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# WELMEC

European Cooperation in Legal Metrology

## **Guide for Securing of Fuel Dispensers** (Measuring Systems for Liquids other than Water)



# WELMEC

European Cooperation in Legal Metrology

WELMEC is a cooperation between the legal metrology authorities of the Member States of the European Union and EFTA.

This document is one of a number of Guides published by WELMEC to provide guidance to manufacturers of measuring instruments and to Notified Bodies responsible for conformity assessment of their products.

The Guides are purely advisory and do not themselves impose any restrictions or additional technical requirements beyond those contained in relevant EU Directives.

Alternative approaches may be acceptable, but the guidance provided in this document represents the considered view of WELMEC as to the best practice to be followed.

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## **Foreword**

This document is intended to provide guidance to all those concerned with the application of the MID and OIML International Recommendations R117-1 (2007) 'Measuring Systems for Liquids other than Water'.

This document provides a guide for a uniform way of securing of fuel dispensers including LPG dispensers.

## Contents

1	Scope .....	5
2	Definitions, abbreviations and symbols .....	5
2.1	Definitions .....	5
2.2	Abbreviations .....	5
3	Securing requirements.....	6
4	Components / Places that require securing .....	8
	Annex A: MID requirements concerning securing .....	12

## 1 Scope

For the benefit of manufacturers, and all other interested parties, e.g. notified bodies under annex B, D, F, G and H1 of the MID, notifying authorities and market surveillance authorities, this document describes a best practise approach to securing measuring systems for the continuous and dynamic measurement of quantities of liquids other than water, covered by Annex VII (MI-005) of the MID but limited to fuel dispensers including LPG dispensers.

It should be noted that it is the responsibility of the manufacturer of the measuring instrument or system to be able to demonstrate the conformity to all applicable requirements of the MID including conformity to the securing provisions of the requirements of MID.

## 2 Definitions, abbreviations and symbols

The definitions of OIML R117-1 edition 2007 apply to this guide and in addition the following:

### 2.1 Definitions

Data sheet     A plate (or other carrier of information, e.g. document) stating all metrologically relevant information of individual measuring systems and components thereof.

### 2.2 Abbreviations

EID	Electronic Indicating Device (EID)
ECID	Electronic Calculating and Indicating Device (ECID)
EU-TEC	EU-type examination certificate or EU design examination certificate
MID	Measuring Instruments Directive (2014/32/EU)

### 3 Securing requirements

Measuring systems for the continuous and dynamic measurement of quantities of liquids other than water placed on the market and/or put into use by the manufacturer or importer need to satisfy the requirements of the MID.

The measuring systems shall therefore be fitted with all securing provisions by the manufacturer.

The manufacturer shall demonstrate to the notified body that these securing measures, including the sealing provisions, are adequate.

The notified body under annex B or H1 shall specify in the EU-type examination certificates or EU design examination certificates the securing measures required to ensure the integrity of the measuring system (e.g. sealing, identification of the software, etc.).

The securing measures shall also be documented by the manufacturer in the technical documentation file (see article 18 of the MID, paragraph 2 and 4).

See “Annex A: MID requirements concerning securing” for the essential requirements of MID.

Securing is needed for the following reasons:

- To prevent access without evidence that this has occurred to parts that are critical for the metrological characteristics of the measuring system.
- To prevent changes without evidence that this has occurred in software that is critical for the metrological characteristics of the measuring system.
- To prevent access without evidence that this has occurred to parameters or settings that can influence the metrological performance of the measuring system, for example but not limited to calibration factors, correction parameters, changes of parameters for adoption of the meter to a specific installation.
- To prevent access without evidence that this has occurred to interfaces of the measuring system when influence on the metrological characteristics of the measuring system can occur through the interface.
  - However, interfaces need not be secured if the fuel dispenser cannot 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 fuel dispenser. If this is the case those interfaces shall be described in the EU-type examination certificates or EU design examination certificates.
- To prevent disconnection of parts without evidence that this has occurred, including ancillary devices or utility mains supply equipment, when this can influence the metrological performance of the measuring system.

In the next chapter some specific securing provisions are given. However, the lists of provisions in this chapter are not exhaustive.

Manufacturers should therefore always show, document and clarify the securing measures so the notified body can evaluate that the securing measures, including the sealing provisions, comply with the requirements of MID.

The details of the securing measures shall be provided by the manufacturer and a notified body should evaluate their suitability.

### **Hardware sealing**

Various types of seals are available, varying in terms of robustness.

Inscriptions, unique to the manufacturer, should be embossed into the seal to allow traceability. Manufacturers should consider and apply robust methods to ensure that seals cannot be easily copied for fraudulent purposes.

Guidance on sealing is given in OIML R117-1 edition 2007, article 2.20.1.

### **Software securing**

Various types of software securing are available, ranging from software identification to audit trails to log files. Guidance on the subject of compliance with the software related requirements contained in the MID is given in WELMEC guide 7.2 and OIML R117-1 edition 2007, article 2.20.2.

### **Data sheet**

A tool to facilitate the placing on the market or market surveillance of the measuring instrument is the data sheet that contains the technical characteristics of the fuel dispenser when it was placed on the market (first made available).

Each exchange of a component shall be recorded on the data sheet or a new document has to be issued.

If the data sheet is secured to the instrument the evidence of an intervention is given if a component is replaced for another component. See WELMEC guide 10.5 with regard to guidance of the data sheet.

## 4 Components / Places that require securing

Note: A Data Sheet, as defined in Guide 10.5 on Marking of Fuel Dispensers, is not required, provided:

- the individual components are sealed to the chassis of the dispenser AND
- all legally required information is marked on the instrument other than the data sheet.

Securing marked with “Yes” are always required.

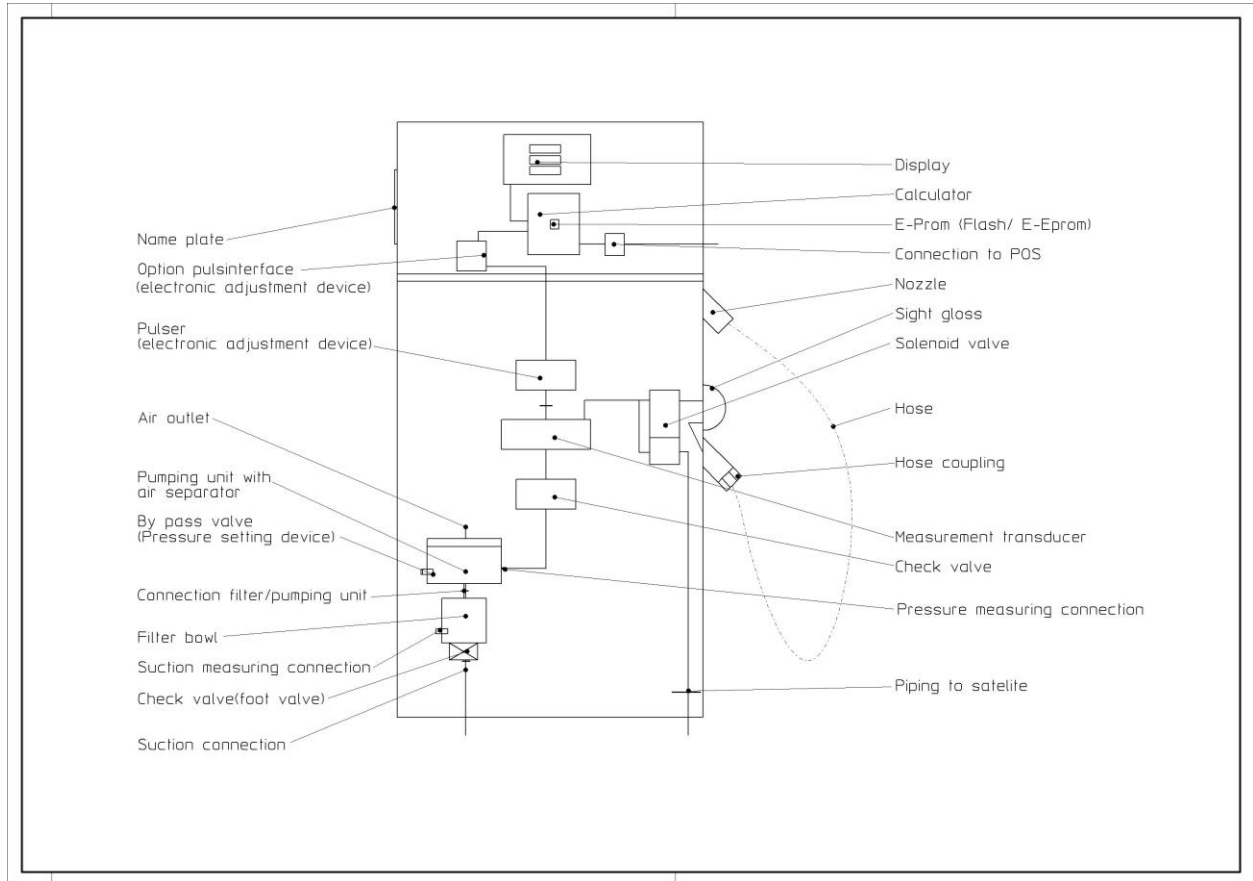
Component / Description	Metrological Securing Yes or No [Y / N]	Remarks
Level detection (submerge system)	N	According to OIML R117-1:2007, article 6 of B.5.1.3 of Annex B all the components of the submerge system shall be in “positive” security so that no delivery is possible if one of these devices fails.
Suction connection	N	
Impact (shear) valve + manual valve	N	
Filter + Foot valve	N	
Measuring connection for vacuum test	N	Check the presence of pressure switch and leak detection
Connection filter - pump	N	
Pump	N	
By-pass setting of pump	N	The installer needs to adjust it at the limit of Qmax
Gas separator against manipulation/opening	Y	
Gas separator against removal	Y	Either by hardware seal or by means of a data sheet
Connection gas separator – check valve	N	
Non-return valve (to keep the meter under pressure) (in scheme called “check valve”)	N / Y	Normally not sealed but depending on the construction (e.g. integrated on the downstream side of the pumping unit), if inner part easily removable, it has to be sealed
Meter Sensor against removal	Y	Either by means of a mechanical seal, software securing or by means of a data sheet.
Meter Sensor against opening	Y	Only when after opening a mechanical manipulation can be made which influences the metrological characteristics
Mechanical adjustment device against manipulation	Y	
Pulser against opening	Y	



<b>Component / Description</b>	<b>Metrological Securing Yes or No [Y / N]</b>	<b>Remarks</b>
All mechanical connections between the meter sensor and pulser or mechanical indicating device against manipulation	Y	Sealing by means of mechanical seals
All connections between the pulser and calculator against manipulation	Y	Sealing by means of mechanical seals, or software securing
Electronic adjustment, correction or conversion device, against manipulation	Y	
Associated measuring instrument against removal	Y	Sealing shall be by means of a mechanical seal
All connections between associated measuring instrument and the Electronic Calculating and Indicating Device (ECID)	Y	Sealing by means of mechanical seals, or software securing
Electronic calculator hardware against manipulation	Y	Sealing shall be either by means of a mechanical seal or software securing As far as manipulation on metrological characteristics is possible after opening
Electronic calculator and or Electronic Indicating Device (EID) hardware against removal	Y	Mechanical seal or sealed by the identification on the data sheet
Calculator and/or EID Software version(s)	Y	By hardware or software securing, see also WELMEC Guide 7.2 regarding guidance on software download.
Calculator and/or EID Software setting/configuration	Y	By hardware or electronic or software securing, see WELMEC Guide 7.2 regarding securing of type - or device specific parameters.
Electronic indicating devices hardware against opening or removal	Y	Sealing shall be either by means of a mechanical seal or sealed by identification on the data sheet. As far as manipulation on metrological characteristics is possible after opening, if not, no seal is required
Markings	Y	Removal, without destroying the markings, shall not be possible, or the markings shall be sealed to the frame of the dispenser (MID: article 22 and annex I article 9.8; R117-1 (2007): article 2.20.1)

<b>Component / Description</b>	<b>Metrological Securing Yes or No [Y / N]</b>	<b>Remarks</b>
Data Sheet	Y	If a data sheet is used to secure components against removal than the data sheet should be secured to the measuring system in such a way that modifying or replacing the data sheet is not possible without evidence of an intervention
Markings on the components	Y	If these markings are required by the EU-TEC, by mechanical seal.
Valves	N	
Piping / meter to hose	N	
Piping to satellite	N	
Hose coupling	N	
Nozzle	N	
Break-away coupling	N	
Volume and/or price totalizers, if used as a basis for legal transactions	Y	For detailed information, also see the indicating device.
Electronic hardware with analogue components (pulse transmission)	Y	
Additional hardware, which is purely digital	N	Under MID it is the manufacturer's responsibility to apply components which work as designed under rated operating conditions. OIML R117-1 (2007) is more restrictive. However, the EU Type- or Design examination certificate might require sealing of electronic hardware in case of type U instrument, see guidance on this subject in WELMEC Guide 7.2.
Software version(s)	Y	
Software setting/configuration, in case of pulse signals	Y	By hardware or software securing, see WELMEC Guide 7.2 regarding securing of type or device specific parameters.
Software setting/configuration, in case of digital data	Y	By hardware or electronic or software securing, see WELMEC Guide 7.2 regarding securing of type or device specific parameters.
Adjustment of the Pressure maintaining device	Y	
Pressure maintaining device against manipulation	Y	
Pressure maintaining device against removal	Y	Mechanical seal or sealed by the identification on the data sheet
Valves in vapour return line	Y	If the system does not stop when the valve is closed, sealed in open position, or labelled stating that it must be open.

## Scheme of a Fuel Dispenser



## Annex A: MID requirements concerning securing

The MID specifies a number of requirements concerning the securing of a fuel dispenser, as lay down in the following articles:

MID, article 18, paragraph 2 and 4:

- The technical documentation shall be sufficiently detailed to ensure the integrity of the instrument;
- The manufacturer shall specify where seals and markings have been applied.

MID, Annex 1 Essential Requirements, article 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 stored or transmitted shall be adequately protected against accidental or intentional corruption.
- 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.

Annex B article 5.2 and Annex H1 article 4.3.2 specify that the certificate and its annexes shall contain all relevant information for conformity evaluation and in-service control.

In particular, to allow the conformity of manufactured instruments with the examined type to be evaluated regarding the reproducibility of their metrological performances, being properly adjusted using appropriate means, these certificates shall contain:

- measures required for ensuring the integrity of the instruments (sealing, identification of software, etc.);
- information on other elements necessary for the identification of the instruments and to check their visual external conformity to type;
- if appropriate, any specific information necessary to verify the characteristics of manufactured instruments.