



- Comité de fabricants européens d'installation et de distribution de pétrole
- Committee of european manufacturers of petroleum measuring and distributing equipment
- Komitee der europäischen Hersteller von Einrichtungen zur Messung und Verteilung von flüssigen Brennstoffen

APPLICATION OF DIRECTIVE 2009/137/EC

BEST PRACTICE PROPOSAL FOR MI-005 PETROL STATION INSTRUMENTS

G010029

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In this specific MID/National approach, this document tries to bring the best non regressive practice proposal to the EU community of member states, to soften the %real life market+of petrol stations in the union, and remove the restrictive/obstructive consequences of MID versus market reality and existing instruments already in service or put to market before MID introduction.

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SCOPE:

Annex of Directive 2009/137/EC:

In Annex MI-005, in point 2 of the Specific Requirements, the following point 2.8. is added:

2.8. The measuring system shall not exploit the MPEs or systematically favour any party

Also need to keep in mind that WELMEC guide 5.2 paragraph 2.4 says "the market surveillance authority may make a check on the production premises after non-compliance has been discovered to verify whether or not a systematic error can be established." **Such check needs rules.**

Consequences:

- **Because provisions to comply with directive must be adopted by member states**
- **Because directive reference must be mentioned in provision adopted by member states**
- **Because text of annex of directive says:**
 - "The measuring system shall not exploit the MPEs or systematically favor any party"
 - it is involving 2 items
 - **Not exploit MPEs**
 - **Not systematically favour any party**

This guide is to help CECOD members anticipate and understand consequences and limits of reasonable and fair compliance to the directive 2009/137/EC. Also to help approach local national authorities in:

- **Market survey**
- **Interpretation of consequences**
- **Potential extension of this directive to service (might happen in some countries)**

Basically, the approach is to highlight strongly that directive is asking for something without "state of the art" metrology practices (ie: tolerances, uncertainties, sampling technique).

This guide also takes reference to OIML R117 (95) and OIML R117-1 (2007) for uncertainties versus MPE.

TIMELINE for petrol dispensers on petrol stations:

The below timeline is to show when directive 2009/137/EC requirement over 'not using MPE to favour any party' can really take place.

| Order from customer | Mfturing | Final control Module D | Ship To site | Install | Commissioning (putting into service) | First transaction | Normal Use (shortly after 1 st transaction) | Normal life |
|---------------------|----------|------------------------|--------------|---------------|--------------------------------------|-------------------|--|--------------------------------------|
| --- | --- | NOBO audit | --- | Admin control | Administrative and accuracy | | Admin control | Too late |
| No ctrl | No ctrl | Clause 4 of this guide | No ctrl | No ctrl | Clause 5 of this guide | | Clause 5 with restrictions in case of claim | Directive 2009/137/EC does not apply |

CECOD proposal is to allow

- 1) For NOBO to check that manufacturer is applying quality rules that fulfil directive 2009/137/EC requirements at final control 'module D' stage. Clause 4 of this guide.
 - a. Audit over quality system records to check for 'mean value of final calibration' and 'standard deviation'
 - b. To be done during yearly Quality System assessment
- 2) For Member State Enforcing market survey authority to check that dispensers do fulfil directive 2009/137/EC requirements while taking in consideration side effects of
 - a. Evaporation
 - b. Misting
 - c. Weak Temperature control during field calibration checks
 - d. Possible potential offset of calibration means and tools in the field versus factory

Clause 5 of this guide

- o If done between commissioning and first transaction, application of Clause 5
- o If done shortly after 1st transaction, restrictions apply as responsibility of instrument is transferred to owner, and proper maintenance and keeping is not under manufacturer's responsibility
- o Compliance to 2009/137/EC is not applicable during normal life of dispensers except if a national law/rule extends application. Responsibility lays at owner and/or service company. Applicable rule is 'national law and/or rules'



1) Domain

This document is only to be used for MID / MI-005 instruments placed on petrol stations.
The purpose is to define clearly the limits applicable to directive 2009/137/EC.

2) References to standards

OIML R117 (1995)

OIML R117-1 (2007)

It is assumed that R117 is a non regressive community standard, meaning that any revision of the recommendation is considered as better or equal to any prior revision to reach the essential requirements.

3) Terms, acronyms and symbols

SSD: Self Service Device

DISPENSER: measuring instrument to transfer fuel into the tank of a vehicle, a small boat, a small aircraft or just a jerry can



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Other terms are usual terms used in the petrol station domain or coming from known references such as R117 or MID.

4) Application of Directive on manufacturing (module D)

When manufacturing instruments under MI-005 (petrol stations) and using module D, calibration means and methods shall comply with A.2 of R117-1 (2007)

A.2 Uncertainties of measurement

When a test is conducted, the expanded uncertainty of the determination of errors on indications of volume or mass shall be less than one-fifth of the maximum permissible error applicable for that test on type approval and one-third of the maximum permissible error applicable for that test on other verifications. The estimation of expanded uncertainty is made according to the $\bar{\sigma}$ Guide to the expression of uncertainty in measurement (1995 edition) with $k = 2$.

Calibration process shall be such that the adjustment shall lead to measuring instrument error curves which are as much as possible near to zero with calibration tools, taking into account the technical opportunities of a measuring instrument.

As a consequence, when manufacturing instruments under MI-005 and using module D, statistical results (based on the final control recorded data, such data being the base for recalibration decisions at final control) of any given population of instruments (**minimum of 20 instruments**) **passed under module D** shall comply with:

Flow rate: tests done at maximum flow rate for instruments (**if possible, min 80%** of approval maximum flowrate).

Mean value (M): very close to zero (fair limit : $\pm 0,05\%$) (note 1)

Population in \pm of MPE with $k=2$ (note 2)

How to check (example):

- Collect population sample calibration data (always after any recalibration action) in an EXCEL® sheet
- Calculate mean value and population standard deviation for all collected data
- Check versus Note 2 approach

Note 1: this is the average calibration value after any recalibration decision

- Instruments will show a standard bell curve distribution before any recalibration decision.
- The mean value and standard deviation of that population will depend on of the manufacturing quality of the sub-components involved upstream final metrology test (meter, etc..)
- After calibration check, decision should be taken to always pull back to the closest to zero any offset seen during final metrology test
- Statistical information (here, mean value and standard deviation) to be built from metrological calibration information AFTER any decision to recalibrate is applied

Note 2: population interval for $k=2$ is established as [(M - 2 x) ; (M + 2 x)]

- It is assumed that statistically, 95% of sampled population is compliant to requirement if population interval does not overlay outside of \pm of MPE from zero.
- **Easy approach is to require that - x 0,5% @ (M - 2 x) and (M + 2 x) @+ x 0,5%**

5) Application of Directive for survey at time of putting in use

When controlling instruments in service under MI-005 (petrol stations), calibration means and methods shall comply with A.2 of R117-1 (2007)

- Because instruments used during field calibration checks are different from those used in factories (module D), most of the time of smaller volume
- Because conditions in field are more difficult to control (temperature, evaporation, wind, etc...)
- Because maximum flow rate might be disturbed by storage tank level
- Because repeatability is required to be better than 2/5 of MPE

Calibration process/rules in the field shall be such that the adjustment shall lead to measuring instrument error curves which are as much as possible near to zero with calibration tools, taking into account the technical opportunities of a measuring instrument. Such requirement (as much as possible near to zero) is deemed to be satisfactory if result is smaller than $\frac{1}{2}$ of MPE.

As a consequence, when controlling instruments under MI-005 on petrol stations, statistical results (based on the control recorded data) of any given population of at least 20 instruments must comply with:

Flow rate: maximum achievable flow rate for instruments, min 50% of approval maximum flowrate

Calibration can volume vs E_{min} : compliance with clause 2.5.3 of R117-1 (2007)

Mean value (M): very close to zero (fair limit : $\pm \frac{1}{2}$ of MPE) (note 3)

Population in $\pm \frac{1}{2}$ of MPE with k=2 (note 4)

How to check (example):

- Collect population sample calibration data (always after any recalibration action) in an EXCEL® sheet
- Calculate mean value and population standard deviation for all collected data
- Check versus Note 4 approach

Note 3: this is the average calibration value before any recalibration decision, only applicable on a duly installed population of instruments, just after putting in use (less than 2 weeks old)

- Instruments will show a standard bell curve distribution before any recalibration decision.
- The mean value and standard deviation of that population will depend on of the manufacturing quality and the intrinsic quality of the instruments considered

Note 4: population interval for k=2 is established as [(M - 2 x σ) ; (M + 2 x σ)]

- It is assumed that statistically, 95% of sampled population is compliant to requirement if population interval does not overlay outside of $\pm \frac{1}{2}$ of MPE from zero.

Easy approach is to require that $E \frac{1}{2} \times 0,5\%$ @ (M - 2 x σ) and (M + 2 x σ) @ + $\frac{1}{2} \times 0,5\%$



Note 5: if a country tries to apply these rules to instruments in use, away from date they were put in use first time, same statistical rules shall apply, but only if uncertainties are under control for subsequent verifications conducted over sampled instruments. **Instruments shall be duly maintained and surveyed.**