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# WELMEC

European Cooperation in Legal Metrology

## **Measuring Instruments Directive 2014/32/EU Thermal Energy Meters Corresponding Tables OIML R 75:2002**



*For information:*

This Guide is available to the Working Group Measuring Instruments for future reference on the Europa Website

# WELMEC

European Cooperation in Legal Metrology

WELMEC is 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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**Notes:**

1. The column “Comments” indicates when necessary the relevant text of OIML R 75 and related explanations concerning the compliance with relevant MID requirement.
2. The column “Conclusion” gives the conclusion on the compliance between MID and OIML R 75 for the relevant requirement.

The indication “Covered” means that:

- the requirement of OIML R 75 is identical to the one of MID; or
- the requirement of OIML R 75 is more severe than the one of MID; or
- All the requirement of OIML R 75 fulfils MID requirements (even when MID allows other alternatives).
- In case the requirement is not fully covered, a short statement explains what is covered.

The indication “Not Covered” means that the MID requirement is either not compatible with the relevant OIML R 75 requirement or not included in OIML R 75.

The indication “Not relevant” means that the MID Annex 1 requirement is not relevant for thermal energy meters.

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
<b>ANNEX I – ESSENTIAL REQUIREMENTS</b>			
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.	Part 1, no. 6 Technical characteristics, no. 9 (Metrological characteristics) and partly no. 10 (environmental classification) and no. 11 (heat meter specification, inscriptions and instruction manual)	The high level of metrological protection is stated according to the MID essential requirements.	covered
The 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.	Part 1, no. 5 to 10, Specific Requirements for class 2 and 3 meters are equal to MI-004 (MPE)	Requirement for class 1 meters in OIML R 75 (3.5 %) is more severe as in the MID.	covered
The solutions adopted in the pursuit of the requirements shall take account of the intended use of the instrument and any foreseeable misuse thereof.	Part 1, no 5 and no 12		covered
<b>REQUIREMENTS</b>			
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.	Part 1, no. 4.4 to 4.9, no 5.	Types of errors are described in the R 75.	covered
Unless stated otherwise in the instrument-specific annexes, MPE is expressed as a bilateral value of the deviation from the true measurement value.	Part 1, no. 9.1.3		covered
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.	Part 1, no. 4.4 and 4.8, Part 2 no 6.12	"No significant faults" means to meet the MPE (no. 4.10.3 in R 75-1).	covered
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.	Part 1, no. 11 and 12	R75 meets MID requirements only for climatic and electromagnetic environment but not for mechanical.	partly covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
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 MI-001 to MI-010, 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.	Part 1, no. 10 and 11	R 75 has got other temperature ranges. The upper temperature (+55 °C) belongs to the 4 upper temperatures specified by MID.  The lower temperatures (-25 °C and +5 °C) belong to the lower temperature specified by MID.	covered
Temperature Limits Upper temperature limit: 30°C 40°C 55°C 70°C Lower temperature limit: 5°C - 10°C - 25°C - 40°C  Table 1	Part 1, no. 10	Only the climatic environment class B with the lower temperature limit of -25°C, upper limit with 55 °C is equal to the MID. R 75-1 has other temperature ranges in relation to the MID, the classes have <u>wider</u> ranges (for example. +5°C to +55°C for "domestic use", indoor installations instead of +5°C to only +30°C acc. to MID.	covered
1.3.2. (a) Mechanical environments are classified into classes M1 to M3 as described below.		OIML R75 does not meet the MID requirement for this point. No characteristics for mechanical environments M1 to M3, "shock / vibration" as information to be delivered by the manufacturer are in part 1, no 12a); no declarations about mechanical classes, no tests	not covered
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.		See 1.3.2 (a)	not covered
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.		See 1.3.2 (a)	not covered
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.		See 1.3.2 (a)	not covered
(b) The following influence quantities shall be considered in relation with mechanical environments: - Vibration; - Mechanical shock.		"See 1.3.2. (a)  See 1.3.2 (a) See 1.3.2 (a)	not covered not covered not covered
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.	Part 1, no. 10.1 and Part 2, no. 6.12	Environmental classes (A to C) in combination with test levels and procedures. It is considered that the class A corresponds to the class E1 and that the class B and C correspond to class E2. The class E3 is not relevant for heat meters.	Partly covered
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.	Part 1, no. 10.1 and Part 2, no. 6.12	with test procedures	covered
E2 This class applies to instruments used in locations with electromagnetic disturbances corresponding to those likely to be found in other industrial buildings.	Part 1, no. 10.1 and Part 2, no. 6.12	with test procedures	covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
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:	Not applicable	Class E3 is not applicable for heat meters	not relevant
- voltage reductions caused by energising the starter-motor circuits of internal combustion engines,		Class E3 is not applicable for heat meters	not relevant
- load dump transients occurring in the event of a discharged battery being disconnected while the engine is running.		Class E3 is not applicable for heat meters	not relevant
(b) The following influence quantities shall be considered in relation with electromagnetic environments:			covered
- Voltage interruptions,	Part 2, no. 6.7 and 6.10	with test procedures	covered
- Short voltage reductions,	Part 2, no. 6.10	with test procedures	covered
- Voltage transients on supply lines and/or signal lines,	Part 2, no. 6.11.1	with test procedures	covered
- Electrostatic discharges,	Part 3, no. 6.13	with test procedures	covered
- Radio frequency electromagnetic fields,	Part 2, no. 6.12	Only covered up to 1 GHz	Partly covered
- Conducted radio frequency electromagnetic fields on supply lines and/or signal lines,			not covered
- Surges on supply lines and/or signal lines.	Part 2, no. 6.11.2	with test procedures	covered
1.3.4. Other influence quantities to be considered, where appropriate, are:			covered
- Voltage variation,	Part 2, no. 6.7 and Part 1 no. 6.5	Part 2 with test procedures	covered
- Mains frequency variation,	Part 2, no. 6.7	with test procedures	covered
- Power frequency magnetic fields,	Part 2, no. 6.15	with test procedures	covered
- Any other quantity likely to influence in a significant way the accuracy of the instrument.	Part 2, no. 6.14	static magnetic field (fraud protection) with test procedures	covered
1.4. When carrying out the tests as envisaged in this Directive, the following paragraphs apply:			
1.4.1. Basic rules for testing and the determination of errors			Partly covered
Essential requirements specified in 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.	Part 2, no. 6.1 and 6.2	OIML R 75 has not <u>all</u> essential requirements like MID has.	partly covered
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.	Part 2	all sub clauses of part 2	covered
1.4.2. Ambient humidity			covered
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.	Part 2, no. 6.9	damp heat cycling with test procedures, but no tests for standing condensation <i>Additional remark: damp heat-steady state (non-condensing) should not be necessary for heat meters.</i>	covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
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.	Part 2, no. 6.9	with test procedures	covered
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.	Part 1, no 4.8 and 4.9.4, Part 2, no 6		covered
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.		Requirement is not met in OIML R75.	not covered
4. Discrimination and Sensitivity			
A measuring instrument shall be sufficiently sensitive and the discrimination threshold shall be sufficiently low for the intended measurement task.	Part 1, no. 5.1.2, 5.2.3 and 5.3.3	Part 2 with test procedures	covered
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.	Part 1, no. 12 Part 2, no. 6.8	The basic test for flow sensors under 6.8 is calculated for a period of 5 years. Additional test(s) with further 300 hours give hints for estimations of durability tests for a longer period.	covered
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.	Part 1, no. 6 and Part 2, no. 6.2		covered
7. Suitability			
7.1 A measuring instrument shall have no feature likely to facilitate fraudulent use, whereas possibilities for unintentional misuse shall be minimal.	Part 1, no. 6.4 and Part 2, no. 6.2		covered
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.	Part 1, no. 6.3, 11 and 12.	The user shall be informed for example. about the necessarily minimal length of straight tubes or the use of straighteners before the flow sensor (installation manual).	covered
7.3 The errors of a utility measuring instrument at flows or currents outside the controlled range shall not be unduly biased.	Part 1, no. 6.2	But no specific tests available in part 2.	partly covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
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.	Part 1 no 6.3.7 Part 2, no. 6.4.1.3	No <u>specific</u> demands for the insensitivity under small fluctuations of the measurand, but hints for lowest significance of the display in part 1 no 6.3.7 and for fast response meters, part 2, no. 6.4.1.3	not covered
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.	Part 1, no. 6.1		covered
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.	Part 1, no. 6.3.7	for indication service, and for instance an error displayed, it is possible to control the measuring tasks of the heat meters after it has been installed but it is necessary to remove the meter from the pipe.	covered
If necessary, special equipment or software for this control shall be part of the instrument. The test procedure shall be described in the operation manual.	Part 1, no. 12e and Part 2, no. 8.1	Software flow chart and description	covered
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.	Part 2, no. 8.1	No special requirement for this, only to provide documentation.	partly covered
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.	Part 2, no. 6.11, 6.12 and 6.13	interconnection interfaces, EMC tests at connector points and part 2, no. 8.1 (software flow chart and description)	covered
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.	Part 1, no.12 and part 2, no. 8.1	information to be delivered with the meters or sub-assemblies. No special requirements are given in R75.	covered
8.3 Software that is critical for metrological characteristics shall be identified as such and shall be secured.		No specific requirements are given.	not covered
Software identification shall be easily provided by the measuring instrument.		No specific requirements are given.	not covered
Evidence of an intervention shall be available for a reasonable period of time.		No specific requirements are given.	not covered
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.	Part 1, no. 6.3.2 and 6.5.1 to 6.5.4	Requirements for the measurement values to be stored for 1 year (part 1 no. 6.3.2) but no requirement to protect the data, parameters, software to measure properly after intentional corruption (attempt).	partly covered
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.	Part 1, no. 6.3.7	There are no general requirements to avoid resetting of the meter except for the case of overflow.	partly covered
9 Information to be borne by and to accompany the instrument			

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
9.1 A measuring instrument shall bear the following inscriptions:			Partly covered
a) manufacturer's mark or name;	Part 1, no. 11		covered
b) information in respect of its accuracy,	Part 1, no. 11		covered
plus, when applicable:			
c) information in respect of the conditions of use;	Part 1, no. 11		covered
d) measuring capacity;	Part 1, no. 11 and no. 6.3.7		covered
e) measuring range;	Part 1, no. 7		covered
f) identity marking;	Part 1, no. 11		covered
g) number of the EC-type examination certificate or the EC design examination certificate;	Part 1, no. 11 Part 1, no. 6.4	part 1, no.6.4 (identity mark)	covered
h) information whether or not additional devices providing metrological results comply with the provisions of this Directive on legal metrological control.		Not part of OIML R 75	not covered
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.			not relevant
9.3 The instrument shall be accompanied by information on its operation, unless the simplicity of the measuring instrument makes this unnecessary. Information shall be easily understandable and shall include where relevant:	part 1, no. 6.4 and no. 12		covered
a) rated operating conditions;	Part 1, no.11	The operation instructions have to be specified in all details.	covered
b) mechanical and electromagnetic environment classes;	Part 1, no.11 and no. 12a	only for environmental classes described; under no. 12a, damage by shock and vibration	covered
c) the upper and lower temperature limit, whether condensation is possible or not, open or closed location;	Part 1, no.11	not for standing condensing, but cyclic condensation tests are sufficient for heat meters	covered
d) instructions for installation, maintenance, repairs, permissible adjustments;	Part 1, no.12	without maintenance and repairs	partly covered
e) instructions for correct operation and any special conditions of use;	Part 1, no.12		covered
f) conditions for compatibility with interfaces, sub-assemblies or measuring instruments.	Part 1, no.11		covered
9.4 Groups of identical measuring instruments used in the same location or used for utility measurements do not necessarily require individual instruction manuals.	Part 1, no.12		Covered
9.5 Unless specified otherwise in an instrument-specific annex, the scale interval for a measured value shall be in the form $1 \times 10n$ , $2 \times 10n$ , or $5 \times 10n$ , where n is any integer or zero. The unit of measurement or its symbol shall be shown close to the numerical value.		Scale interval not prescribed, only the location of unit. The terms: $1 \times 10n$ , $2 \times 10n$ , or $5 \times 10n$ are not specific required, but this is not relevant as calculators are equipped with an electronic display.	covered
9.6 A material measure shall be marked with a nominal value or a scale, accompanied by the unit of measurement used.			Not relevant
9.7 The units of measurement used and their symbols shall be in accordance with the provisions of Community legislation on units of measurement and their symbols.	Part 1, no.6.3.1		covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
9.8 All marks and inscriptions required under any requirement shall be clear, non-erasable, unambiguous and non-transferable.	Part 1, no.6.4	There is no requirement about the demand for non-erasable, non-transferable marks and inscriptions.	partly covered
10 Indication of result			
10.1 Indication of the result shall be by means of a display or hard copy.	Part 1, no.6.3		covered
10.2 The indication of any result shall be clear and unambiguous 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.	Part 1, no.6.3	There is no specific requirement to avoid the confusion with additional indications.	partly covered
10.3 In the case of hard copy the print or record shall also be easily legible and non-erasable.		Not applicable	not relevant
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. 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 an appropriate restrictive information.		Not applicable	not relevant
10.5 Whether or not a measuring instrument intended for utility measurement purposes can be remotely read it shall in any case be fitted with a metrologically controlled display accessible without tools to the consumer. The reading of this display is the measurement result that serves as the basis for the price to pay.	Part 1, no. 6.3		covered
11 Further processing of data to conclude the trading transaction	Not applicable		Not relevant
11.1 A measuring instrument other than a utility measuring instrument shall record by a durable means the measurement result accompanied by information to identify the particular transaction, when:	not applicable		not relevant
a) the measurement is non-repeatable and;	not applicable		Not relevant
b) the measuring instrument is normally intended for use in the absence of one of the trading parties.	Not applicable		Not relevant
11.2 Additionally, a durable proof of the measurement result and the information to identify the transaction shall be available on request at the time the measurement is concluded.	Not applicable		Not relevant
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.	Part 2, no. 8	demand according to the sub-clauses for the documentations	covered
<b>ANNEX VI THERMAL ENERGY METERS (MI-004)</b>			

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
The relevant requirements of Annex I, the specific requirements of the Annex 004 and the conformity assessment procedures listed in this Annex, apply to heat meters and sub-assemblies, intended for residential, commercial and light industrial use.			
1 The values of the rated operating conditions shall be specified by the manufacturer as follows:	Part 1, no. 4.4		covered
1.1 For the temperature of the liquid: $\theta_{max}$ , $\theta_{min}$ , subject to the following restrictions: $\Delta\theta_{max}/\Delta\theta_{min} \geq 10$ ; $\Delta\theta_{min} = 3 \text{ K}$ or $5 \text{ K}$ or $10 \text{ K}$ .	Part 1, no. 11	no specific declarations for <u>minimal</u> $\Delta\theta_{min}$ and the ratio $\Delta\theta_{max}/\Delta\theta_{min}$ under legal law	Partly covered
1.2 For the pressure of the liquid: The maximum positive internal pressure that the heat meter can withstand permanently at the upper limit of the temperature.	Part 1, no. 11		covered
1.3 For the flow rates of the liquid: $q_s$ , $q_p$ , $q_i$ , where the values of $q_p$ and $q_i$ are subject to the following restriction: $q_p/q_i \geq 10$ .	Part 1, no. 11.1 and 11.4	no restriction about the ratio $q_p / q_i$ under legal law	covered
1.4 For the thermal power: $P_s$ .	Part 1, no. 5.4		covered
2 Accuracy classes	Part 1, no. 9.2	The error limitations for class 1 flow sensors are $\pm 3.5 \%$ , which is <u>more severe</u> .	covered
3 MPEs applicable to complete heat meters			Partly covered
For class 1: $E = E_f + E_t + E_c$ , with $E_f$ , $E_t$ , $E_c$ according to points 7.1 to 7.3. For class 2: $E = E_f + E_t + E_c$ , with $E_f$ , $E_t$ , $E_c$ according to points 7.1 to 7.3.  For class 3: $E = E_f + E_t + E_c$ , with $E_f$ , $E_t$ , $E_c$ according to points 7.1 to 7.3.	Part 1, no. 9.2		covered
The complete thermal energy meter shall not exploit the MPEs or systematically favour any party			Not covered
4 Permissible influences of electromagnetic disturbances	Part 1, no. 10 Part 2, no. 6		covered
4.1 The instrument shall not be influenced by static magnetic fields and by electromagnetic fields at mains frequency.	Part 2, no. 6.14 and 6.15		covered
4.2 The influence of an electromagnetic disturbance shall be such that the change in the measurement result is not greater than the critical change value as laid down in requirement 4.3 or the indication of the measurement result is such that it cannot be interpreted as a valid result.	Part 2, no 4	The critical change value is not so clear described in OIML R 75, there is the significant fault, see part 1, no. 4.10.3. Significant fault. if considered that significant fault and critical change value are just a matter of wording	covered
4.3 The critical change value for a complete heat meter is equal to the absolute value of the MPE applicable to that heat meter (see paragraph 3).	Part 1, no 10.3	The critical change value is not described by the wording in R 75, but this is not relevant because the MPE's are the same before, during and after the disturbances.	covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
5 Durability			
5.1 Flow sensors: The variation of the measurement result after the durability test, when compared with the initial measurement result, shall not exceed the critical change value.	Part 1, no. 4.9.4	The critical change value is not described by the wording in R 75, but in Part 1 is a definition for the durability error. Under Part 2, no. 6.8 is described that the meters shall meet the MPE (significant fault).	covered
5.2 Temperature sensors: The variation of the measurement result after the durability test, when compared with the initial measurement result, shall not exceed 0.1 °C.	Part 2, no. 6.8.2		covered
6 Inscriptions on a heat meter - Accuracy class - Limits of flow rate - Limits of temperature - Limits of temperature difference -Place of the flow sensor installation: flow or return -Indication of the direction of flow	Part 1, no. 11		covered
7 Sub-assemblies The provisions for sub-assemblies may apply to sub-assemblies manufactured by the same or different manufacturers. Where a thermal energy meter consists of sub-assemblies, the essential requirements for the thermal energy meter apply to the sub-assemblies as relevant. In addition, the following apply:	Part 1, no. 11.1; 11.2 and 11.3		covered
7.1 The relative MPE of the flow sensor, expressed in %, for accuracy classes: Class 1: $E_f = \pm (1 + 0.01 qp / q)$ but not more than 5 %, —Class 2: $\pm (2 + 0.02 qp / q)$ but not more than 5 %, —Class 3: $\pm (3 + 0.05 qp / q)$ , but not more than 5 %, where the error $E_f$ relates the indicated value to the true value of the relationship between flow sensor output signal and the mass or the volume.	Part 1 no. 9.2	Class 1: $E_f = \pm (1 + 0.01 qp / q)$ , not more than $\pm 3.5 \%$ Class 2 (like in MI-004): $E_f = \pm (2 + 0.02 qp / q)$ , not more than $\pm 5 \%$ Class 3 (like in MI-004): $E_f = \pm (3 + 0.05 qp / q)$ , not more than $\pm 5 \%$  The limitation for class 1 is smaller than in OIML R 75.	Covered
7.2 The relative MPE of the temperature sensor pair, expressed in %: — $\pm (0.5 + 3 \Delta\theta_{min} / \Delta\theta)$ , where the error $E_t$ relates the indicated value to the true value of the relationship between temperature sensor pair output and temperature difference.	Part 1 no. 9.2.2.2	$E_t = \pm (0.5 + 3 \Delta\theta_{min} / \Delta\theta)$ like in MI-004	covered
7.3 The relative MPE of the calculator, expressed in %: $E_c = \pm (0.5 + \Delta\theta_{min} / \Delta\theta)$ where the error $E_c$ relates the value of the thermal energy indicated to the true value of the thermal energy.	Part 1 no. 9.2.2.1	$E_c = \pm (0.5 + \Delta\theta_{min} / \Delta\theta)$ like in MI-004	covered
7.4 The critical change value for a sub-assembly of a heat meter is equal applicable to the sub-assembly (see paragraphs 7.1, 7.2 or 7.3).	Part 1 no. 9.2., 4,10;3	Critical change value is not described as wording in R 75 . if considered that significant fault and critical change value are just a matter of wording	covered

Directive 2014/32/EU	OIML Recommendation OIML R75-1; -2 (2002)	Comments	Conclusion
7.5 Inscriptions on the sub-assemblies Flow sensor: Accuracy class Limits of flow rate Limits of temperature Nominal meter factor (e.g. litres/pulse) or corresponding output signal Indication of the direction of flow Temperature sensor pair: Type identification (e.g. Pt 100) Limits of temperature Limits of temperature difference Calculator: Type of temperature sensors Limits of temperature Limits of temperature difference Required nominal meter factor (e.g. litres/pulse) or corresponding input signal coming from the flow sensor Place of the flow sensor installation: flow or return	Part 1, no. 11		covered
8	PUTTING INTO USE	no declarations in R 75	not covered
(a)	Where a Member State imposes measurement by means of any Class 3 meter.	no declarations in R 75	not covered
(b)	Where a Member State imposes measurement of commercial and/or light industrial use, it is authorised to require any Class 2 meter.	no declarations in R 75	not covered
(c)	As regards the requirements under paragraphs 1.1 to 1.4, Member States shall ensure that determined by the distributor or the person legally designated for installing the meter, so appropriate for the accurate measurement of consumption that is foreseen or foreseeable.	no declarations in R 75	not covered