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Compilation of comments on Committee Draft with Observations of Secretariat				**OIML TC 8/SC 7/026/CC/Secr**
TC8 / SC7 Comments on: **OIML TC 8/SC 7/004/1CD**	Committee Draft: OIML 1CD **R137-1 and -2**	Title: Gas meters		Project: **p3** ; development of R 137-2 Gas meters - Part 2: Test methods
CD Circulation date : 16 October 2009	Closing date for comments: 15 January 2010	Compilation of Comments: **OIML TC 8/SC 7/005/CC**	Circulation date CC: 26 February 2010	Circulation date: **15 September 2010**
Secretariat: **NL** Mr. George Teunisse	**Please note** that a number of **the comments have been discussed** at the **TC 8/SC 7 meeting** organised on **1** and **2 July 2010** in **Delft.**The outcome of discussions is presented in color and as much as possible implemented in **OIML TC 8/SC 7/023/2CD available on the TC /SC website**			

Country Code	**New Clause**	**Clause/ paragraph/ table**	**gen./ edit./ techn.**	**COMMENTS**	**PROPOSED CHANGE**	**OBSERVATIONS OF THE SECRETARIAT** on each comment submitted
		Foreword				
FR			gen.	The directive 2009/137/EC of 10 November 2009 has introduced a new provision concerning the non-exploitation of maximum permissible errors, as regards the instrument-specific annexes MI-002. It should be useful to introduce in the R137 a specific provision in order to cover this new requirement.		In the referred directive it is stated that: "The gas meter shall not exploit the MPEs or systematically favour any party'. This requirement is assumed to be covered by clause 5.4 on WME.
UK			edit.	In the third paragraph – correct typos.	This Recommendation ~~also~~ applies to correction devices, and other electronic devices that can be attached to the gas meter~~. This including~~, and to devices for internal temperature compensation.	Scope re-edited (keeping the original contents)
CEN/ TC 237		Gen	edit.	The word 'fault' is used in a number of places throughout the document e.g. 5.10, 5.11 etc. Is this the correct work? A fault is where something has gone wrong.	Change the word 'fault' to 'error'	Within OIML D11a fault is defined as a deviation and not a defect or mistake. It is also coupled to significant fault. Recommendations shall be made in line with D11. Your remark has been noted by the secretary of TC 5/SC 1
		Scope				
AU		2		Third paragraph, second sentence should read: "This *includes* devices…"		Scope amended during the TC meeting.
BIML		Scope	gen. /techn.	In order to avoid any confusion with OIML R 140 which includes the requirements for conversion devices, we suggest changing the wording of the third and fourth paragraphs.	Suggest changing to: "This Recommendation also applies to correction devices, and other electronic devices that **are included in the gas meter**. **Built-in temperature compensation is included in the scope of this Recommendation.** However, ……..".	Scope amended during the TC meeting
CA		2	edit.	Change the word "including" to read "includes"	"This includes devices for internal temperature compensation"	Scope amended
CEN/ TC 237		2	edit.	R137-1 -2 states in the scope that is covers gas meters that to meter the quantity for energy, however there is little in the standard covering the 'metrological and technical requirement or testing of such meters.	Consider how the standard should be enhanced to cover such meters.	SC decission to delete energy from the whole document. Scope re-edited
CEN/ TC 237		2	techn.	In the first sentence the words "at operating conditions" are rather confusing as they can only apply to volume and in the case of compensated meters do not even apply then.	See EN 12405-1	See definition of operating conditions (3.2.11)

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CEN/ TC 237		2	edit.	In the second paragraph the word also should be removed as there have been no previous exclusions.	Delete the word 'also'	Scope amended
DE		2	gen.	The measurement of the chemical energy of an amount of gas is not directly possible (no meters or principles are available). The only opportunity to determine the energy is to multiply the amount of gas by the specific calorific value of the gas. This is a energy conversion which is covered by R140. It is possible to use the meter sensors or associated devices to determine values which are correlated to the calorific value but this works only for a limited range of gases and gas mixtures. Hence, if energy measurement by shall be in the scope then the correct function of energy determination need to be tested for different gases and gas mixtures.	delete energy measurement in the scope	SC decission to delete energy from the whole document
DE		2	gen.	The scope should be clear in respect to the kind of meters covered and should not overlap with R140	- mass meter - meter for volume at working conditions - meters for volume at working pressure but with internal temperature conversion to a base temperature - meter for volume at base conditions (if no pt or ptz conversion is used)	Scope amended Scope only covers meters , not measuring systems the SC agreed on the amended scope adequate
FACO-GAZ		2	gen.	The scope should be clear in respect to the kind of meters covered and should not overlap with R140	- Mass meter - Meter for volume at working conditions - Meters for volume at working pressure but with internal temperature conversion to a base temperature - Meter for volume at base conditions (if no pt or ptz conversion is used)	see response on DE comment
UK		2	edit.	In the first sentence the words "at operating conditions" are rather confusing as they can only apply to volume and in the case of compensated meters do not even apply then.	Delete "at operating conditions".	See definition of operating conditions (3.2.11)
UK		2	edit.	In the second paragraph the word "also" should be removed as there have been no previous exclusions.	"…(CNG dispensers) are ~~also~~ excluded…"	Scope amended
US		2 (Scope) + All	gen.	US Scope comment A: As much as possible, we would like to harmonize between the US draft ANSI B109 standard and R137. The scope statements are obviously of high-level, big-picture importance to both documents. In the next column, we have provided the proposed scope statement from our draft ANSI B109 standard – provided also as a suggested revision to R137. For the most part, we believe the suggested text improves on the clarity of the R137 scope while keeping the intent consistent. However, we have had lengthy discussions in the US about this scope – some of our discussions/questions about this scope are listed in the comments boxes below.	Suggestion for revised scope section text: 2 Scope This standard applies to gas meters based on any measurement technology that are used to measure the quantity of gas that has passed through the meter at operating conditions. The quantity of gas can be expressed in volume, mass, or energy units. This standard applies to gas meters intended to measure quantities of gaseous fuels or other gases. The standard does not cover meters used for gases in the liquefied state, multi-phase, steam, compressed natural gas (CNG), or liquefied natural gas (LNG).	In principle the suggested scope does not deviate much from the present one. The first 2 sentences of the scope could be replaced Subcommittee Observation To use the US alternative and modify by including "used in CNG dispensers"

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US		2	gen.	US Scope comment B: The following is a set of statements concerning inclusion of the measurement of "all gasses." a. The scope statement says that R137 is "intended to measure quantities of gaseous fuels or other gases." The way this is written, it says that it covers all gasses. We want to ensure that this is truly the intent. b. One way to possibly limit the scope somewhat is to do what we did in the scope of R117, saying that the document is limited to measuring systems that are subject to legal metrology controls (or custody transfer applications). c. Manufacturers have estimated that at least 95% of US gas meters are used only for the measurement of natural gas. Gaseous propane is probably the second-most-measured gas. One thought is that maybe we should just limit the document to the measurement of "gaseous fuels." This is the area of expertise of those reviewing the document. d. If the documents are really being written to properly cover all gasses (including, for instance, the measurement of in-plant process gasses), then we need to ensure the inclusion of "specialty-gas experts" in the technical work. For example, if the document is being written to include the measurement of oxygen, there would probably be a need to include some special "cleanliness" requirements (somewhat similar to requirements for beer and milk measurement in R117)	Please clarify the intent to include the measurement of "all gasses."	This comment presents the omission of distinguishing the principle difference between an international standard and an OIML recommendation. OIML recommendations only and exclusively concern legal metrology, which means that any non-legal or non custody transfer application in principle is outside the scope of the OIML and therefore outside the scope of the recommendation. Taking this in consideration the use of the term "all gasses" means "all gasses for the measurement of which legal requirements have/will be arranged in a member state and which depends on the decisions made by national authorities. Since this is a general applicable condition within OIML it would be superfluous repeating this statement in all Recommendations. Subcommittee Observation It is confirmed by the SC that all gasses are included in the scope in case of legal transaction
US		2	gen. /techn.	US scope comment C The R117-1 scope includes the following statement "This Recommendation is not intended to prevent the development of new technologies." The concept of encouraging new technologies (and writing the document in a way that allows for their development) is also important in the ANSI B109 effort.	Add a statement about allowing/encouraging the development of (as yet) unknown technologies.	This US suggested statement would be redundant. It is general OIML policy that Recommendations shall not create a restriction to innovation unless this would result in a deterioration of the measurement . Taking into account the inconvenience as expressed in the comments of the US the secretary wonders whether a separate document on OIML policy could help in elimination of the US reservations expressed

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US		2 + Part 2 + All	gen. /techn.	US scope comment D: The R117-1 scope allows for the type approval of individual components (in addition to complete measuring systems). While the concept of type-approving individual components makes sense and was fairly easy write into R117-1 (the requirements part), it has proven to be much more difficult to properly/completely implement this concept in the development of R117-2 (test methods). To illustrate the process that we are using in the IWG to develop R117-2, Enclosure (1) is included at the end of this document – it is a table showing the specific components that will be allowed to get a separate R117 type approval (cross-referenced with R117-1 requirements that apply to that specific component). Only page 1 of 7 pages of the table was included for brevity. The full table is available upon request. It is not currently clear exactly which specific components will be allowed to obtain separate R137 type approval.	1. Ensure full clarity about exactly which specific components will be allowed to obtain separate R137 type approval. 2. Improve the requirements section and the testing requirements section to ensure clarity about which requirements and tests are applicable for which specific components. (See also US comment on Annex C.)	Noted. Although the concern expressed is appreciated by the secretariat there are some reservations concerning comparison between R117 (concerning dispenser installations) and R137 (concerning general gas flow metering) E.g. for this reason CNG dispensers are outside the scope of R137. Furthermore at present R137 does not deal with modules;. This implies only one type approval document per gas meter.
		Terminology				
FR		3.2.1	*gen.*	We don't know any meters able to measure by its own the gas energy.	Replace the first sentence by the following one : "Total quantity of gas obtained by integrating the flow over time, expressed as volume V or mass m ~~or energy E~~ passed through the gas meter, disregarding the time taken"	SC decission to delete energy from the whole document. Amended as such
AU		3.2.4	*gen.*	This section defines Error as "measured quantity value minus reference quantity value" taken from VIM 2.16. This effectively represents an absolute error, however all of the requirements of OIML are expressed as relative errors (%). For completeness OIML R137 should define the relationship between absolute and relative error.		The former as well as the present definition of (measurement) error is often interpreted to be the definition for the absolute error. However when expressing the parameter in percentage or dB this definition could also be applied to a relative error. It shall be decided whether a separate definition for a relative error is needed. This would probably be necessary when errors are expressed in absolute as well as relative format. In the case that an extra definition is needed the following addition is suggested: relative error ratio between the error (value) and the reference quantity value and expressed as a quantity of dimension one (e.g. in a percentage or decibel) For the present draft the secretariat has a prevalence for keeping only the VIM definition since the use of the term in all cases concerns a relative error If agreed it is suggested to introduce in the clause an explanatory note in line with the above comment. Discussed in SC meeting and adapted as suggested

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CEN/ TC 237		3.2.4	techn.	With this definition of error it is not possible to express MPE in percentage terms. The error must be expressed as a ratio x 100%		see above
JP		3.2.4	*gen.*	The definition of 3.2.4 means an absolute error. However, the maximum permissible error of gas meters is defined by a relative error, the term and definition of the relative error should be added.	Change the title of 3.2.4 to "Absolute error". Then add the term "Relative error" and its definition of 2.2.7 in the present Recommendation R 137-1 into the CD document.	see above
UK		3.2.4	techn.	With this definition of error it is not possible to express MPE in percentage terms.	The error must be expressed as a ratio x 100%	see above
AU		3.2.5	techn.	Why is there a discontinuity in the weighting factor at $Q_i = 0.9Q_{max}$?		The WME is introduced to avoid a possible (mis)exploitation of the MPE. A linear application however intoduces the contribution by the error at maximum flow rate to have the highest weighing factor. In practice many meters are constructed oversized, meaning that the latter contribution would be excessive. Therfore the weighing factor was reduced which results in the discontinuity. During the SC meeting a new and more elegant solution for calculation of the WMEwas presented and adapted in the 2CD which covers both the need for reducing the contribution from Q max and the elemination of a the sudden discontinuity in the present formula.
		Metrological requirements				
SK		5	edit.		We recommend to make from the part "Technical Requirements" a new chapter (eg "6"). Then, to adapt the numbering of following chapters.	agree; numbering chapter 6 was inadvertedly deleted in editorial process; change undone
		Rated Operating Conditions				
		Table 2 and Table 3				
UK		5.3.3 5.4	edit.	Suggest removing this text from the column heading 'During type evaluation and…' Reason: MPEs are for initial verification tests which form part of the type evaluation.	~~During type evaluation and~~ Initial verification	Sorry, initial verification is not part of type evaluation
UK		5.3.3	techn.	Errors expressed as a percentage are inconsistent with the definition of error in 3.2.4	Reword 3.2.4 to align with specified mpes.	see response on 3.2.4
AU		5.3.4	gen.	Should t_{sp} be included in the definitions?		yes, implemented in chapter 3
AU		5.3.4	gen.	This clause discusses temperature correction and allows the MPE to increase at more extreme temperature. If a correction for temperature is performed accuracy should improve. Can this clause be clarified?		This clause concerns an extra temperature correction which can be done either electronically or mechanically for which an extra error is allowed
BIML		5.3.4	edit. /techn.	This paragraph refers to internal temperature compensation. For consistency, we suggest using a consistent wording. In general this requirement is intended to apply to gas meters which display the compensated quantity only.	Suggest changing "temperature conversion device" to "**temperature compensation device**". Suggest changing the beginning of the sentence to: "For a gas meter with a built-in **temperature compensation device, which displays the volume at base conditions only**, the maximum permissible errors….	Agreed not to amend during SC meeting

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CZ		5.3.4	gen.	For a gas meter with a built-in temperature conversion device, having only one indicating device (????) displaying the volume at base conditions, the maximum permissible errors as indicated in Table 2 are increased by 0.5 % in a range of 30 °C extending symmetrically around the temperature tsp specified by the manufacturer.	For a gas meter with a built-in temperature conversion device, having ~~only one~~ indicating device ~~(????)~~ displaying **only** the volume at base conditions, the maximum permissible errors as indicated in Table 2 are increased by 0.5 % in a range of 30 °C extending symmetrically around the temperature tsp specified by the manufacturer. Reason: One indicating device (e.g. LCD) can display several items.	Amended as such during SC meeting
DE		5.3.4	edit.	"having only one indicating device"	Replace by "having only an indication for …"	Amended as such
DE		5.3.4	edit.	Even it seems to be clear what "temperature t_{sp} specified by the manufacturer" should mean, it should be listed in the terminology or may be replaced by term "reference temperature"	replace by term "reference temperature"	Amended in terminology
FR		5.3.4	gen.	The item 5.3.4 refers to gas meters with a built-in temperature device, having only one indicating device displaying the volume at base conditions. It should be interesting to mention what would be the maximum permissible errors for such instruments having two indicating devices displaying on the one hand the volume at metering conditions and on the other hand the volume at base conditions.		Discussed during the meeting see below
US		5.3.4	techn.	Section 5.3.4 states: "For a gas meter with a built-in temperature conversion device, having only one indicating device displaying the volume at base conditions, the maximum permissible errors as indicated in Table 2 are increased by 0.5 % in a range of 30 °C extending symmetrically around the temperature t_{sp} specified by the manufacturer. Outside this range an additional increase of 0.5 % is permitted in each interval of 10 °C." Some questions: 1. R137 (2006) limited this section to only mechanical meters with mechanical temp conversion devices – this has now been expanded to <u>all</u> meters with <u>all</u> temp conversion devices. Why? 2. We acknowledge that some meter technologies may tend to operate less accurately at the limits of their temperature ranges. But, <u>the manufacturer makes the statement that the meter will meet the mpe(s) of Table 2 over the full rated operating conditions temperature range</u> (Section 5.1). Why does this section seem to significantly relax the mpe requirements at higher and lower temperatures?	2. Clarify how Section 5.3.4 relates to Section 5.1 concerning temperature range in the rated operating conditions.	Discussed during the meeting see below

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						SC observations pressure and temperature conversion to be taken into account. When only displaying in base conditions This point could conflict with R140 Could be part of questionaire for revision R140 Extension of MPE for temperature compensated instruments for high and low temperatures from WELMEC is suggested. The SC decides, because of the mandate, to not accept a modification yet, but could take this into account with a further revision of R 137-1 The request of US for deletion of extension of MPE´s at high and low temperatures can also not be considered at this time for the same reason. US disagrees
CEN/ TC 237		5.4	techn.	The WME requirement is out of line with the recently agreed modification to the MID		The secretary considers the WME in line with the recent modification.
UK		5.4	techn.	The WME requirement is out of line with the recently agreed modification to the MID		The secretary considers the WME in line with the recent modification.
		Reproduc-ibility				
AU	5.6 and 5.7 (12.4.2 and 12.4.3)	5.6 and 5.7 (11.4.2 and 11.4.3)	techn.	Some types of meters, particularly diaphragm meters that utilise change gear adjustment, exhibit a systematically large distribution of error values (cyclical) when tested over small increments of the measurand. To determine conformance with the requirements of this section, in a uniform and unambiguous manner will require some additional testing control to choose appropriate test increments. Suggested mechanisms for specifying for the minimum test measurand increment:- • Nomination by the meter manufacturer (value included as an additional item in section 6.1) • Providing a equation to calculate a minimum test measurand increment e.g. Q_{max}*Time(min); that is the quantity of gas that would be passed by the meter at a flow rate of Q_{max} in a specified time period. From our experience a time period of 60 seconds or greater may be required for some meter types to conform to this requirement.		Beyond the mandate

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BIML		5.6	*techn.*	The number of measurements (currently defined in 11.4.2) should be part of the requirement. We would also raise the question of specifying a minimum value. A manufacturer could be interested in having more tests conducted in order to minimize the risk to have the instrument rejected even if this is more costly.	Suggest changing to: "This requirement is applicable to gas meters which are sensitive to hysteresis behaviour. Assuming …….estimated on the basis of calculation of the experimental standard deviation **of at least six measurements**, shall be less…".	The number of tests should in principle not be of influence to the result gained as actual variance (performance) of the measuring instrument. However since there is still some dispute on the way in which the experimental standard deviation is converted to the variance it was suggested that it probably is easier for practical reasons to state the number of measurements in the requirement (like been suggested by BIML) During the SC meeting it was states that the number of 6 measurements however could be a too extensive and excessive test for some types of gas meters.
DE		5.6 + 5.7	gen.	In context with 11.4.2 and 11.4.3 the difference between repeatability and reproducibility seems to be related to only (hydro)-mechanical hysteresis by changing flow rates. See also comments to 11.4.2 and 11.4.2		Text amended and SC response: Repeatability for all types set now. Reproducability amended and in the test part introducing a clause on testing on hysteresis to be worked out further
						5.6; 5.7; 12.4.2; 12.4.3 Reproduceability is now described to be performed for all measurement devices, so including the larger ones. The SC discussed this subject and first it was suggested to perform 6 measurements on the smaller devices and to perform a smaller number of measurements on the larger devices, recording the behaviour. On the basis of the behaviour, it will be decided if more measurements are needed. This however would be in conflict with the acceptable limits specified in terms of standard deviation. For that reason, it is suggested to introduce a fixed limit to be applied to each individual measurement
FR		5.6	*techn.*	"Assuming that the results from reproducibility measurements of a gas meter will show normal distribution" is not a metrological requirement. How this provision should be understood if after the test described in 11.4.2, the test results don't show a normal distribution.		Correct. It is the mathematical boundary condition being the introduction to this requirement containing a statistical statement. This in needed to provide a relationship between the experimental standard deviation calculated from a number of measurements and the actual variance of the measurements. If not assumed some distribution the clause is meaningless since results could not be compared. Requirement is simplified for clarity reasons Text Amended
UK		5.6	edit.	The 1st line 'Assuming that the results from reproducibility measurements of a…' is ambiguous and not specific.	Suggest changing to 'The results of the reproducibility measurements of a gas meter shall show a normal distribution, and its associated standard deviation, estimated from …'	Difficult to prove normal distribution. See meeting results SC: Solved see above

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BIML		5.7	*techn.*	Same comment as for reproducibility. The requirement shall include a defined number of measurements to be repeated.	Suggest changing to: "This requirement is applicable to gas meters which are not sensitive to hysteresis behaviour. Repeatability is defined as the difference between the maximum and minimum error **of at least three** consecutive measurements…..changing the flow rate. It shall be less…".	Amended By introducion of definitions from VIM and the number see also reproducibility
FR		5.7	techn.	Item 5.7 mentions : "The difference between the maximum and minimum error of consecutive measurements of gas meters, at reference conditions, during repeated measurements without changing the flow rate, shall be less than or equal to one third of the maximum permissible error." Is there a technical justification for the difference "one third of the maximum permissible" ? Couldn't current technologies allow to precise more severe specifications ?		In combination with the choice of different accuracy classes it is the opinion of the secretariat that the limit of 1/3 MPE is sufficient, especially for a document which is technology independent
US		5.9	tech	Do not agree that the mpe should be doubled when "the ambient temperature is unequal to the gas temperature." The type approval lab should be required to achieve equal temps or the results of type approval should not be valid. Of course, it is very rare that the two temps would be <u>exactly</u> the same (maybe a tolerance could be provided, ± 1 or 2 deg C??). Initial verification is a different situation where achieving equal temps is often not possible. Even during initial verification, though, it is not clear why <u>double</u> the mpe was chosen.	Propose to delete second sentence of Section 5.9. **5.9 Temperature** The requirements as mentioned in 5.3 shall be fulfilled over the whole temperature range, where the ambient temperature is equal to the gas temperature. ~~In case the ambient temperature is unequal to the gas temperature the double maximum permissible error limits apply.~~	Be aware this is an overall requirement, which is not specific to type evaluation. Some amendments have been made for improvement of the clauses. The choice on double MPE was based on experts input in R 137-1 Changing would be rather beyond the present mandate. SC : US will come up with proposal

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US	(see also 12.4.10)	5.10 (see also 11.4.9)	tech	5.10 DURABILITY Gas meters ~~with internal moving parts~~ shall meet the following requirements after being exposed to the equivalent of 2000 hours flow at Qmax … a. The durability/endurance tests are (by far) the most expensive and time-consuming tests – therefore, the issues raised here are very important to all interested parties. b. There was a great deal of discussion during the revision of R117-1 whether endurance testing would be required for all meters – or only those with "internal moving parts." • Argument A: A fairness issue says that all of the different meter technologies should be tested the same way. • Argument B: Little is accomplished by endurance testing meters without moving parts – it is just a lengthy, expensive test. The electronics on other meter technologies will be adequately tested by completion of all of the other testing requirements. c. In R117-1, we decided to require testing on all meters. But now, during the development of R117-2, we are leaning back toward only requiring endurance testing on meters with internal moving parts. d. Maybe some other form of durability testing (other than lengthy, expensive, total-volume-based testing) could be developed for electronic meters. e. For right now, while we have had significant internal debate about this, **US participants in this work tend to support a requirement to do durability tests on <u>all</u> meters** (not just those with internal moving parts).		see reply to next US comment

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US		5.10 (see also 11.4.9)	techn.	US comments on 5.10 (continued): f. In the US, there is some discussion of the phrase "…exposed to the equivalent of 2000 hours flow at Q_{max}" …The issue is that running the test for 4000 hours at ½ of Q_{max} (for the same total volume through the meter) is not nearly as abusive a test – and therefore, not an "equivalent" test. g. The "families of meters" issue is significant to durability testing. Specific requirements concerning "families of meters" need to be covered somewhere in R137. See also OIML R49 and R117-2. (See also US comment on Section 11.3.1) h. A harmonization note: Another issue for the US is that all of our current ANSI gas meter standards require a 4000 hour "accelerated life test." US manufacturers are very supportive of reducing this requirement to 2000 hours – saying that if the tests are going to reveal a problem, it will happen in the first 2000 hours of testing. US customers of these meters (the utilities), however, tend to support keeping the 4000 hour requirement. This is a significant issue concerning harmonization with R137.	f. Consider a clarification of the term "equivalent." g. Develop a section on "families of meters."	SC decission to separate between residential and industrial meters Requirements will be applicable for all residential meters and industrial meters with internal moving parts family of meters is in the document; add Annex "selection pyramid" US will send newest R 49 and R117 sections on "family of meters" SC : keep to 2000 hours (since it is a part 1 requirement) Could be reviewed in future revision of R 137-1 5.10 and 12.4.9 have to be amended on the topic of maximum test time. Changed flow rate requirement to at least 0,8 Q max also clause amended to clear up the term "equivalent" by introducing the word quantity
US		5.11	techn.	Some comments on Section 5.11 "OVERLOAD FLOW" We believe this requirement is very dependent on the meter technology. • diaphragm meters can often go up to 200% without a problem; • rotary meters require caution around 120%; • it is easier for meters with no moving parts to accomplish this requirement. Some meters stop registering when the in an overload status (like ultrasonic)	Consider a possible revision to the wording of this requirement based on the comments.	On question of US To which meters is this applicable ? (see new restriction in 5.10)
FACO-GAZ		5.12 and 5.13.7 table 4, No. e	gen.	Instead of the random vibration test the sinusoidal test acc. OIML D11, 11.1.2 should be allowed	As an alternative to the random test add the sinusoidal vibration test with the dates of the severity level 2 from OIML D11, 11.1.2	This requirement was already stated in R137-1 (2006) A rationale need to be given for choosing sinusoidal vibration (see D11, 11.1) SC decides: no change
BIML		5.12.1	edit.	This section should be included in a section which defines the relevant disturbances as suggested in 6.12 of the Draft Recommendation Format.		Agree, but more or less beyond the present project, to BIML clears up comment: Some have been described as influence but are disturbance instead; to be amended
BIML		5.12.2	edit.	Same comment as for 5.12.1.		See comment on 5.12.1

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	Technical requirements					
DE	6.1.9	5.14.9	gen.	Below Q_{min} the gas meter shall not be biased unduly. This clause shall avoid a continuous counting with large positive error below Qmin for instance by a zero shift of electronic meters. The currently available clause is not sufficient		Please supply new clause proposal
FR	6.1.9	5.14.9	*techn.*	5.14.9 mentions "The gas meter totalization shall not change when the flow rate is zero, while the installation conditions are free from pulsations and vibrations." It's important the meter doesn't count even there are pulsations or vibrations in the pipe. The situation has already been observed on site whereas they weren't any flow rate and the meter totalization was changing due to pulsations in the pipe.	Please erase the provision "while the installation conditions are free from pulsations and vibrations."	This requirement is meant to avoid registration in case of no flow. In case of flow pulsations it means that there is some flow, so registration is allowed. In practice this will not be a problem since in these cases always a low flow cut-off will be applied.
FACO-GAZ	6.5.2 number To be fixed	5.18.2	techn.	"Penultimate paragraph": This wording is too restricting and with electronic indexes there are more possibilities	Modify the text as follows: With an electronic index the last digit is used as integral test element. More efficient test methods like increased number of digits may be available in a specific test mode, which can be accessed through either physical or electronic interfaces.	Please indicate in which case the text in this clause is too restrictive SC meeting included: ….increased or other methods may be used in…… ….switches or interfaces.
JP	6.3.1	5.16.1	*edit./ techn.*	In the note, there is description that this requirement is not mandatory for meters for direct mass measurement. However, this is not limited only to meters for mass measurement but also to meters with function to compensate pressure.	It is proposed to add the following sentence in the note: "This requirement is not mandatory when meters have capabilities of pressure compensation by themselves."	comment is not clear please enlighten your view SC added …….or for meters with a built in pressure sensor
AU	moved to 12.3.4	9.1	techn.	The manufacturer may wish to generate conversion/correction tables for error curve corrections to be applied when testing meters (at initial or subsequent verification) with a different type of gas than that at operating conditions. If these conversion/correction factors were tested and validated as part of the type approval process then they could be used in place of the limit of 0.5 x MPE given here.		see the secretariat response on US comment on this clause
BIML	moved to 12.3.4	9.1	techn.	This requirement allows the errors to be outside the MPEs when the gas meter is verified with gas different from that measured. A general principle should be to demonstrate at the level of type approval that alternative gases may be used under specific conditions for verification purpose. We suggest having a more general requirement similar to that in OIML R 117-1 for liquids (see 2.6 in R 117-1).		see the secretariat response on US comment on this clause
DE	moved to 12.3.4	9.1	*techn.*	the permitted difference of meter errors for a test gas other then the gas specified in the rated operating conditions is to large	$\Delta e \leq 0{,}33$ MPE	see the secretariat response on US comment on this clause
FACO-GAZ	moved to 12.3.4	9.1	gen.	The permitted difference of meter errors for a test gas other then the gas specified in the rated operating conditions is to large	Change the limit between the testing with different gases from 0,5 MPE to 1/3 (0,33) MPE	see the secretariat response on US comment on this clause

Country Code	New Clause	Clause/ paragraph/ table	gen./ edit./ techn.	COMMENTS	PROPOSED CHANGE	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
US	moved to 12.3.4	9.1	techn.	9.1 Use of Different Gases for Testing "When gas meters are to be verified (at initial or subsequent verification) with a type of gas different from that at operating conditions the maximum mutual difference between the error curves of the gas meter, obtained as result of testing with different gases, is limited to 0.5 times the maximum permissible error." "Example: In case it is the intention to perform the verifications with air while in practice, under operating conditions, the gas meter is used for natural gas." We agree that most verification testing is done with air (or a special "testing gas" with similar properties to natural gas). We do not agree, however, that there should be an additional mpe granted just because you are testing with a different gas. If the decision is made to not remove the allowance for an additional mpe, please clarify the why "0.5 times the maximum permissible error" was chosen for this requirement.	Remove the allowance of an additional mpe when the testing is done with a different gas.	The objection is understood, however what apparently is interpreted as relaxation, in fact is some margin given due to the plausible different behaviour of the gasses compared. This relaxation is not the intention of the clause. For that reason the clause was re-edited and is reallocated in the section "12.3 Type evaluation procedures" Probably there will be a need for further specifying the margin. Possibly this could be done by limiting the mutual WME results. Another approach could be the use and introduction of conversion factors, like suggested by AU. SC: In some way there should be some room for shift based on the use of different gasses for test SC reached a possible compromise in using the 1/3 th MPE (uncertainty) In case correction for different gasses is possible over the whole range, using correction factors,there is no relaxation of the MPE for using a different test gas.
AU	11.1.2	10.1.2	*gen./ math*.	In this industry there is often debate as to whether the uncertainty arising from the non-reproducibility of the meter under test should be included in the calculation of uncertainty. Similarly, if the determination of meter error is as the result of several observations, are all observations required to conform with the values of MPE, or should the conformance test be performed using the mean value. Section 5.7 permits up to one-third MPE variation between observations; hence how these matters are dealt with has the potential to significantly alter the evaluation outcome. Guidance along the lines discussed in OIML TC3/SC5 "The role of measurement uncertainty in conformity assessment decisions in legal metrology" (draft) should be considered for inclusion.		Comment to be taken into account TC3/SC5 developments to be taken into consideration
BIML	12.3.1	11.3.1	gen.	For consistency among testing laboratories within the implementation of the Basic OIML Certificate System and the OIML MAA, we suggest adding guidance on the number of instruments to be tested in general and in case of type approval of a family.		Please deliver suggested clauses accordingly SC advices : Add number of specimen to be delivered on basis of format (13.1.1) Add Annex on family of meters and refer to this Annex. (to be completed)
US	12.3.1	11.3.1	techn.	Families of Meters Issue "If so requested by the authority responsible for the type evaluation, these meters shall include more than one size if simultaneous approval of a family of gas meters is requested." Recommend that the secretariats of OIML TC8/SC3 + SC5 + SC7 all work together and jointly develop a consistent way to handle the type approval of "families of meters" in all OIML metering recommendations. (See also US comment on Section 5.10.g)		Consistency will be searched with the other committees Suggest to create ad-hoc WG on this item SC advices : Discussed first by Secr R117 an Secr R137
DE	12.4.3	11.4.2	gen.	The reproducibility shall be tested for all kind of meters, it is not possible to decide about the sensitivity in respect to hysteresis by the principle		SC dealt with on 1 july See amended text

Country Code	New Clause	Clause/ paragraph/ table	gen./ edit./ techn.	COMMENTS	PROPOSED CHANGE	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
CA	12.4.3	11.4.2	edit.	Some words seem to missing in the sentence in the third sentence of the first paragraph.	"For each flowrate, the experimental standard deviation is to be calculated using at least six measurements."	
DE	12.4.4+ 12.4.5	11.4.2+ 11.4.3	gen.	See also comment to 5.6 + 5.7		SC dealt with on 1 july See amended text
FR	12.4.3	11.4.2	*techn.*	Why is hysteresis the clue for deciding that meters should be only subject to reproducibility or repeatability test ? If these two tests are not modified, would it be possible to assert the two requirements (reproducibility and repeatability) are satisfied for the two meter types (hysteresis and non hysteresis) Furthermore hysteresis is not defined. If hysteresis concerns only meters with moving parts or Vortex, why do not use "meter with moving parts or Vortex" instead of meters with hysteresis ?		SC dealt with on 1 july See amended text
JP	12.4.3- 12.4.4	11.4.2- 11.4.3	*techn.*	What is "hysteresis behaviour"? Please explain the technical difference between gas meters sensitive to hysteresis behaviour and those not sensitive to hysteresis behaviour.		SC dealt with on 1 july See amended text
	12.4.3 - 12.4.4					
CA	12.4.7	11.4.6	techn.	Amend wording to specify that gas meters must be tested at or near the meter's intended maximum operating pressure, or at a Reynolds number equivalent, in addition to the meter's minimum operating pressure, which is what the American Gas Association recommends in AGA Report No. 7 (2006 Edition) for turbine meters. Type approval testing at pressures less than the meter's intended maximum operating pressure is only valid for certain types of meter technologies. Although the Reynolds number relationship becomes fairly flat above pressures of 50 bar, this relationship should always be confirmed through tests on the meter at the time of type approval.		This test was already described in R137-1 (2006) In practice 5 MPa covers almost any application. In those specific cases where the pressure exceeds 5 MPa Reynolds correction is always possible to apply. SC meeting agrees with the secr. observation
CEN/ TC 237	12.4.7	11.4.6	techn.	This testing causes unnecessary expense. e.g. a diaphragm meter is rated to 0.2 bar say to ensure it will remain gas tight if there is an upstream failure. The meter is used at about 20 mbar. Testing a meter at 0.2 bar is difficult, expensive and does not add value.		Safety pressure range and operating pressure range should not be confused. This clause only concerns working (operating) pressure
DE	12.4.7	11.4.6	gen.	a gas meter for a limited pressure range, especially for low pressure near or ambient pressure shall be tested only at one pressure	one test pressure is sufficient if for the rated operated pressure range if the following equations are fulfilled $2\ p_{test,abs} <= p_{max,abs}$ $0{,}5\ p_{test,abs} >= p_{min,abs}$	Not (yet) adopted The recommendation applies to all kind of measurement principles and e.g. turbine meters at low flow rate are very sensible for different pressures. A rationale for a different approach is needed . SC: On BIML remark Note is made part of the main clause SC: In the note a relaxation for diaphragm meters and other technologies that are proven to be insensitive to pressure to be made
FACO-GAZ	12.4.7	11.4.6	gen.	A gas meter for a limited pressure range, especially for low pressure near or ambient pressure shall be tested only at one pressure	One test pressure is sufficient for the rated operated pressure range if the following equations are fulfilled $2\ p_{test,abs} <= p_{max,abs}$ $0{,}5\ p_{test,abs} >= p_{min,abs}$	see above

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US	12.4.7	11.4.6	techn.	11.4.6 Working pressure The accuracy measurements as stated in 11.4.1 are performed at least at the minimum and at the maximum operating pressure. However, for specified maximum pressures above 5 MPa (50 bar) a test at 5 MPa (50 bar) is deemed to be acceptable. The results of the different accuracy measurements are evaluated with the requirements as laid down in 5.8 without intermediate adjustments. Comments: This test makes sense, however… In the US, we have very few facilities that do accuracy tests at elevated pressures. Typical low pressure meters are not tested at elevated pressures. Why was the 50 bar number selected as the highest pressure where testing would be conducted?		SC: Agree to delete the following sentence: "However, for specified maximum pressures above 5 MPa (50 bar) a test at 5 MPa (50 bar) is deemed to be acceptable".
DE	12.4.8 a	11.4.7 a	*gen.*	the restriction to electronic meters only if domestic is not reasonable		
DE	12.4.8 b	11.4.7 b	gen.	the unsuppressed flow rate is only a hint in respect to a correct function. At least tests for small flow rates in the whole temperature range or in a part of the temperature range should give additional evidence		SC: tests at zero flow are deemed to be sufficient
DE	12.4.8.c	11.4.7.c	gen.	the manufacturer shall provide a report on the issue which is available public.		The evaluation of the construction will be part of the test report
FACO-GAZ	12.4.8.a	11.4.7.a	gen.	In Europe this technical solution is used for diaphragm meters only. In these applications the ambient temperature is not significantly different from the gas meter temperature due to the good heat exchange function of the housing. Therefore, it should be an option and not mandatory (as it is in EN 1359)	New wording of the second sentence: For gas meters with a built-in temperature conversion device the manufacturer can declare the meter suitable for operation where the temperature of the gas at the meter inlet is significantly different from the ambient temperature of the air surrounding the meter. In this case also flow tests are performed with a gas temperature different from the ambient temperature as specified in 11.4.7.2.	To be discussed
BIML	12.4.8.1	11.4.7.1	techn.	The minimum number of flowrates to be tested is not defined. Do we refer to the flowrates defined in 11.3.3 and perform the test for all of them equal or greater to Q_t?		correct; text amended
CA	12.4.8.1	11.4.7.1	edit.	The first sentence contains duplicated words, in the section which reads "…in the flow range in the flow range …".	"The flow tests are performed in the flow range ..."	amended SC: reference not correct further to be edited H. Schouten will propose
DE	12.4.8.1	11.4.7.1	gen.	temperture test shall include Qmin up to Qmax		copied from R137-1 not part of the present project to change this
JP	12.4.8.1	11.4.7.1 11.4.7.2		By separating mechanical meters, electronic household meters and electronic meters, the contents of actual flow test should be clarified. Please tell us the difference between "the different temperatures" in 11.4.7 and "the ambient temperature equal to the reference temperature" in 11.4.7.2.	Similar to 11.4.7, this should be described in a) and b) separately.	comment not clear SC: Amended; Solved
DE	12.4.8.2	11.4.7.2	gen.	temperature test with tamb ≠ tgas shall be optional (only if manufacturer specifies)		to be discussed

Country Code	New Clause	Clause/ paragraph/ table	gen./ edit./ techn.	COMMENTS	PROPOSED CHANGE	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
US	12.4.10	11.4.9 (see also 5.10)	techn.	11.4.9 Durability Gas meters with internal moving parts are submitted to the durability test. …. There seems to be a conflict between the requirements of Section 11.4.9 and Section 5.10 (which says that all meters shall be tested for durability). While we have had significant internal debate about this, US participants in this work tend to support a requirement to do durability tests on <u>all</u> meters (not just those with internal moving parts). See also US comment on Section 5.10. Decisions need to be made concerning the durability testing requirement when a "family of meters" is being type-approved.	Make Section 11.4.9 agree with Section 5.10 11.4.9 Durability Gas meters ~~with internal moving parts~~ are submitted to the durability test. …. Clarify durability testing requirements for a "family of meters."	see amended text on basis of SC discussions
DE	12.4.12	11.4.11	*techn.*	Overload flow shall not be restricted to meters with moving parts. Meters with pressure sensor for instance may be sensitive to overflow too		To be discussed
DE	12.4.17	11.4.16	gen.	the influence of functions on the accuracy shall be evaluated by investigating the software design. Tests may be carried out only if the software evaluation shows no adequate results		Suggest implementing Software annex
US	12.4.17	11.4.16		11.4.16 Software The effect of all functions of the software (like communication possibilities) is determined by performing an accuracy test at Qmin, with and without applying the specific function. The effect shall be negligible. Question: Why was Q_{min} selected as the flow rate for this testing?? Utilities are much more concerned at high flow rates.		Suggest elaborating on this subject and implementing in Software annex The software influence on Qmin is expected the highest SC: (Copy of annex of breath analysers to be sent by Régine); Less severe level to be implemented
FR	12.5	11.5	techn.	The software identification should be pointed out in the certificate as it's the case in the R140 : "When applicable, the version of the metrological part (the complete part if there is no specific metrological part) of the evaluated software shall be indicated in the type approval certificate or in its annexes.		see above SC: Will be mentioned in software Annex Still to be elaborated on
DE	12.6	11.6	edit.	replace "Directions" by "provisions"		agree; amended
DE		B.2.1	gen.	Ultrasonic and vortex meters can be sensitive to the orientation in relation to the perturbation, because the perturbed flow profile is asymmetric.	Add note in table B.1 for ultra sonic and vortex meter in case of single bend out of plane and double bend out of plane or add a paragraph B.2.4	New proposal presented and amended at SC meeting
FACO-GAZ		B.2.1	techn.	Reference condition with 80 D straight line makes no sense for turbine meters	Change to 5 - 10 D for turbine meters	Seems misunderstood; This is for test lab only
FACO-GAZ		C1	gen.	Thermal mass meters may be sensitive to flow disturbances as well	Test of flow disturbance acc. clause 11.4.8. must also be performed for thermal mass meters	implemented in cross list
FACO-GAZ		C1	gen.	For electronic meters there is no durability test (11.4.9) required, but tests for electronics. There is a serious question if these tests are really simulating the lifetime of the meter with his sensors and electronic	Looking and discussing other methods to simulate the lifetime, e. g. by using the HALT (highly accelerated lifetime test) and the HASS (highly accelerated stress screening).	Still to be elaborated on

Country Code	New Clause	Clause/ paragraph/ table	gen./ edit./ techn.	COMMENTS	PROPOSED CHANGE	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
US		Annex C	gen./ edit./ techn.	Annex C and Table C.1 provide a great reference for users of R137. Consider making Annex C informational (instead of mandatory) for two reasons: 1. All of the actual requirements are already written in textual form in the main document. 2. It makes the table seem a little more compatible with the concept of promoting/encouraging new technologies. (see also US scope comment C). Consider making a new table, very much like Table C.1, that will provide an overview of which requirements sections and which testing requirements sections are applicable for which specific components. (See also US scope comment D and Enclosure (1) of the US comments.) In Table C.1, if durability testing is decided to be applicable to all meter types, add "Xs" all the way across that row. (See also US comments on Sections 5.10 and 11.4.9) In Table C.1, is the drive shaft test applicable to diaphragm meters?	Suggested editorial change: This Annex **provides an overview of testing requirements** ~~the shows the tests required~~ **for some existing** ~~the different~~ metering principles. In Table C.1, the diaphragm gas meter, the temperature-compensated (TC) diaphragm gas meter, the rotary piston gas meter, and the turbine gas meter are purely mechanical meters. Consider making a new table that will provide an overview of type approval requirements for specific components. (See also Enclosure 1 of the US comments)	SC: Annex C to keep mandatory and include references to the requirement clauses Clause to be included on measurement principles not implemented in the table Remove TC Diaphragm. US believes orifice meters to be included in the document

Section from R117-1	General metrological requirements for specific components of a measuring system															
	Meter						Gas elimination device			Associated measuring devices			Self-service device	Ancillary device		
	Measuring device				Electronic calculator (incl. conversion, adjustment, correction)	Indicating device	Gas separator	Gas extractor	Special gas extractor	Pressure sensor	Density sensor	Temperature sensor		Printing device	Memory device	Conversion device(not included in the calculator)
	Meter sensor		transducer													
	electrical	mechanical	electrical	mechanical												
2.5	X	X	X	X	X	X										
2.6.2	X	X	X	X	X	X				X	X	X				
2.7.1					X					X	X	X				X
2.7.2					X					X	X	X				X
2.8					X											
2.9.1						X										
2.9.2						X										
2.10.1							X	X	X							
2.10.2							X	X	X							
2.10.3							X	X	X							
2.10.5							X	X	X							