

## MID targeted amendment 2023

On May 24, 2023 WELMEC was approached by European Commission DG GROW whether WELMEC would be able to develop a technical proposal for a targeted amendment of the MID by the end of October 2023. This proposal runs in parallel to the fit-for-purpose / evaluation project for which the preparatory study is outsourced to a consortium led by CSES Ireland. WELMEC Chairmanship has decided to accept this challenge.

The European Commission specification reads as follows (Mr. G.Couzigou, DG GROW):

*I am contacting you within the context of the ongoing evaluation of the Metrology Directives.*

*Preliminary internal reflexions and contacts with stakeholders suggest that there are several areas in the Directives where improvement could be beneficial. In particular, we have identified 4 gap areas in the Measuring Instruments Directive (MID) that are critical to the success of the green and digital transition.*

*Taking into account your technical expertise and with reference to the existing cooperation between Welmec and the Commission, I would like to ask for your help in the preparatory work that should eventually lead to a legislative proposal once the Commission political validation process is completed. I refer to e-vehicle charging stations, hydrogen dispensers, smart utility meters (primarily electricity) and the suitability of gas meters for new gases like hydrogen. Your help would be appreciated because you gather the expertise of national metrology institute as well as industry stakeholders.*

*Concretely we are looking to see your thoughts on:*

- the set of essential requirements e-vehicle charging stations should meet;*
- the set of essential requirements hydrogen refilling stations for motor vehicles should meet;*
- if the requirements of MID Annex V. on electrical energy meters **and the corresponding requirements in Annex I.** should be modified taking into account technological development, new uses and the roll-out of smart meters, and if yes, how;*

*Ideally we would appreciate your input by the end of October 2023.*

It has been agreed with Commission that in exception cases the scope can be broader if an urgent metrology matter at the European level is addressed and the consensus is not threatened by that. Apart from the instrument-specific annexes Annex I Essential requirements has to be revised accordingly as some of the provisions are not any more technologically independent enough due to an immense progress in digital ICT technologies in recent years.

In response to that, WELMEC ExBo has formed drafting groups for Annex I and all the instrument-specific annexes and initiated the work.

*As stated in the Commission Blue Guide of 2022: The objectives of the first harmonisation directives focused on the elimination of barriers and on the free movement of goods in the single market. These objectives are now being complemented by a comprehensive policy geared to ensuring that only safe and otherwise compliant products find their way on to the market.*

Therefore, the principles for the revision can be formulated as follows:

- The Essential requirements should be technology neutral, future and innovation proof in order to reflect the principles of the New Legislative Framework.
- Due to the close end of the current term of the European Parliament the proposal should be developed by a close deadline, therefore the project is called “fast-track targeted technical amendment of the MID” and consequently, it should enjoy as wide as possible consensus among all the stakeholders in legal metrology which might require some ability to make reasonable concessions.
- The amendment should also provide necessary provisions for protection of public interests inclusive protection of consumers against incorrect measurements – due to the fact that even after a considerable effort on the part of the Commission and WELMEC Chair no representative of consumers could be identified to be involved in the process. The representatives of legal metrology authorities of the Member States should play a role here.
- In addition to the instrument-specific annexes, corresponding essential requirements in Annex I have also to be amended as some of the provisions, linked to the areas listed above, are not any more technologically independent due to an immense progress in digital technologies in recent years. These changes have to be limited to the extent that it is absolutely needed.
- The proposed changes should be minimal and limited to the extent absolutely necessary.
- A correction of obvious errors in MID are accepted to be proposed provided it can be linked to areas proposed and they are minimal (“cooling meters”).
- If the ongoing evaluation concludes this, the MID and the NAWI will be revised according to the normal timeline and procedure.

As regards Annex I, roughly, the following order of comment stages was used:

- Annex I drafting group (P.Klenovsky, W.de Waal, M.Grum);
- NoBoMet;
- WELMEC WG 7 + manufacturer associations;
- WELMEC WG 8 + manufacturer association;
- ESMIG aisbl, Mr. W.Strabbing
- Consumer association – WELMEC Chair with an assistance of the European Commission has gone to considerable length to secure their representation. The associations of BEUC (the European Consumer Association) and ANEC (the European consumer voice in standardisation) have been approached - finally, both have informed us that they have no suitable knowledgeable person to be involved. A representation of consumers is, unfortunately, habitually a weak point, their role should be assumed by legal metrology authorities of MSs;
- WELMEC ExBo after collation of the comments;
- WELMEC Delegates – final discussion/polling.

The way forward agreed by the ExBo is:

- By September 15: to finish the drafts of all the parts of the proposals by the drafting groups and to send it to the ExBo;

- By September 19: ExBo will discuss and review all the proposals;
- September 28: a webinar for the WELMEC community where representatives of all the drafting groups should present the proposals and to give a thorough explanation of the background (to facilitate any discussions afterwards);
- October 25: on-line WELMEC Extraordinary Committee meeting – based on comments received after the webinar the whole proposal will be submitted to the Com for discussion/polling/acceptance. If consensus cannot be made then the whole draft will be forwarded to the European Commission with a list of the Members who voted in favour or against.

The Commission's proposal should be finished by the 1st quarter 2024.

*As regards the text below, basically, in black there is the original text, in red new additions before the webinar and in green changes made after the webinar in response to the comments. The stakeholders are strongly encouraged to read the explanatory text before making any decisions.*

## ANNEX I

### ESSENTIAL REQUIREMENTS

A measuring instrument shall provide a high level of metrological protection in order that any party affected can have confidence in the result of measurement, and shall be designed and manufactured to a high level of quality in respect of the measurement technology and security of the measurement data.

The essential requirements that shall be met by measuring instruments are set out below and are supplemented, where appropriate, by specific instrument requirements in Annexes III to **XII** that provide more detail on certain aspects of the general requirements.

The solutions adopted in the pursuit of the essential requirements shall take account of the intended use of the instrument and any foreseeable misuse thereof.

### DEFINITIONS

Measurand - The measurand is the particular quantity subject to measurement.

Influence quantity - An influence quantity is a quantity that is not the measurand but that affects the result of measurement.

Rated Operating Conditions - The rated operating conditions are the values for the measurand and influence quantities making up the normal working conditions of an instrument.

Disturbance - An influence quantity having a value within the limits specified in the appropriate requirement but outside the specified rated operating conditions of the measuring instrument. An influence quantity is a disturbance if for that influence quantity the rated operating conditions are not specified.

Climatic environments - Climatic environments are the conditions in which measuring instruments may be used. To cope with climatic differences between the Member States, a range of temperature limits has been defined.

Critical change value - The critical change value is the value at which the change in the measurement result is considered undesirable.

**Electronic receipt - refers to a digital document or record generated by a transaction or operation, which confirms the details of the transaction. It serves the same function as a physical receipt, providing a record of the transaction for both the provider and the recipient. This electronic document can be stored, retrieved, and transmitted digitally.**

*Legend: the term used across the amended Annex I, a matter to be resolved by the EC legal services.*

Compatibility - is the ability of a measuring instrument, including software, when used together with one or more other devices in alignment with its designated function, to:

- perform without losing or compromising the ability to perform as intended, and/or
- integrate and/or operate without the need for modification or adaption of any part of the combined devices, and/or
- be used together without conflict/interference or adverse reaction.

*Legend: used in art. 9.3.*

Material Measure - A material measure is a device intended to reproduce or supply in a permanent manner during its use one or more known values of a given quantity.

Utility - A utility is regarded as a supplier of electricity, gas, thermal energy or water **to the community using regulated distribution systems.**

*Legend: the term is important to be retained as some provisions use it (e.g art. 11), only the definition has to be adapted to stress the special regime in which those measuring instruments operate – therefore, a difference has to be drawn between using the same measuring instruments for other applications (e.g. electricity meters in electromobility). Alternatively, those measuring instruments could be given in the text explicitly but anyhow they have to be differentiated for utility measurements - on the technical side, those utility ones will have always be mandatorily non-resettable whereas those for other applications like electricity meters in EVSE should ideally be resettable. As an additional benefit, it reduces the number of possible changes in Annex I. The absence of the term has also generated some confusion in a number of commentators.*

Direct sales - A trading transaction is direct sales if:

- the measurement result serves as the basis for the price to pay; and
- at least one of the parties involved in the transaction related to measurement is a consumer or any other party requiring a similar level of protection; and
- all the parties in the transaction accept the measurement result ~~by communicating face-to-face or via networks~~ at the time **the measurement is concluded** ~~and place~~.

*Legend: classically, the interaction between both parties took place in face-to-face communication (implying that it has to be at the same place), currently as regards some measuring instruments the communication can be made on-line (using networks) as well during the process of a measurement (e.g. EVSE measuring system using SW-application delivered by EMSP – E-Mobility Service Provider). The words “...and place” are redundant as face-to-face communication can only take at the same place.*

## ESSENTIAL REQUIREMENTS

### 1. Allowable Errors

- 1.1. Under rated operating conditions and in the absence of a disturbance, the error of measurement shall not exceed the maximum permissible error (MPE) value as laid down in the appropriate instrument-specific requirements **based on shared risk.**

*Legend: The problem how to take into account the uncertainties of measurement has to be resolved – at the last WG MI meeting in April 2021 it was raised by an association of manufacturers of CSMs: various NBs have different interpretations. Traditionally, in legal metrology the principle of the shared risk or simple acceptance rule has been used, see JCGM 106:2014, par. 8.2, ILAC G8:09/2019, par. 4.2 and 5.1. The change provides for necessary harmonization.*

Unless stated otherwise in the instrument-specific annexes, MPE is expressed as a bilateral value of the deviation from the true measurement value.

- 1.2. Under rated operating conditions and in the presence of a disturbance, the performance requirement shall be as laid down in the appropriate instrument-specific requirements.

Where the instrument is intended to be used in a specified permanent continuous electromagnetic field the permitted performance during the radiated electromagnetic field-amplitude modulated test shall be within MPE.

- 1.3. The manufacturer shall specify the climatic, mechanical and electromagnetic environments in which the instrument is intended to be used, power supply and other

influence quantities likely to affect its accuracy, taking account of the requirements laid down in the appropriate instrument-specific annexes.

#### 1.3.1. Climatic environments

The manufacturer shall specify the upper temperature limit and the lower temperature limit from any of the values in Table 1 unless otherwise specified in the Annexes III to **XIV**, and indicate whether the instrument is designed for condensing or non-condensing humidity as well as the intended location for the instrument, i.e. open or closed.

Table 1

	Temperature Limits			
	30 °C	40 °C	55 °C	70 °C
Upper temperature limit	30 °C	40 °C	55 °C	70 °C
Lower temperature limit	5 °C	-10 °C	-25 °C	- 40 °C

#### 1.3.2. (a) Mechanical environments are classified into classes M1 to M3 as described below.

M1: This class applies to instruments used in locations with vibration and shocks of low significance, e.g. for instruments fastened to light supporting structures subject to negligible vibrations and shocks transmitted from local blasting or pile-driving activities, slamming doors, etc.

M2: This class applies to instruments used in locations with significant or high levels of vibration and shock, e.g. transmitted from machines and passing vehicles in the vicinity or adjacent to heavy machines, conveyor belts, etc.

M3: This class applies to instruments used in locations where the level of vibration and shock is high and very high, e.g. for instruments mounted directly on machines, conveyor belts, etc.

#### (b) The following influence quantities shall be considered in relation with mechanical environments:

- vibration;
- mechanical shock.

#### 1.3.3. (a) Electromagnetic environments are classified into classes E1, E2 or E3 as described below, unless otherwise laid down in the appropriate instrument-specific annexes.

E1 - This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in residential, commercial and light industrial buildings.

E2 - This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.

E3 - This class applies to instruments supplied by the battery of a vehicle. Such instruments shall comply with the requirements of E2 and the following additional requirements:

- voltage reductions caused by energising the starter-motor circuits of internal combustion engines,
- load dump transients occurring in the event of a discharged battery being disconnected while the engine is running.

(b) The following influence quantities shall be considered in relation with electromagnetic environments:

- voltage interruptions;
- short voltage reductions;
- voltage transients on supply lines and/or signal lines;
- electrostatic discharges;
- radio frequency electromagnetic fields;
- conducted radio frequency electromagnetic fields on supply lines and/or signal lines;
- surges on supply lines and/or signal lines.

1.3.4. Other influence quantities to be considered, where appropriate, are:

- voltage variation;
- mains frequency variation;
- power frequency magnetic fields;
- any other quantity likely to influence in a significant way the accuracy of the instrument.

1.4. When carrying out the tests as envisaged in this Directive, the following points shall apply:

1.4.1. Basic rules for testing and the determination of errors

Essential requirements specified in points 1.1 and 1.2 shall be verified for each relevant influence quantity. Unless otherwise specified in the appropriate instrument-specific annex, these essential requirements apply when each influence quantity is applied and its effect evaluated separately, all other influence quantities being kept relatively constant at their reference value.

Metrological tests shall be carried out during or after the application of the influence quantity, whichever condition corresponds to the normal operational status of the instrument when that influence quantity is likely to occur.

1.4.2. Ambient humidity

(a) According to the climatic operating environment in which the instrument is intended to be used either the damp heat-steady state (non-condensing) or damp heat cyclic (condensing) test may be appropriate.

(b) The damp heat cyclic test is appropriate where condensation is important or when penetration of vapour will be accelerated by the effect of breathing. In conditions where non-condensing humidity is a factor the damp- heat steady state is appropriate.

## 2. Reproducibility

The application of the same measurand in a different location or by a different user, all other conditions being the same, shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

### 3. Repeatability

The application of the same measurand under the same conditions of measurement shall result in the close agreement of successive measurements. The difference between the measurement results shall be small when compared with the MPE.

### 4. Discrimination and Sensitivity

A measuring instrument shall be sufficiently sensitive and its discrimination threshold shall be sufficiently low for the intended measurement task.

### 5. Durability

A measuring instrument shall be designed to maintain an adequate stability of its metrological characteristics over a period of time estimated by the manufacturer, provided that it is properly installed, maintained and used according to the manufacturer's instruction when in the environmental conditions for which it is intended.

### 6. Reliability

A measuring instrument shall be designed to reduce as far as possible the effect of a defect that would lead to an inaccurate measurement result, unless the presence of such a defect is obvious.

### 7. Suitability

7.1. A measuring instrument shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.

7.2. A measuring instrument shall be suitable for its intended use taking account of the practical working conditions and shall not require unreasonable demands of the user in order to obtain a correct measurement result.

7.3. The errors of a utility measuring instrument at flows or currents outside the controlled range shall not be unduly biased.

7.4. Where a measuring instrument is designed for the measurement of values of the measurand that are constant over time, the measuring instrument shall be insensitive to small fluctuations of the value of the measurand, or shall take appropriate action.

7.5. A measuring instrument shall be robust and its materials of construction shall be suitable for the conditions in which it is intended to be used.

7.6. A measuring instrument shall be designed so as to allow the control of the measuring tasks after the instrument has been placed on the market and put into use. If necessary, special equipment or software for this control shall be part of the instrument **or shall be made available free of charge by the manufacturer to an authorized conformity assessment body on the European or national level or market surveillance authority in a timely manner upon request by such authority in a timely manner**. The test procedure shall be described in the operation manual.

*Legend: in introduction, it has to be pointed out that the provision has nothing in common with the **use** of measuring instruments, it is about **metrological control** of measuring instruments (see the definition from the VIML: legal control of measuring instruments generic term used to globally designate legal operations to which measuring instruments may be subjected, e.g. type approval,*

verification, etc.). At the moment the interpretation of 7.6 by some in the community is that those tools, to be only necessary to make the metrological tests, should be delivered with e.g. every and each watermeter delivered to a consumer - consumers do not need them, it is expensive and useless and manufacturers represented by AQUA are logically sharply against it. Under conformity assessment bodies are meant both notified bodies under European harmonized legislation and authorized verification/inspection bodies on national level. It is a restriction of this requirement, therefore a liberalization provision.

When a measuring instrument has associated software which provides other functions besides the measuring function, the software that is critical for the metrological characteristics shall be identifiable and shall not be inadmissibly influenced by the associated software.

## 8. Protection against corruption

8.1. The metrological characteristics of a measuring instrument shall not be influenced in any inadmissible way by the connection to it of another device, by any feature of the connected device itself or by any remote device that communicates with the measuring instrument.

8.2. A hardware component that is critical for metrological characteristics shall be designed so that it can be secured. Security measures foreseen shall provide for evidence of an intervention.

8.3. Software that is critical for metrological characteristics shall be identified as such and shall be secured.

Software identification shall be easily provided by the measuring instrument.

Evidence of an intervention shall be available for a reasonable period of time.

8.4. Measurement data, software that is critical for measurement characteristics and metrologically important parameters shall be adequately secured and protected to ensure availability, integrity and authenticity.

*Legend: a rewording and updating of the current 8.4. Securing and protecting is required to ensure availability, integrity, and authenticity for measurement data, but also for software and metrologically important parameters. This is particularly relevant in the case of e-receipts.*

8.5. For utility measuring instruments the display of the total quantity supplied or the displays from which the total quantity supplied can be derived, whole or partial reference to which is the basis for payment, shall not be able to be reset during use.

8.6. Updates of legally relevant software critical for metrological characteristics are assumed to be in conformity with this Directive without any immediate conformity assessment action without an immediate re-verification is allowed under the following conditions:

- the new version of the software has been duly certified (as an addition to the TEC of the given measuring instrument) and shall include the upgrade path to new version of the software;
- the legal metrology authorities touched by the download are duly notified;
- metrologically important parameters inclusive the measurement data remain unchanged;
- no hardware seals need to be broken;
- the software updated is logged in an audit trail with sufficient information;
- the audit trail giving the history of software updates is not erased during the operation.

*Legend: This is a pervasive unsolved problem which might be considered to be exclusively associated with MIs in use but due to the fact that it is preceded by a change in TEC it is de iure an operation of conformity assessment under EU legislation. Manufacturer associations have often criticized that arrangements as to download of new SW are vastly different in the Member States. European*

*Commission DG GROW has expressed a view that it is a serious barrier to trade on the Single Market to be urgently solved.*

## **9. Information to be borne by and to accompany the instrument**

9.1. A measuring instrument shall be **visibly inscribed with:**

a) manufacturer's name, registered trade name or registered trademark **and if applicable its website;**

and, where applicable:

b) the number of the EU-type examination certificate or the EU design examination certificate.

c) information whether or not additional devices providing metrological results comply with the provisions of this Directive on legal metrological control.

**Additionally, the measurement instrument shall either present, or be inscribed with:**

(d) information in respect of its accuracy;

**and, where applicable:**

(e) information in respect of the conditions of use;

(f) measuring capacity;

(g) measuring range;

(h) identity marking.

*Legend: rearranging and updating of the existing provision.*

9.2. An instrument of dimensions too small or of too sensitive a composition to allow it to bear the relevant information shall have its packaging, if any, and the accompanying documents required by the provisions of this Directive suitably marked.

9.3. The instrument shall **either** be accompanied by information on its operation **or provide access to this information via commonly available tools** unless the simplicity of the measuring instrument makes this unnecessary.

Information shall be easily understandable and shall include where relevant:

(a) rated operating conditions;

(b) mechanical and electromagnetic environment classes;

(c) the upper and lower temperature limit, whether condensation is possible or not, open, or closed location;

(d) instructions for installation, maintenance, repairs, permissible adjustments;

(e) instructions for correct operation and any special conditions of use;

(f) conditions for compatibility with interfaces, sub-assemblies or measuring instruments.

*Legend: necessary update of the existing provision.*

9.4. Groups of identical measuring instruments used in the same location or used for or used for utility measurements do not necessarily require individual instruction manuals.

9.5. Unless specified otherwise in an instrument-specific annex, the scale interval for a measured value shall be in the form  $1 \times 10^n$ ,  $2 \times 10^n$ , or  $5 \times 10^n$ , where  $n$  is any integer or zero. The unit of measurement or its symbol shall be shown close to the numerical value.

9.6. A material measure shall be marked with a nominal value or a scale, accompanied by the unit of measurement used.

9.7. The units of measurement used and their symbols shall be in accordance with the provisions of Union legislation on units of measurement and their symbols.

9.8. All the marks and inscriptions required under any requirement **in addition to the CE marking** shall be clear, non-erasable, unambiguous and non-transferable. **Digitally and/or electronically presented marks and inscriptions shall be adequately secured and protected.**

*Legend: necessary extension/update of the existing provision, the mentioning of CE marking to be solved by the EC legal services.*

## 10. Indication of result

*Legend: art. 10.1. is a key part of the revision taking on board recent state-of-the-art in the ICT technology in application to measuring instruments, especially to smart metering systems. It provides for a wide range of technical solutions based on the current state of the art for manufacturers to be used, formulated in the most general form. On the other hand, a basic technical specification has to be given if the applicability of various solutions to instrument-specific annexes should be given, as required by a number of commentators – it should be used definitely in MI-003 and possibly in MI-002 and MI-004 at this stage. The current MID text is extremely technologically dependent, even to such an extent that other forms of readout of measured values (material measures, CSMs) than a display are not supported at all – added.*

### 10.1. A measuring instrument shall:

- a) be fitted with a metrologically controlled display, scale, readout and/or printer accessible without tools to present the relevant data and/or
- b) present the relevant data on a metrologically controlled remote display accessible without tools and/or
- c) present the data via metrologically controlled application software on the device of the user and/or consumer and/or
- d) present the data via a metrologically controlled channel (e.g. data storage, website).

At least one of the technical solutions above shall be used to indicate the measurement result. ~~For smart metering systems all the solutions above are permitted to be used, otherwise~~ The instrument specific annex shall specify whether the technical solutions under 10.1. c) and d) are permitted as the only option for indication. ~~The instrument specific annex may specify the need for a local indication under 10.1. a) (mainly display).~~

The measurement result presented by the ~~respective technical solution~~ serves as the basis for the price to pay where applicable.

10.2. The indication of any result shall be clear, unambiguous, ~~protected against accidental deletion~~ **trustworthy and non-discriminatory** and accompanied by such marks and inscriptions necessary to inform the user of the significance of the result. Easy reading of the presented result shall be permitted under normal conditions of use. Additional indications may be shown provided they cannot be confused with the metrologically controlled indications.

~~10.3. In the case of hard-copy the print or record shall also be easily legible and non-erasable.~~  
*Legend: after the changes in 10.2. the provision of 10.3. can be deleted.*

10.4. A measuring instrument for direct sales trading transactions shall be designed to present the measurement result to both parties in the transaction when installed as intended. **The measurement data shall be fully established in each device individual-instrument and immediately presented to the consumer.**

*Legend: for the sake of consumer protection this provision excludes the use of clouds which is anyhow in this case highly impractical, on the other hand it does not exclude a transfer of measurement results e.g. to mobile apps of consumers – in this case the app is under control of the manufacturer, therefore it could be put effectively under metrological control.*

When critical in case of direct sales, any ticket provided to the consumer by an ancillary device not complying with the appropriate requirements of this Directive shall bear appropriate restrictive information.

## 11. Further processing of data to conclude the trading transaction

11.1 A durable proof in the form of a print-out **or electronic receipt of the measurement result from** measuring instruments other than a utility measuring instrument and the information to identify the transaction **shall be available on request at the time the measurement is concluded,** when:

- (a) the measurement is non-repeatable; and
- (b) the measuring instrument is normally intended for use in the absence of one of the trading parties.

**11.2 In the case of an electronic receipt** the measurement result and the information to identify the transaction shall be **accompanied by information that enables the consumer to verify the integrity and authenticity of the data with easily available and suitable tools.**

*Legend: reshuffling of the text to include electronic receipts.*

## 12. Conformity evaluation

A measuring instrument shall be designed so as to allow ready evaluation of its conformity with the appropriate requirements of this Directive.