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WELMEC

European cooperation in legal metrology

Guide for Sealing of Fuel Dispensers
(Measuring Systems for Liquids other than Water)



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WELMEC

European cooperation in legal metrology

WELMEC is a co-operation between the legal metrology services of the Member States of the European Union and EFTA. This document is the introduction to WELMEC.

WELMEC is publishing a number of Guides 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 EC Directives. Alternative approaches may be acceptable, but the guidance provided in these documents are representing 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 (1995) and R117-1 (2007) 'Measuring Systems for Liquids other than Water'.

This document provides a guide for a uniform way of sealing of fuel dispensers

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1 Introduction

This document aims to create a uniform policy for the Sealing of Fuel Dispensers within WELMEC Member States and thus following all applicable legal requirements.

2 Purpose of Sealing and applicable references

From OIML R117, edition 1995:

Sealing should be provided on all parts of the measuring system which cannot be materially protected in any other way against operations liable to affect the measurement accuracy.

It must be prohibited to change parameters which participate in the determination of the results of measurement (parameters for correction and conversion in particular) by means of sealing devices.

Note: The general requirements of R117-1 (2007) regarding sealing are essentially identical with those of R117 (1995).

From the MID 2004/22/EC:

Article 10 "Documentation" point 4: The manufacturer shall specify where seals and markings have been applied.

Annex 1, Essential Requirements, article 8:

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.

Note: "MID, MI-005, item 5.2 has been taking under consideration for the proposed sealing."

Annex B point 5.2 second paragraph:

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 to be evaluated with the examined type regarding the reproducibility of their metrological performances, when they are properly adjusted using appropriate means, content shall include:

- *the metrological characteristics of the type of instrument;*
- *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;*
- *....*

Annex H1 point 4.3.2

The certificate or its annexes shall contain all relevant information for conformity evaluation and in-service control. It shall to allow the evaluation of conformity of the manufactured instruments with the examined design regarding the reproducibility of their metrological performances, when they are properly adjusted using appropriate means, including:

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

From WELMEC 7.2 Guide, issue, May 2005, chapter 4 and 5:

Legally relevant software and measurement data shall be protected against accidental or unintentional changes.

Parameters that fix legally relevant characteristics of the measuring instrument shall be secured against unauthorized modification.

Liberally translated one can summarise the above as: the purpose of sealing is to provide evidence of an intervention in the instrument/system's metrological characteristics.

Note: OIML R117 (1995) and R117-1 (2007) and the WELMEC 7.2 guide use words like "protected" and "prohibited", which seems to imply that the presence of seals will make it impossible to make changes. This is not in line with the general accepted way of putting a hardware seal on a adjustment device or program switch to secure the intervention but which makes it not impossible to make changes
In contrast, MID finds it sufficient to provide evidence of interventions.

Motivations for sealing:

Given the problem sketched in the previous Chapter of this document, for the Working Group a further distinction is required in the kinds of interventions that may be critical:

- I) Interventions resulting in a shift in calibration data (e.g. mechanical/electronic adjustment devices)
- II) Interventions caused by non-approved modifications, which may affect the instrument/system's metrological characteristics and performances (guarantee conformity to type)
- III) Interventions caused by the replacement of components by identical ones, but where the change may affect the metrological characteristics and performances.

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 given on plates other than the data sheet

Seals marked with "Yes" are always required.

The way of sealing must be described in detail in the Type (Design) Examination certificate or the annexes in order to give enough information to the persons who are performing the verification and Marked Surveillance / Inspection (also see MID Annex B 5.2 2nd paragraph and Annex H1 4.3.2 1st sentence).

3 Components / Places that require sealing

Component / Description	Metrological Seal Yes or No [Y / N]	Category of Seal [I, II and/or III]	Remarks
Level detection (submerge system)	N	-	According Discussion paper 8_05 (“living guide”) all the components of the submerge system shall be in “positive” security.
Suction connection	N	-	
Impact (shear) valve + manual valve	N	-	
Filter + Foot valve	N	-	
Measuring connection for vacuum test	N	-	Check presence of pressure switch and leak detection
Connection filter - pump	N	-	
Pump	N	-	
By-pass setting of pump	N	-	The installer adjust it at the limit of Qmax
Gas separator against manipulation/opening	Y	II) and III)	
Gas separator against removal	Y	II) and III)	By means of the sealed identification on the data sheet
Connection gas separator – check valve	N	-	
Non return valve (to keep the meter under pressure) (in scheme called “check valve”)	N / Y	- (if yes, II)	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	III)	Either by means of a mechanical seal, electronic feature or the sealed identification on the data sheet.

Component / Description	Metrological Seal Yes or No [Y / N]	Category of Seal [I, II and/or III]	Remarks
Meter Sensor against opening	Y	I) II)	Only when after opening a mechanical manipulation can be made which influences the metrological characteristics
Mechanical adjustment device against manipulation	Y	I)	
Pulser against opening	Y	I)	
All mechanical connections between the meter sensor and pulser or mechanical indicating device against manipulation	Y	II) III)	Sealing by means of mechanical seals or a electronic checking
All connections between the pulser and calculator against manipulation	Y	II) III)	If manipulation does not require specific tools: sealing by means of mechanical seals, or electronic means (e.g. unique electronic identification, power consumption control, ...) which guarantee proper operation
Electronic adjustment, correction or conversion device, against manipulation	Y	I)	
Associated measuring instrument against (temporary) removal	Y	III)	Sealing shall be by means of a mechanical seal

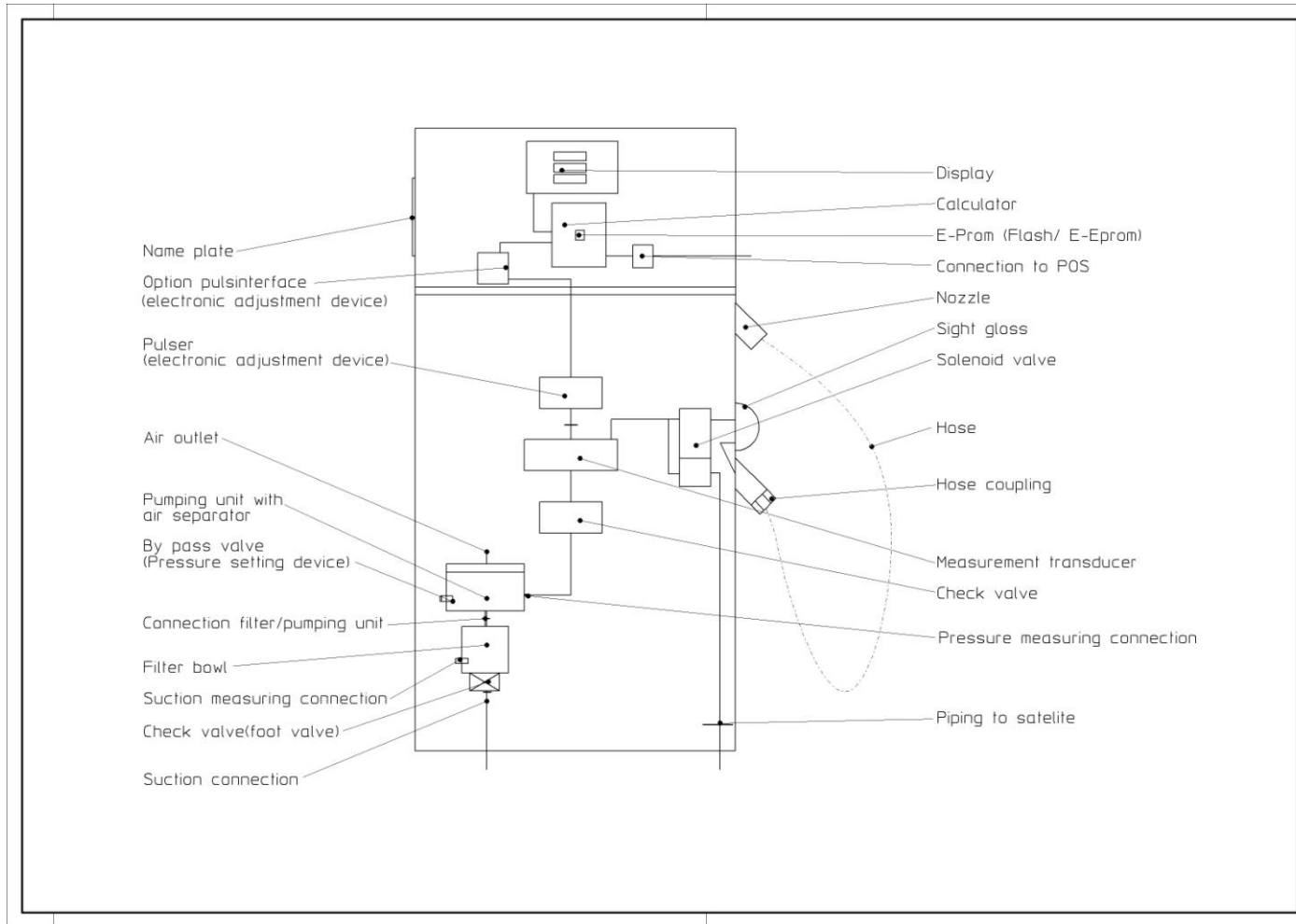
Component / Description	Metrological Seal Yes or No [Y / N]	Category of Seal [I, II and/or III]	Remarks
All connections between associated measuring instrument and the Electronic Calculating and Indicating Device (ECID)	Y	II) III)	If manipulation does not require specific tools: sealing by means of mechanical seals, or electronic means (e.g. unique electronic identification, power consumption control, etc.) which guarantee proper operation
Electronic calculator hardware against manipulation	Y	II)	Sealing shall be either by means of a mechanical seal, electronic feature As far as manipulation on metrological characteristics is possible after opening
Electronic calculator and or Electronic Indicating Device (EID) hardware against removal	Y	III)	Mechanical seal or sealed by the identification on the data sheet
Calculator and/or EID Software version(s)	Y	II)	By means of hardware or software sealing, or other electronic means e.g. software identification. Also see Guide 7.2 regarding software download.
Calculator and/or EID Software setting/configuration	Y	I) and III)	By means of hardware or software sealing, or other electronic means e.g. software identification. Also see Guide 7.2 regarding setting of parameters.
Electronic indicating devices hardware against opening or removal	Y	II)	Sealing shall be either by means of a mechanical seal, electronic feature 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

Component / Description	Metrological Seal Yes or No [Y / N]	Category of Seal [I, II and/or III]	Remarks
Nameplate	Y	Not applicable	Removal, without destroying the nameplate, shall not be possible, or the name plate shall be sealed to the frame of the dispenser (MID: article17, sub 5 and art. 9.8 from annex 1;R117 (1995) and R117-1 (2007): article 2.20.1)
Data Sheet	Y	-	Identification data of the devices are sealed on the data sheet
Typeplate (attached on the components)	N	-	Is indirectly secured by the sealed identification data on the data sheet
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	I), II) and III)	For detailed information, also see the indicating device.
Self Service Devices			
Electronic hardware with analogue components (pulse transmission)	Y	II)	
Electronic 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 (1995) and R117-1 (2007) is more restrictive.
Software version(s)	Y	II)	

Component / Description	Metrological Seal Yes or No [Y / N]	Category of Seal [I, II and/or III]	Remarks
Software setting/configuration, in case of pulse signals	Y	I) and III)	By means of hardware or software sealing, or other electronic means e.g. software identification. Also see Guide 7.2 regarding setting of parameters.
Software setting/configuration, in case of digital data	Y	III)	By means of hardware or software sealing, or other electronic means e.g. software identification. Also see Guide 7.2 regarding setting of parameters.
Specials for LPG dispensers			
Adjustment of the Pressure maintaining device	Y	I)	
Pressure maintaining device against manipulation	Y	II) and III)	
Pressure maintaining device against removal	Y	II) and III)	By means of a mechanical seal or the sealed identification on the data sheet
Valves in vapour return line	Y	I)	If the system does not stop when the valve is closed, sealed in open position, or labelled stating that it must be open (5.7.10 R117, 1995).

Note: This table concerns only metrological aspects of Fuel Dispensers and LPG dispensers.

Scheme of a Fuel dispenser



4 Software Sealing

Please see the relevant articles of OIML R117 (1995), R117-1 (2007), Welmec Guide 7.2 and the MID.