranteed.
- testing laboratories are recognised by the competent supervising verification authorities and are subject to their supervision and control.
- members of the managerial staff are officially appointed and must moreover bind themselves to perform their tasks conscientiously and impartially.
- testing laboratories are responsible for the certification of about 80 million instruments installed in public supply networks to measure electricity, gas, water and heat.

Future Aspects

- new verification act and ordinance will implement MID
- general requirements and conformity assessment modules will be identical for all meters under legal control (as in MID)
- besides MID national regulated measurements will exist
- PTB will be notified body for Modules B, D and H1
- MID conformity assessment are much more complex than current approvals (additional tests)

Policy of PTB

- notified bodies besides PTB may be established by private organisations for all meters types
- PTB will not compete with other NB
- PTB will maintain core competence and care about organisation work in legal metrology issues

- PTB as well as verification authorities are faced to staff cuts
---> this will lead to a shift of tasks to private organisations