



International Comments on the First Committee Draft (1CD) of OIML R 117-2
“Measuring Systems for Liquids other than Water;
Part 2: Metrological controls and performance tests.”

To accompany the 2CD Package of R117-2
(dated 21 December 2013)

Highlight = needs further review/action

1CD date: 10 March 2011

TC 8 / SC 3 Co-secretariats:
 Germany and the United States

Closing date for comments on the 1CD: 17 June 2011

Country Code	Section	gen./ edit./ techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
JP	General	Gen.	It is desirable to ensure the equal opportunity for all countries to participate in the International Working Group (IWG). Also, we consider the discussion of the IWG needs to be transparent (i.e., by sharing meeting information on the OIML website). We hope the Secretariat to consider having a TC8/SC3 meeting for 2CD. If there is a meeting, we would like to participate in it.		A	Agree. The Project Group (PG) for the development of R117 (all three parts) was re-established and reorganized with many new PG members based on an inquiry to all P-members and all O-members of TC8/SC3 in Sept/Oct 2012, Also, as recommended, a meeting of the OIML Technical Subcommittee TC8/SC3 was held in Nov 2012 in Paris.
JP	General	Gen.	There are some requirements that do not conform to IEC Standard. As a general comment, we would like to know the relationship or priority between OIML Recommendations and ISO/IEC documents (e.g., the requirements in 4.9.11).		A	As much as possible, R117 will follow D-11 and the IEC documents that D-11 is based upon. The R117 Project Group has worked closely with the Convenor of D-11 to ensure maximum harmonization.

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JP	General	Gen.	There are some tables that do not have titles. Putting titles and numbers to all tables will be helpful in understanding.			Agree
JP	General	Gen.	Please propose the contents of Annex C to I as soon as possible. We will make comments on these annexes to be included 2CD.		A	New Annexes to be included in the 2CD include: <ul style="list-style-type: none"> o Annex E – Measuring Systems for Beer + Milk + other foaming potable liquids; and o Annex F – Pipelines + Ship Loading Systems o Annex G – Aircraft Fueling Systems (see also the explanatory note)
NL	general		In a number of clauses the term “significant fault” has been given a value. This could give confusion with the fact that significant fault sometimes is used as a Boolean For that D11 and VIML will be amended	Please try to keep in line with the changes in D11 and VIML The term “fault limit” is introduced as the value at which a fault is considered a significant fault.	A	Agree. There was a full review of the FDD of D11. The R117 Project Group has worked closely with the Convenor of D-11 to ensure maximum harmonization with D-11.
NL	general			In all situations refer to “Part 1” instead of to “OIML R117-1”		Disagree; references to R117-1 eliminate any confusion about what document is being referenced.
NL		Gen./Tech	In Chapter 4 a copy is made of D11(2004) Choices shall be made on the applicability of test levels to the specific installations	Select for each installation the applicable environmental classification (Mx, Ex and Hx)	A	Disagree, Manufacturer will decide on the correct test level for their system. This issue was discussed in Paris in Nov 2012 – and consensus was reached. NMi suggests that all Annexes list the minimum test levels for each system/installation. Phil & Michael agree.

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Canada	1	edit	The scope that is pertinent to part II is fully described in 1.5. Section 1.1. to 1.4 is a duplication of information and is pertinent to part I	Remove sections 1.1 to 1.4		Disagree with removal. Agree that this section duplicates the scope found in R117-1; however, this was intentional. It was decided that this document should also have a scope statement. No change.
NL	1.1-1.4	Gen.	This is repeated from part 1	Propose to delete		See response to Canada comment above.
Canada	1.5	edit	I think it is worthwhile to specify that part II of the document is intended for both type approval testing and field testing	Add “for the purpose of type approval and initial verification. Both..” after OIML R117-1		Agree to add words about initial verification in Section 1.5. (see also 1.5 NL comment below)
NL	1.5			Suggest to change to: This part 2 of this Recommendation specifies the metrological controls and performance tests to meet the metrological and technical requirements as specified in part 1 for both complete measuring systems and constituent elements of a measuring system that are approved by separate type evaluation.		1.5 edited (see also Canada comment above)
Canada	2	gen	This section addresses information that is already covered in part I section 6. It is not required	Remove section 2 Or reference section 6 of part I		Agree that this information duplicates some information in R117-1; however, the info has been modified slightly from the text in R117-1 – based on extensive discussions. No change.
NL	2.1		The vocabularies have been amended such that today there is a clear distinction between type approval and type evaluation. The action performed to gain the type approval is now called the “ type evaluation” “Type evaluation” comprises “type examination” and (type) (performance) tests	Change title to “Type evaluation” (As in the template) Amend where applicable in the whole Recommendation		Understand the distinction. The project group has tried to make changes to “type evaluation,” as appropriate.

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NL	2.1		<p>This complete clause concerns the attitude and policy related to the acceptability for modules/devices getting separate type evaluation. This concerns requirements and therefore should be part of Part 1 of the recommendation.</p> <p>In addition, the constituent elements of a measuring system, mainly those listed below, and the sub-systems which include several of these elements (for example, a flowcomputer), are able to receive separate type approval upon the request of the manufacturer:</p>	<p>editorial suggestion: change “.. are able to receive..”to “..may receive..”</p>		<p>Agree that the applicable parts of R117-1 will need modification in the next revision (or amendment) of R117-1.</p> <p>Disagree with editorial suggestion.</p>
NL	2.1		<p>(except, of course, in the case of ancillary devices and additional devices that are exempted from the controls).</p>	<p>delete the “of course” since referring explicitly to “common sense” is not applicable in specifying requirements and tests</p>		<p>agree</p>

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NL	2.1		<p>The test lab will have the ability to authorize alternative testing procedures as long as they are fully documented in the test report, the reasons for not following the regular test procedures are fully justified, and the procedures are within reasonable state-of-the-art testing practices</p> <p>The background of such clause is understood but at the moment is too less restrictive “reasonable state-of-the-art” would at least need an audit by an independent body.</p>	delete		<p>Tend to disagree with the removal of this paragraph.</p> <p>Originally, it was NL that pushed for such a sentence to be added. This paragraph was the result of much debate in the project group.</p> <p>Discussed in Paris in Nov 2012.</p> <p><u>As discussed, Option 1:</u> “When it is found that it is not possible to exactly complete testing procedures as described in R117-2, the test lab will have the ability to authorize alternative testing procedures as long as they are fully documented in the test report, the reasons for not following the regular test procedures are fully justified, and the procedures are within reasonable state-of-the-art testing practices.”</p> <p><u>As discussed, Option #2:</u> Any exceptions to the test procedures described in R117-2 must be fully and clearly documented in the type evaluation report.</p> <p>Option #2 had consensus in Paris.</p>
SE	2.1	edit	Reference incorrect	Change Annex X.4 to X.11		agree
NL	2.1	Gen	Reference to X.4 is wrong	Change to X11		Agree, changed to X.11.

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NL	2.1	Gen	Reference to X.4: Restrict to parts for which MPE's are defined	Add: restrict to parts for which MPE's are defined	A	These components need to meet the applicable requirements. See also the 5 th paragraph of 2.1 Discussed in Paris. Netherlands agrees to withdraw comment.
JP	2.2	Gen.	Please propose the content of Initial Verification as soon as possible. We will make comments on the content to be included in 2CD.		A	OK – Initial Verification test procedures now inserted into applicable Annexes for complete measuring systems.
NL	3	Gen.	Vmin in L	Change “quantity” in “volume”		edited
NL	3	Gen.	Mmin is missing	Add “Mmin Minimum measured mass		Disagree; prefer to just leave as “mmq (kg)”
NL	3	Gen.	Description Emi (B) not complete	Add “at metering conditions”		Agree, added
NL	3	Gen.	Description Emi (A) not complete	Add “at metering”		Agree, added
NL	3	Gen.	Viscosity is missing	Add symbol for viscosity η or ν plus definition		Agee, added the following: μ = dynamic viscosity of the liquid (mPa·s)
SE	3	edit	Two definitions of n_o , the last one not understood, not one used in the document.	Delete both definitions.		OK, both definitions deleted.
USA (MB)	3	Edit.	Equation “ $Q = K_F^{n-1} X Q_{max}$ ” appears with no associated definition.	Insert “Flowrate of a flow rate test” to the right of the equation.		Equation moved closer to the “Q” definition.
USA (MB)	3	Edit.	Missing line break between equation for P_c and equation for V_r .	Insert line break.		Agree

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CECOD DE Thomas	4	Gen	<p>Type approval performance tests (mandatory) Section 4 was developed from Annex A of R117-1: 2007 ... As planned when R117-1 was approved, Annex A will be removed from R117-1. This removal will occur in the next update/revision of R117-1 – which is planned to accompany the 2CD of R117-2.</p> <p>As the 117-2 is the recommendation "how to do", it shall not include requirements. It shall simply give the framework for the tests. Annex A of 177-1 shall remain, and if any requirements on the measuring systems shall be requested, they have to be laid down in R117-1</p>		A	<p>Agree, all requirements must <u>only</u> be in R117-1.</p> <p>Discussed highlights of this in Paris.</p> <p>Attempted to move all "requirements" back into Annex A of r117-1.</p>
Canada	4.	gen	<p>It may be beneficial to have performance testing for: - Permanence of markings</p>		B	<p>Team 4 – further discussion, generic for all types of measuring systems ... depends on the environment the measuring system will see in its life</p> <p>Although discussed, "permanence of markings" testing is not added to Chapter 4 at this time.</p>

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Canada	4	gen		Add a section for hose performance test and describe when these tests are required.		<p>Team 4 – Comment understood, Hose performance requirements are found in R117-1 Section 2.13 – 2.16 (especially 2.15) and 6.2.2.1.</p> <p>Requirements OK.</p> <p>In R117-2, test procedures for hoses are found in A.6.2 and B.6.3 (double-check this).</p> <p>Hoses are only tested as part of a complete measuring system – hoses do not receive a separate type evaluation as a component.</p> <p>Additional guidance on this issue may be needed (possibly in Chapter 4).</p> <p>Suggest Canada works with the Project Group convenor and the leaders of Annex A and Annex B on this.</p>
NL	4		Title	Change to: Type evaluation performance tests	B	Team 4 – agree with comment

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CECOD FR Phil	4.1	Gen	This General clause shall require identification of systematic disturbance contributors, as per specified in available technical documentation of manufacturer. Any systematic (always present) disturbance shall be specified in documentation, and recorded in test results.			<p>Not accepted.</p> <p>There are no “gifted mpes” for what would be considered a “constant (always present) disturbance” – systems need to be properly designed.</p> <p>Disturbances are only a temporary occurrence. If a disturbance is constant, it becomes part of the rated operating conditions.</p> <p>Statement to this effect should be added to the next draft of R117-1. (needs to checked at type evaluation and initial verification).</p> <p>Consensus on this response in Paris.</p>
Ufacturers shouls (NL)	4.2		Title	Change to “Measurement uncertainty”	B	Team 4 - agree
NL	4.2	Gen	Alternative as described in 5.2 is not included	Include alternative from article 5.2 to allow higher uncertainties	A	<p>Update to Uncertainty:</p> <p>If it is technically or economical impossible impractical to reach 1/5 and 1/3 of the MPE, a “reduced MPE” = (6/5 x MPE – U) and ” = (4/3 x MPE – U) respectively may be used. When calculating the expanded uncertainty, the resolution but not the repeatability of the EUT shall be included.</p> <p>Add advice X.4.2: This exception is only valid in mutual agreement of the manufacturer and the test facility, and only to approve a device.</p> <p>Team 4: Done!</p>

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NL	4.2	Edit	Text needs some improvement. e.g. 95% probability needs to be added		B	Team 4 – K=2 now covers this
JP	4.2	Gen.	The treatment of measurement uncertainty in legal metrology is still under consideration in TC3/SC5 and has not reached a conclusion. Therefore, we recommend the description in this clause would be harmonized with the discussion in TC3/SC5.		B	Team 4 – We've had direct discussions with the sec of TC3/SC5. Now done – see response to NL (4.2) above.
USA (MB)	4.3	Gen.	Section presents a range of acceptable test conditions. Use of the term “reference conditions” could be confused with fixed reference or standard reference conditions for converting to a baseline.	Substitute the term “Test” for the word “reference” in each of three locations in the paragraph.	B	Team 4 – comment understood ... however the term “reference conditions” has a long history and everyone understands it
NL	4.4	Gen.	Mass is missing	Add behind volumes “/mass(ses)”	E	
NL	4.4	Gen	Second sentence: “If the value of the significant fault...” Significant fault has no value	Solution presented in 1CD D11 : “If the fault limit value...” (Attn.: D11 still in draft phase)	A	Team 4 – Comment understood, want to stay in-line with D11 ... so OK
CECOD FR Jean-Luc	4.5	Edit	Testing requirement for temperature are not found in Section 4.10		C	Agree – Section 4.8
NL	4.5	Gen.	Reference to Section 4.10 is not correct	Replace 4.10 with “4.8.5, 4.8.6 and 4.8.7	C	Team 4 – OK see above
SE	4.5	edit	Reference incorrect	Change first sentence to “Temperature tests in chapter 4.8 concerns...” Delete last sentence.	C	Team 4 – OK see above
Canada	4.5	edit	This section is specific to temperature testing of electronic equipment.	Move this section to section 4.8	B	Team 4 – Comment understood, however since liquid temp is not part of the influence factor tests, we prefer to keep liquid temp out of section 4.8.

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JP	4.6	Gen.	Please propose the practical content of Software. In the content, we particularly would like to know which level of severity in D31 to be required. Since requirement on software is important in legal metrology, please provide an opportunity for a meeting in TC8/SC3 attended by many specialists to refine R117-2.		A	<p>New section on software requirements needs to be added to a revision of R117-1.</p> <p>Test procedures/assessments on software needs to be added to R117-2.</p> <p>Consider OIML D31 + Welmec Guide 10.5 + Welmec Guide 7.2.</p> <p>“Risk class ‘C’”??</p> <p>Propose using section on software from just-published R137 “Gas meters”</p> <p>This was discussed in Paris.</p> <p>Now needs to wait until actual “full” revision of R117-1.</p>
USA (MB)	4.6	Edit.	Note contains incorrect word form.	Substitute the word “additional” for the word “addition” in the Note.	E	
Canada	4.7	edit	This section is not required. Reverse flow performance testing is addressed in the relevant sections	Remove section	B	Team 4 -- Disagree – check for reverse flow needed in the general section
DE Thomas	4.8.1	Gen	<p>The general reference for testing requirements in 4.10 is OIML D 11 (Edition 2004)</p> <p>Note: The testing requirements in 4.10 are planned to be updated to the 2011 version of D11 in the 2CD of R117-2</p> <p>The whole part shall give hints on "how to do" no more. Additionally this changes requirements on active R117-1</p>		B	<p>Team 4 --</p> <p>Response is that many of the “requirements” of Chapter 4 are being moved back into R117-1.</p> <p>See re-written Chapter 4.</p>
NL	4.8.1	Gen.	Reference not correct	Change 4.10 in 4.9 (2 times)	E	

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CECOD UK Mike	4.8.1	Tech	There are some differences between the requirements suggested by OIML D11 and what is written in R117-1:2007. Having moved annex A from R117-1 to R117-2, the proposal to then update the testing requirements as part of the R117-2 review with the OIML D11 2011 version could introduce significant technical requirement changes. The technical requirements are supposed to be in R117-1. R117-2 should deal with how to test for those requirements – and should not change requirements for compliance with R117-1	ENSURE NO TECHNICAL CHANGES IN REQUIREMENTS – ESPECIALLY ELECTRICAL DISTURBANCE TESTS	A	Agree: Ralph will solve this by double-checking changes to D11 and moving “requirements” back into R117-1. Ralph working with George (NL) to ensure R117 + D11 + R139 are all in-line with each other
NL	4.8.1	Gen.	Reference not correct	Change A.10 in 4.8 and 4.10	E	
SE	4.8.1	edit	Reference incorrect	Change A.10 to 4.8.	E	
NL	4.8.2	Gen.	Reference not correct	Change A.10.5 and A.10.6 in 4.8.3 and 4.8.4	E	
SE	4.8.2	edit	Ancillary devices are part of a measuring system	Change “and” to “including” in the first sentence.	E	
NL	4	Gen.	It is not intended in D11 that the Classes tables are copied in a Recommendation. The SC should choose the applicable class for the applicable instrument. It is recognized that R137 because of its wide scope may need a different approach	Suggest to separate this “catalogue” part and shift it to the end of part 1 (e.g. in an Annex)	A	Discussed by PG and Team 4 in Braunschweig. Recommended to keep the document as written – let the manufacturer choose the severity level where applicable.
DE Thomas	4.8.4 to 4.8.8 And from 4.9.2 to 4.10.3	Gen	all severity levels and their accompanying values to be substituted by a reference to R117-1		A	See earlier comment from CECOD on Chapter 4. Yes, severity level “requirements” will be in R117-1 – how to test will be in R117-2.
CECOD FR Jean-Lu	4.8.5	Edit	What is the meaning of “free air”? In a, temperature chamber, without ventilation?		C	Yes, fans <u>not</u> running in the chamber.

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SE	4.8.5	edit	Reference incorrect, missing bullets.	Change “4.1.1” to “R117-1 4.1.1” Add one bullet “The EUT shall be tested • at the reference ... Add 2 bullets below table.	E	OK
JP	4.8.5	Edit.	In “Object of the test,” “4.1.1” actually means “4.1.1 of R117-1.” Therefore, please replace “the provisions in 4.1.1” with “the provisions in 4.1.1 of R117-1.” Please make the same correction as shown on the right column.	Before: with the provisions in <u>4.1.1</u> After: with the provisions in <u>4.1.1 of R117-1</u> Please make the same correction in 4.8.6, 4.8.7, 4.8.8, 4.9.2, 4.9.2.2, 4.9.3, 4.9.4, 4.9.5, 4.9.6, 4.9.7, 4.9.8, 4.9.9, 4.9.10, 4.9.11, 4.9.11.2, 4.9.11.3, 4.10.2, and 4.10.3.	E	Agree to ensure references are correct.
SE	4.8.6	edit	Reference incorrect	Change “4.1.1” to “R117-1 4.1.1”	E	
NL	4.8.7	Techn.	Damp heat cyclic test is a disturbance test	Move to section 4.9 Change 4.8 to read “Influence factor test” Change chapter 4.9 to read “disturbance tests”	B	Team 4 – Ralph will work with NL to resolve
NL	4.8.7	Techn.		Delete “During tests, the EUT shall be in operation.” in the Test Procedure last sentence.	B	Team 4 – Ralph will work with NL to resolve
SE	4.8.7	edit	Reference incorrect	Change “4.1.1” to “R117-1 4.1.1”	E	OK
SE	4.8.7	edit	Unnecessary text	Delete the sentence “This is applicable only ...”.	E	OK
SE	4.8.8	edit	Reference incorrect	Change “4.1.1” to “R117-1 4.1.1”	E	OK
SE	4.9.1	edit	Reference incorrect	Change A.11 to 4.9	E	OK
USA (DK)	4.9.1.1	techn	DC mains voltage variation is the only one in the table without severity level assigned.	Assign severity level “1” for Class E1 and E2, as it is done for AC mains voltage variation. This would make more sense in view of the next comment – to make DC mains voltage variation test consistent with AC mains voltage variation test.	C	OK
SE	4.9.2.1	edit	Reference incorrect	Change “4.1.1” to “R117-1 4.1.1”	E	
USA (DK)	4.9.2.1	edit	Not clear at which V to test	Need to test at upper and lower limit only	C	fixed
SE	4.9.2.2	edit	Reference incorrect	Change “4.1.1” to “R117-1 4.1.1”	E	
USA (DK)	4.9.2.2	edit	Why is this test presented in a different way than AC mains voltage variation	Make consistent with AC main voltage variation test.	C	OK - fix
USA (DK)	4.9.2.2	techn	Not clear at which V levels to test.	Need to test at upper and lower limit only	C	Fixed – finish edits

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SE	4.9.3	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change “4.3” to “R117-1 4.3”	E	
USA (DK)	4.9.3	techn	Tests d and e exceed highest levels of 61000-6-2. Once these tests are removed, Tests a, b, and c in Level 2 and Level 3 are the same.	Propose striking Severity 3 as unjustified.	A	Key comment from Dmitri – Ralph, Marc, and Rich will do a little more research and discuss. Louisville/USNWG resolution: This test is still current in the DD of D-11. Test levels changed to level 1 and level 2 based on D-11
SE	4.9.4	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change A.12 to 4.10 One line in the middle has a smaller text size. Change “4.3” to “R117-1 4.3”	E	OK
SE	4.9.5	edit tech?	References incorrect, Time interval 1 second between discharges seems too small.	Change “4.1.1” to “R117-1 4.1.1” Change 1 second to 10 seconds (check IEC standard). Change “4.3” to “R117-1 4.3”	B	Team 4 – check this “10 seconds” comment
SE	4.9.6	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change “4.3” to “R117-1 4.3”	E	OK
SE	4.9.7	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change “4.3” to “R117-1 4.3”	E	OK
SE	4.9.8	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change “4.3” to “R117-1 4.3”	E	OK
USA (MB)	4.9.8	Gen.	Organization of Test Severity can create confusion.	Reorganize table as shown in Annex USA – 4.9.8 below.	B	Team 4 – agree to change to a similar table
USA (DK)	4.9.8	techn	Dips and interrupts aren’t required in 61326-1 or 61000-6-2. The reason that they are required for AC mains is that THEY HAPPEN ALL THE TIME. If a voltage dip happens on DC mains, it is due to a shared supply being undersized, or due to periodic switching of a DC output being poorly designed.	Remove this test		Dmitri says that he accepts the comments from Rich and Marc that test is OK.
USA (DK)	4.9.9	edit	Add IEC 60654-2: 1998 as the second reference standard	Add IEC 60654-2: 1998 as the second reference standard	B	Under review
USA (DK)	4.9.9	techn	2% is too high.	Use 0.2% or 1% per IEC 60654-2	B	Under review
SE	4.9.9	edit	References incorrect	Change “4.1.1” to “R117-1 4.1.1” Change “4.3” to “R117-1 4.3”	E	

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USA (DK)	4.10	techn	ISO 7637 and tests of the levels specified in ISO 7637 should not apply to measuring instruments mounted on vehicles. ISO 7637 covers vehicle design, i.e. electrical and electronic systems provided by vehicle manufacturer, which are integral to the operation of the vehicle. It is understandable that such "mutual agreement between vehicle manufacturers and component suppliers" is necessary for the safe operation of a vehicle and to minimize dangers to people's lives and property damage. However, measuring instruments are not in this category. They are not "components" of vehicles per se, are not a part of vehicle design, and are not provided by vehicle manufacturers. They are add-on equipment. If this is not acceptable, then the lowest severity levels and pulses should be used in the 4.10 tests. Otherwise, the measuring equipment is not likely to survive the tests.	Remove	B	Now resolved with DK.
SE	4.9.10	edit	References incorrect	Change "4.1.1" to "R117-1 4.1.1" Change A.12 to 4.10 Change "4.3" to "R117-1 4.3"	E	OK
SE	4.9.11.1	edit	References incorrect	Change "4.1.1" to "R117-1 4.1.1" Change A.11.11.1 to 4.9.11.1 Change A.11.11.2 to 4.9.11.2 Change A.11.11.3 to 4.9.11.3 in two places Change "4.3" to "R117-1 4.3"	E	OK
SE	4.9.11.2	edit	References incorrect	Change "4.1.1" to "R117-1 4.1.1" Change "4.3" to "R117-1 4.3"	E	OK
SE	4.9.11.3	edit	References incorrect	Change "4.1.1" to "R117-1 4.1.1" Change "4.3" to "R117-1 4.3"	E	OK
SE	4.10.1	edit	References incorrect	Change A.12.2 to 4.10.2 in two places Change A.12.3 to 4.10.3 in two places	E	OK
SE	4.10.2	edit	Reference incorrect	Change "4.1.1" to "R117-1 4.1.1"	E	OK
SE	4.10.3	edit	Reference incorrect	Change "4.3" to "R117-1 4.3"	E	OK
NL	5	Edit.	General: The indentation of several articles of this section is not correct	Align the applicable articles		OK

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Canada	5.1	tech	The requirement for “metrological stability shall be achieved” would require additional detail to be effective	<p>Metrological stability shall be achieved before any testing is started. (See Annex X.5.1 for advice on this.)</p> <p>Chris says to just make a reference to X.5.1.</p> <p>Chris made a proposal for a resolution to this issue.</p>	A	<p>Additional detail provided in X.5.1: Every time the meter sensor/measuring device to be tested is connected hydraulically, it should be operated at the maximum flowrate for at least five minutes (e.g. to reach stability of [liquid] temperature and removal of air/gas) before measurement starts. Every time a new work session starts (for example after a stop of one hour or more), the EUT should operate at the maximum flowrate for at least one minute or until metrological stability is achieved, before the measurement starts.</p> <p>Note: Rich says that he sometimes runs a system for an hour to achieve stability. (closed loop system)</p> <p>Note: Marc says that NMi tries to achieve 1/5 of the mpe for stability.</p> <p>Marc: Stability should at least be within the repeatability error (See 3.1.2.2 of R117-1) this is 2/5 of line A. Valid on 5x the mmq.</p> <p>“System should be stable enough to operate within the repeatability error of Section 3.1.2.2.”</p> <p>Modify to: A “proof” of metrological stability is that the system operates within the repeatability error of Section 3.1.2.2</p> <p>OK -- Consensus in Paris.</p> <p>Wim: Process stability</p> <p>Issue of system stability vs. EUT stability.</p> <p>Problem: poor results – don’t know if it is a meter issue or a test facility issue</p> <p>Note: Possibly, part of the problem is that “metrological stability” is not really defined. (Possible to add a definition in R117-1.) VIM – VIML?? Team 4 – not agreed</p>

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
NL	5.1	Gen	Reference to X.4: Restrict to devices for which MPE's are defined	Add: restricted to devices for which MPE's are defined	B	From KM: Add: restricted to those constituent elements for which partial MPE's and/or hard pass/fail criteria have been defined. Team 5: edited and now OK!
Canada	5.1	tech	The Qmax rating is specified by the manufacturer, if QMax rating is not consistent between meters within a family, this could lead to the misapplication of the guideline.	Require that the Qmax rating, within a meter family, must be established in a consistent manner that is representative of the meter performances.	A	This is fixed by NL response below ... no more than 2x Qmax of next smaller meter. Chris: Situations where manufacturers will try to game this requirement (by under-rating a larger meter). Chris says OK to just drop this – not a problem very often. Team 5: Now OK! Added new text in Paris for Annex X -- consensus
NL	5.1	gen.	The text after the second bullet is in conflict with figure 5.1	Add as third bullet: • If practical, the largest meter in any family of meters should always be tested. However, if the largest meter is not tested, then any meter having a $Q_{max} > 2 \times Q_{max}$ of the largest meter tested, shall not be considered part of the family concerned. (see R49-2)	A	Agree. Same as Welmec guide on this issue. Consensus
NL	5.1 last bullet	gen		All performance tests relating to influence quantities shall be carried out on the size from a family of meters which is considered the most sensitive.	A	OK, change last bullet from "one size" to the most sensitive size. Consensus.

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
USA (MB)	5.1	Techn.	<p>Statement under Meter Selection – family of meters in second bullet is more restrictive than NTEP requirements and may force more sizes in the family to be tested than necessary:</p> <ul style="list-style-type: none"> Meters which have the most extreme operating parameters within a family, shall be considered for testing (e.g. the largest flowrate range, the highest peripheral (tip) speed of moving parts, etc); <p>Furthermore, Figure 5.1 appears to conflict with this statement now because sizes 2, 4, and 6 are not underlined in the rows were they represent the largest size (2nd, 4th, and 6th, respectively).</p>	<p>Primary proposal is to remove the bullet entirely.</p> <p>Alternative proposal is to append language to bullet as shown:</p> <ul style="list-style-type: none"> Meters which have the most extreme operating parameters within a family, shall be considered for testing (e.g. the largest flowrate range, the highest peripheral (tip) speed of moving parts, etc) if the operating parameter extreme in question has metrological impact; 	A	<p>Change the bullet as suggested: (needed if family is “inconsistent”).</p> <ul style="list-style-type: none"> Meters which have the most extreme operating parameters within a family, shall be considered for testing (e.g. the largest flowrate range, the highest peripheral (tip) speed of moving parts, etc) if the operating parameter extreme in question has metrological impact;
SE	5.1	edit	Simplify text, exchange “measuring sensor/measuring device” for EUT in a lot of places in chapter 5	Add EUT in the first sentence “The measuring sensor/measuring device EUT...” “...it is necessary to evaluate the EUT...” “Different sizes of the EUT...”	B	OK
SE	5.1	tech	The zero flow is not a problem for the turbine meter according to the advice chapter X (and not for the vortex meter either). Without a flow rate, they will not move!	Delete vortex and turbine from 5.3.1 in the table. (To be changed also in R117-1 3.1.5.4 and 3.1.8.1)	B	<p>Agree to change in the table:</p> <p>Section 5.3.1 only applies for turbine, electro-magnetic, ultrasonic, vortex, and massflow coriolis meters. For those meter types, a selection of meter sizes according to Fig 5.1.</p> <p>Now OK</p> <p>Don’t believe that R117-1 needs to be changed because of the way R117-1 3.1.5.4 is worded.</p> <p>Kerstin is OK with not changing this.</p> <p>Double-check about vortex meters.</p> <p>Paris – reviewed table.</p>
SE	5.1	edit	Reference incorrect	Reference in table 5.3.3 to Annex X is changed from Section 5.4.3. to 5.3.3		OK

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
SE	5.1	edit	Missing reference	Add reference in table 5.3.4 to Annex X Section 5.3.3		Reference to Annex X Section 5.3.4
SE	5.1	edit	Reference incorrect	Reference in table 5.5 is changed from Fig x. to Fig 5.1		OK
USA (MB)	5.1	Techn.	Intent of statement is unclear: “In accordance with the requirements of Section 6 of OIML R 117-1, tests should be carried out at the limits of the rated operating conditions – the limits of pressure, temperature, density, and viscosity (and alcohol content for drum meters for alcohol). It is possible to reduce the number of liquids to be tested if it can be shown, through technical analysis of the metering principals, that all requirements are fulfilled for any other liquid.”	Modify wording to clarify intent of statement: “In accordance with the requirements of Section 6 of OIML R 117-1, tests should be carried out at the limits of the rated operating conditions – the limits of pressure, temperature, density, and viscosity (and alcohol content for drum meters for alcohol). It is possible to reduce the number of operating conditions to be tested if it can be shown, through technical analysis of the metering principals, that all requirements are fulfilled for any other condition not tested. ”	B	Team 4 – talk to Mr. Buttler, Deals with “families of liquids” – needs further discussion From Milan -- drum meters for alcohol measure only volume – it is not necessary to measure concentrations of alcohol Kerstin: If not sensitive to concentrations of alcohol, remove this part in 5.1. Kerstin will double-check with Milan. From KM: Delete: (and alcohol content for drum meters for alcohol)
USA (MB)	5.1	Techn.	The equation representing the allowable range for adjacent family sizes is arranged such that the terms are in reverse order of what would be intuitive and also the order of family members that is shown in Figure 5.1.	Rearrange the order of the terms in equation: $0.5 \times Q_{\max} \leq Q_{\max} \leq 2 \times Q_{\max}$ To appear as: $2 \times Q_{\max} \geq Q_{\max} \geq 0.5 \times Q_{\max}$		No problem
SE	5.2	edit	Simplify text	Exchange “measuring sensor/measuring device” for EUT in 3 places (first and last line)		OK
Canada	5.2	tech	Evaluation of repeatability requirements require test volumes be at least 5 X MMQ.	Chris: Propose to add this requirement in 5.2 Chris drafted a proposal for this.	B	Kerstin: Already included in text of 5.3.2.1. Done.
Canada	5.2	tech	Consideration should be given to repeatability evaluation when testing is conducted with Small Volume Prover as the required 5 X MMQ may not apply.	Chris drafted a proposal for this.	B	Add X.5.3.2.1 Repeatability may be evaluated with test volumes smaller than 5xMMQ, as long as the repeatability error is within 2/5 of R117-1, line A in table 2. Christian agrees with this response. Discussed web-meeting ... now OK

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Canada	5.2	edit	It would be beneficial to clarify "identical test"	Change "three independent and identical .. " to three independent test under repeatability conditions.."		".. three independent tests under the same condition..." OK
CECOD FR Jean-Lu	5.3.1	Tech	Reading at zero flowrate is not relevant for turbines which are volumetric meters while the other meters are flow meters	A selection of meter sizes according to Fig 5.1 (only for electro-magnetic, ultrasonic, vortex, and massflow meters)		Delete both vortex and turbine. OK
Czech Rep	5.3.2.1	tech	There is an unclear expression of the quantity (error of the volume)	2 Draw an error-curve with v_i as a function of Q for each liquid and each unit price (optional)		V_i is changed to E_{vi} . OK
SE	5.3.2.1	tech	For a small flow range, 5 test points is too many.	Add a line in the table for flow range <5 with 3 test points.		Discussed in Braunschweig. Table was adapted from a table in R118. Both low end and high end of flowrate ranges need to be "open-ended" Also in the revised table in 5.3.2.1. OK A $Q_{max}/Q_{min}: -4 \quad N_f=3$ $Q_{max}/Q_{min}: 61- \quad N_f=10-$ Allow for ranges like 12,5. <13 and ≥ 13 . Team 5: edited, fixed. Consensus in Paris
SE	5.3.2.1	edit	Simplify text	Exchange "measurement transducer" for EUT in 3 places (on page 53)		OK
SE	5.3.2.1	edit	Incorrect symbol on the last line	Exchange " v_i " for " E_{vi} "		OK

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
USA (MB)	5.3.2.1	Edit.	In first sentence of General Information , “point” should be plural.	Substitute “points” for “point”.		OK
USA (MB)	5.3.2.1	Techn.	General principal for calculation of test flow rates is complex and may be introduce opportunities for errors and delays while testing.	Consider carefully the full range of use where this principle will need to be applied and offer alternative simplified options (e.g., equally spaced flow rates, or a table of preset patterns) for those working in environments where these calculations may be more difficult to carry out repetitively.		Don't understand comment ... seems pretty simple already. No change, have been used in R118 since 1995.
USA (MB)	5.3.3	Techn.	Statement “at 3 flow rates” in first paragraph is non-specific as to what 3 flow rates are required.	Specify what 3 flow rates are required.	A	See new advice annex text in X.5.3.3.
NL	5.3.3	Gen	Wrong reference	Change Section X.5.3.3 into X5.4.3		OK
NL	5.3.3	Gen	Section X.5.4.3 is more than only a table	Delete “for a table”		OK
SE	5.3.4	edit	Simplify text	Exchange “meter” for EUT in 3 places		OK
SE	5.3.4	edit	OIMLR49-2:2006 is currently under revision	Check status when finishing OIML R117-2		OK
NL	5.3.5		Numbering and heading are not logic	Suggest to read: “additional testing procedures for drum meters for alcohol” and change numbering to 5.7		Change title, keep numbering.
SE	5.3.5.4	edit	Headline not consistent	Reedit the headline according to 5.3.5.3		OK
SE	5.3.5.5	edit	Headline not consistent	Reedit the headline according to 5.3.5.3		OK
NL	5.3.5.6	Gen	Reference in the note is wrong	Change 5.4.5.4, 5.4.5.5 and 5.4.5.6 into 5.3.5.4, 5.3.5.5 and 5.3.5.6		OK
SE	5.3.5.6	edit	Headline not consistent	Reedit the headline according to 5.3.5.3		OK
NL	5.3.6.4; 5.4	Gen	Reference to 5.4.2 and 5.4.3 are not in the document		Change to 5.3.2 and 5.3.3.
CECOD DE Thomas	5.4	Edit	Use of word “durability” Might be confusing with endurance, while “durability” only used once in document			Endurance is preferred. Endurance test is used to prove the durability of the equipment. Agreed
Canada	5.4	tech	The mid flow test point is better represented by a range of values so that accuracy data of meters of different turn down ratios can be used	Change” 0.25 Q _{max} “ to “0.25 to .40 Q _{max}	A	(Q _{min} , 0.25-0.40 x Q _{max} , and 0.80 - 1.00 x Q _{max}). Kerstin is OK with response Consensus in Paris
NL	5.4	Gen.	Note at bottom: Due to absence of references it is not clear what is meant	amend		See two lines down at *.
SE	5.4	edit	Simplify text	Exchange “measurement transducer” or similar text for EUT in 7 places		OK

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SE	5.4	edit	References incorrect	Reference is changed from 5.4 and 5.4.2 to 5.3.2.1 (4 places)		*OK. If drum meters do endurance test, the reference is 5.3.2. Refer to
USA (MB)	5.4	Techn.	Object of the test should also mention reliability. The Endurance test is not just to ensure stability but also continued functioning.	Substitute “stability and reliability” for “stability” in Object of the test		Maybe. Kerstin is OK either way.
USA (MB)	5.4	Techn.	General information mentions that most severe conditions are “(normally the liquid of the lowest viscosity).” In truth, fluids with lower lubricity are more severe for meters with moving parts.	Substitute “(normally the liquid of the lowest lubricity and viscosity)” for “(normally the liquid of the lowest viscosity).”		Agree.
USA (MB)	5.4	Edit.	Test procedure incorrectly references 5.4, should be 5.3	Substitute “5.3” for “5.4”		See 3 lines up at *.
USA (MB)	5.4	Edit.	Note at and of test procedure incorrectly references 5.4.2 twice, should be 5.3.2	Substitute “5.3.2” for “5.4.2” in both places.		See 4 lines up at *.
USA (MB)	5.5	Techn.	Under General information, the note states that should be performed “even if the requirements on uncertainty given in section 4.2 are not fulfilled”. This note requires additional guidance on how to then interpret results.	Add a sentence to the end of the note that states: “When these tests are performed without meeting the uncertainty requirements of section 4.2. apply additional tolerance when assessing results equal to the amount that the uncertainty of the reference exceeds the uncertainty requirement.”	A	Braunschweig discussed. Change note to: The requirements on uncertainty given in section 4.2 may not be fulfilled due to “large” scale interval of indicator of the EUT.
NL	5.5. Note 2	Techn.	Is this in line with the previous sentence: “ <i>The indicating device used for test has to be suitable for this minimum measured quantity</i> ”?	To be discussed	B	Not really. When a fuel dispenser with d=0,01 litre and MMQ=2 litre is tested as a complete MS, the uncertainty is larger than 1/5 of MPE=1/5 x 1%. If the EUT is only the measurement transducer, this applies. Proposal to delete the line. Done, OK deleted, webinar,
SE	5.5	edit	Simplify text	Exchange “measurement transducer” for EUT in 2 places		OK
SE	5.6.3	edit	Simplify text	Exchange “electronic meter” or similar text for EUT in 2 places		OK

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
USA (Keilty)	5.6.3	tech	For electromagnetic and ultrasonic flowmeters it is usually necessary to fill the flowsensor with (conductive) liquid, to be able to get it in proper operating order. This section is offering additional comments to the tests described in section 4. The testing is looking for influence factors on the flowmeter. While it is correct that the sensor should be filled with a liquid. The statement is not correctly stated.	Change text: Test ultrasonic flowmeters with the flow sensor filled with a liquid. Test electromagnetic flowmeters with the flow sensor filled with an electrically conductive liquid.		OK
USA (Keilty)	5.6.3	tech	For Coriolis meters (which need the volume output to be verified), the initial intrinsic error on the density indication must also be determined under reference conditions.	Change text: For flow meters which use a density measurement device to calculate the liquid quantities in units of volume or mass, the initial intrinsic error of the density indication must also be determined under reference conditions.	B	This is only applicable for coriolis meter, density meters are handled in 6.4. Change text to: For coriolis meters using its density measurement to calculate the liquid quantity in units of volume, the initial intrinsic error of the density indication must also be determined under reference conditions. Team 5: OK
USA (Keilty)	5.6.3	tech	Set the low-flow-cut-off, and damping to zero. (If the low-flow-cut-off can not be set to zero, one will not be able to observe small changes in flowrates around that value. One way to get around this problem is to create a systematic offset in flowrate, so that it indicates a flowrate larger than the low-flow-cut-off.) It is not always possible to create an offset. If the low-flow-cut-off is set to zero, the flowmeter will begin to indicate flow. Is the purpose of the test to determine how much additional off set will be created by an external influence?	Strike text.	B	Yes, that is the purpose. Change text to: If test is performed under no-flow condition, set the low-flow-cut-off and damping to zero, so changes can be observed. Add to X.5.6.3 If the low-flow-cut-off cannot be set to zero, one will not be able to observe small changes in flow rates around that value. One way to solve get around this problem is to create a systematic offset in flow rate, so that it indicates a flow rate larger than the low-flow-cut-off. Team 5: OK
SE	5.6.3.1	edit	Simplify text	Exchange "electronic meter" for EUT in 1 places		OK
NL	6	Edit	Cycle: shall be cyclic	Change cycle into cyclic		Agree

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SE	6.1	edit tech?	Repeated text, requirement already included in the specific tests. No need to test at the end of each day.	Delete the sentence "Reference tests required..."	A	Team 6 – Disagree Statement should remain due to the fact that some testing may span multiple days; this is only applicable when reference testing is not mentioned in the test format. The last line could be added to the sentence to clarify.
Canada	6.1.1	tech	Calculators often accept a range of input sensitivity. The calculator input sensitivity must be set to the maximum.			Agree Team 6 – Assumption must be made that the author is referring to the frequency input. All signal input types should be evaluated i.e. analog type for turbine meters, and digital levels for amplified signals. The limits of the specified frequency span for both digital and analog signals, and the limits of the amplitude for analog type signals should be evaluated.
NL	6.1.1	Gen.	First paragraph: significant fault is missing	Add "fault limit" after "...1/5 of the MPE".		Team 6 – Agree, see next box
CECOD FR Jean-Lu	6.1.1	Tech	" It is advisable to apply at least 10000 pulses to minimize the uncertainty caused by pulse-counting". This sentence is unnecessary since the requirement of uncertainty less than 1/5 MPE is achieved This "error" must be taken in account whatever the number of pulses	Suppress the sentence	B	Team 6 – Disagree, rewrite sentence as follows: Sufficient pulses shall be generated applied to meet an uncertainty of 1/5 of the MPE fault limit. to be verified. It is advisable to apply at least 10 000 pulses to minimize the uncertainty caused by pulse-counting". Consensus in Paris
SE	6.1.3	edit	References incorrect	Change A.10.3 to 4.8.3 Change A.10.4 to 4.8.4		Disagree: see two comments further down.

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NL	6.2.1, 6.2.2., 6.3.1.1, 6.3.1.2	Gen	<p>In principle it is incorrect to specify “requirements” like MPE in part 2. Part 1 should cover such wording and part 2 only how to verify the compliance. From the present wording it seems as if part 2 specifies the requirements, which would be wrong.</p> <p>This clause therefore should better stress that the requirements are laid down in 2.8 of part 1 and indicate that the values presented are the result of these requirements.</p> <p>The “...half of the scale interval..” in the note is part of the referred requirement and therefore should not be a note.</p>	<p>Suggest to change to: “The maximum permissible error for this device is shown in table (6.2.x) below, which is the value as specified in part 1 clause 2.8 and concerns one tenth of the measuring system MPE (see Part 1 table 2 line A)“ Like presented in the referred clause 2.8 the magnitude of the MPE shall never be less than half the scale interval.</p> <p>Apply similar changes to the further clauses.</p>	<p>A</p>	<p>Team 6 – Agree The following changes are recommended for 6.2.1, and 6.2.2.</p> <p>Remove tables and replace old sentence with the following sentence: “The value of the maximum permissible error for this device is specified in part 1 clause 2.8.”</p> <p>The following changes are recommended for 6.3.1.1, and 6.3.1.2.</p> <p>Remove tables and replace old sentence with the following sentence: “The value of the maximum permissible error for this device is specified in part 1 clause 2.7.1.2”</p> <p>The following changes are recommended for 6.3.1.3</p> <p>Remove tables and replace old sentence with the following sentence: “The value of the maximum permissible error for this device is specified in part 1 clause 2.7.1.3”</p>

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NL	6.1.3	Gen.	Reference not correct	Change A.10.3 and A.10.4 in 4.8.3 and 4.8.4		Team 6 – Disagree; to be consistent all specifications should remain in part 1, therefore the sentence should be changed as follows: “For each test the severity levels shall be determined as shown in A.10.3, A.10.4 and A.11.1 of part 1. The test severities for the tests are mentioned in the applicable articles A.10 and A.11 of part 1.”
CECOD DE Thomas	6.1.3 and 6.1.4	Edit	shall refer to R117-1, Annex A.10 and A.11			Team 6 – Agree, see above comment 6.1.3 The following needs to be changed for 6.1.4: “For the severity levels see Section A.11.1 of part 1.”
NL	6.1.4	Techn.	For some set-ups it is almost impossible to keep the simulation equipment outside of the RF field. Suggest adding the reason for this clause in the last but one sentence	Add to the last but one sentence: “ ..in order to prevent the simulation equipment being disturbed by the RF field”		Team 6 – Agree, sentence rewritten as follows: ”In case of the radio frequency immunity tests, the equipment used for simulation of the deliveries and associated measuring instruments is kept outside the radio frequency chamber in order to prevent the simulation equipment being disturbed by the RF field” The change in the sentence above does not address the highlighted sentence.
Canada	6.2	tech	It is not clear under what circumstance the note “mpe requirements shall not be less than half of the scale interval” would be applicable since the test should be conducted with at least 10000 pulses to eliminate resolution issues.	Remove note or add comment in section 6.1.1 to the effect that the test quantity will must be minimum 10000 the min resolution in order to minimize resolution error.		Team 6 – Disagree already resolved in previous comment above which was out of order

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NL	6.2		Do not refer forward, only refer backward. Furthermore there is no need for such reference. The foreword or scope could indicate the general approach of OIML concerning the different parts of a Recommendation So do not refer to R 117-3 R117-2 results from R117-1 and R117-3 is the result of R 117-2	delete all references to R 137-3		Team 6 – Agree
Austria	6.2.1	tech	The data processing is digital and not analog. There is no error curve with the variable “frequency”.	Only 1 simulated flowrate is necessary. The question is whether it has to be the Qmax.	A	Phil suggests that a frequency generator is set at 1.2 x Qmax. (but only one flowrate is needed. Qmax is the worst case. Team 6 – Agree with group discussion of 11/15, Ralph has the notes already of that discussion
Canada	6.3.1	Edit	The measured unconverted volume or unconverted volume derived from the simulated input is assumed to be without error for all tests of the conversion device. The verification is for the conversion calculation and also the associated measurement.	Put statement “For the verification of the conversion, the unconverted volume, measured or derived from simulated input, is assumed to be without error” in sections general section 6.3.		Team 6 – Agree, sentence should be rewritten as follows: “For the verification of the conversion of the unconverted volume, measured or derived from simulated input, is assumed to be without error”

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Canada	6.3.1.1	tech	The procedure does not provide any guidance in the determination of the required test points. The conversion calculation should be verified over the rated range of the device. The test points must be chosen so that the various conversion equations and algorithms are evaluated.		A	<p>Team 6 – Agree Add the following sentence:</p> <p>“For each of the applicable characteristics of the liquid (e.g. temperature, pressure, density, relative density, etc.) the minimum, medium, and maximum values are applied. Based on the values represented by the simulated signals, the indications of the converted quantities are verified.” For density, test points must be chosen so that the various conversion equations and algorithms are evaluated.</p> <p>**Also insert this in the 2nd approach. 6.3.2.1</p> <p>Maybe improve wording.</p> <p>Consensus in Paris</p>
SE	6.3.1.1	edit	Missing word	Add “deviation” at the end of the note		Agree
SE	6.3.1.1	tech	Missing test points	Add (not simulated) test points according to 6.3.2.1, one simulated flow rate.		Team 6 – Agree See above
SE	6.3.1.2	edit	Missing word	Add “deviation” at the end of the note		Agree
SE	6.3.1.2	tech	Missing test points	Add one test points (T, p, rho), one simulated flow rate.	A	<p>Team 6 – Agree Add the following sentence:</p> <p>“For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium value is applied and evaluated”</p>
Austria	6.3.1.3	tech	for accuracy class 1,5 should SF = 0,30 % instead of 0,35 %	Change value		Team 6 – Point no longer valid, but it has been resolved in previous comments by removing the tables

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SE	6.3.1.3	tech	Missing test points	Add one test points (T, p, rho), one simulated flow rate.		Team 6 – Agree Add the following sentence: “For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium, value is applied and evaluated”
DE Thomas	6.3.2.1	Edit	Accuracy tests of the calculator/conversion device. Reference to source of values for the table is not given			Team 6 – Point no longer valid. Table of requirements should be removed and referenced back to the part 1 document which was suggested above in the comments.
Canada	6.3.2.1	tech	In the case of conversion devices with configurable input sensitivity(measured unit per input signal unit) , the input sensitivity must be set to the maximum .The accuracy of the conversion device is dependent on this setting. The accuracy will decrease with increased input sensitivity.	Add “In the case of conversion devices with configurable input sensitivity(measured unit per input signal unit) , the input sensitivity must be set to the maximum.”		Team 6 – Suggest Group Discussion Team 6 – agree
Austria	6.3.2.1	edit	For conversion devices, the system of MPE/SF is complex. For the ease of understanding care shall be taken in R117-2 that the MPE/SF for digital/analog devices appears in the same order as in R117-1.	Put the table (which is for analog inputs) behind the last paragraph (which is for digital inputs). State that the table is identical with table 4.1 of R117-1 and that it is for analog inputs.		Team 6 – Point no longer valid Table of requirements should be removed and referenced back to the part 1 document which was suggested above in the comments.
SE	6.3.2.2	tech	Missing test points	Add one test points (T, p, rho), one simulated flow rate.		Team 6 – Agree Add the following sentence: “For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium, value is applied and evaluated”
SE	6.3.2.3	tech	Missing test points	Add one test points (T, p, rho), one simulated flow rate.		Team 6 – Agree Add the following sentence: “For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium, value is applied and evaluated”

Country Code	Section	gen./edit./techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
Canada	6.4.1	tech	Some analogue transducers have configurable output signal range. These should be tested configured at the maximum range setting as this is where we can expect the poorest the performance of the device.		B	Team 6 – Suggest Group Discussion Agree
Austria	6.4.1	gen	Acc. to R117-1, 6.1.1: “the constituent elements of a measuring system, mainly those listed below, and the sub-systems which include several of these elements, are subject to separate type approval upon the request of the manufacturer”. This applies to the pressure sensor, density sensor (but certainly not to a Pt100). Speaking only for a density AMD (for a pressure AMD the same applies by analogy): The tests at only 3 density values as stated in the second paragraph do not seem to be sufficient when bearing in mind that the AMS can be used under various temperatures and pressures of the liquid, and especially when the measurand “density” is used for a conversion volume ↔ mass. Some kind of endurance test is missing (according to the design of the type). Test of checking facilities is missing. Functional test of compatibility (e.g. communication protocol) is missing.	Define tests - like in R117-2 for meters - at the limits of temperature and if necessary, pressure for a density AMD and at the limits of temperature for a pressure AMD.	A	Team 6 – Suggest Group Discussion Team 6 – Agree that more test points should be required and the test points should be evenly distributed over the measuring range of the device. Team 6 – disagree; Endurance test is not applicable based on table X.5.4.3 when comparing to a mass or Ultrasonic meter Discussed in Paris (text revised by Marc + team)
Austria	6.4.1	tech	The table is a mixture of measuring devices (sensor AMS + transducer AMT) and sensors AMS. For measuring devices and for sensors with a digital output the table 4.2 of R117-1 applies (which is identical with the lower part of this table), for measuring sensors (which provide an analog output) the table 4.3 of R117-1 applies (which is identical with the upper part of this table).	First column of table: substitute “analog device” by “sensor with analog output”, substitute “digital device” by “measuring device and sensor with digital output”. Make a reference to the tables 4.2 and 4.3 of R117-1.		Team 6 – Point no longer valid Table of requirements should be removed and referenced back to the part 1 document which was suggested above in the comments.
NL	6.4.1	Edit.	Last sentence not correct	Change the sentence: indicating device is are verified.		Agree
NL	6.4.1. table	Edit.		Delete un used rows. Insert line between “analog device” cell and “digital device” cells		Agree
SE	6.4.1	edit	Repeated text.	Delete the second sentence “The device is subjected to...”.		Agree
SE	6.4.1	edit	One word too much in the sentence before the table	Delete “are”.		Agree

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Austria	6.4.2	tech	Dry heat and cold test – testing <u>during</u> the dry heat and cold test: This test intends to examine the effect on the electronics and not on the measurand. But when electronics and sensor are combined they must be tested together, and then the electronics will show both effects.	Guidance should be given how to check which part of the observed changes can be contributed to changes of the sensor and which is caused by effects on the EUT's electronics for which this test is intended.		Team 6 – Suggest Group Discussion Disagree: then it is seen as a complete system and the total MPE is valid.
SE	6.4.2	tech	Missing test points	Add one test points (T, p, rho)		Team 6 – Agree Add the following sentence: “For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium, value is applied and evaluated”
SE	6.4.2	edit?	References to R117-1, Section 4.2 and 4.3 is not relevant?	Delete reference		Disagree: but change section to table.
SE	6.4.3	tech	Missing test points	Add one test points (T, p, rho)		Team 6 – Agree Add the following sentence: “For each of the applicable characteristics of the liquid (i.e. temperature, pressure, density, relative density, etc.) the medium, value is applied and evaluated”
SE	6.4.3	edit?	References to R117-1, Section 4.2 is not relevant?	Delete reference to 4.2		
Austria	6.5	tech	In 6.5 the EUT is only the temperature sensor. But please note that in Guide 10.4 (from which the requirement 6.5 comes) the EUT is not only the temperature sensor, but the EUT is also the flowcomputer plus the sensor or the flowcomputer plus the combination of the sensor and the transducer.	The sum of the response time of the flowcomputer + the response time of the sensor must fulfil the stated MPE.		Team 6 – Disagree with comment, the flow computer and other response times are an order of magnitude smaller that the PT100 response time.
NL	6.5	Gen		Delete “See also IEC 60751”		Agree

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Secretariat Note	7	Gen				<p>Team 7 (Jens and Gerhard) worked together to revise the entire text of Chapter 7.</p> <p>General consensus on Chapter 7 in Paris. Note will be added to address Phil's concern on Figure 1. Formal review on the revised Chapter 7 will be during the 2CD review.</p>
Austria	7	gen	<p>It is no progress at all to cancel R117:1995 Annex B, which has clear and comprehensive testing methods. R117-1 states the requirements and Annex B states the measuring means and procedures how to check these requirements. Annex B describes the measuring means generally and only specifically when it is necessary.</p> <p>Chapter 7 (of R117-2) puts the cart before the horse: Chapter 7 states specified measuring means (the author of 7 seems to refer to a special test bench) and requires tests with these specified means.</p> <p>But it can't be that R117-2 copies the design of a special test bench, but R117-2 shall give general guidance how a test bench should look like in order that correct tests on it are possible.</p>	Keep the text of R117 (1995) Annex B as far as possible. Modify Annex B only by information of the author of 7 which had not been yet contained in Annex B (see my comments below).	A	<p>Agree, limited to one test stand.</p> <p>Old text (from 1995) was much more general and applicable to numerous other test stands.</p> <p>More of the new text will be put into Annex X as only a suggestion.</p> <p>(See also several revisions made in the general text of Chapter 7.)</p>
NL	7	Gen.	There are no procedures mentioned for testing air separators used in fuel dispensers	Add procedure as described in R118 without the measurement of the air volume	A	<p>NL and CECOD worked on the resolution of this comment.</p> <p>Procedures added, see new Section 7.2.2.1 "Tests on Gas separators" and "Test procedure for fuel dispensers"</p>
NL	7	Gen.	The numbering of this section is not logical E.g. the sub articles 7.4.x.x do not really belong to the article 7.4 "Execution of the test"	Change numbering		Agree, whole chapter has been re-written

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CECOD FR Jean-Lu	7.2	Tech	"The capacity of the proving tank should be at least equal to the volume delivered in one minute at maximum flow rate of the EUT" This sentence is unnecessary since the requirement of uncertainty less than 1/5 MPE is achieved Error due to start and stop must be taken in account whatever the volume of the proving tank .	Suppress the sentence		"Where possible" added to the sentence. Phil OK Ok, this sentence shall give guidance and starts in the new doc, 7.2.1 with "As a general rule ...".
Austria	7.2	gen	The first 3 paragraphs of 7.2 are general, whereas the followings paragraphs refer to gas separators.	Keep the text of Annex B.1.1 (general provisions) as it stands (it also contains other useful information which is missing in 7.2, such as the adjustable non-return valve, no reverse gradient of the pipe). The second criterion of Annex B.1.1 for the volume delivered "1000 times the scale interval of the meter on the test bench" is missing in 7.2. Last paragraph of 7.2 about the usage of positive displacement meters is a necessary info, which is missing in Annex B The sight glasses of 7.2 is a necessary info, which is missing in Annex B.		adjustable non-return valve: missing in new doc; can be added, if desired reverse gradient of the pipe: ok, see new doc 7.2.1 missing in new doc; this or a similar requirement can be added, if desired ok, see new doc 7.1 ok, see new doc 7.2.1
Austria	7.2	tech	7.2 deals only with the injection method, performed by 2 reference meters, whereas Annex B.1.2 contains the injection method AND the suction method, and instead of the second reference meter of 7.2, any other reference measure may be used.	Keep the text of Annex B.1.2 (injection method AND suction method). Moreover, B.1.2 contains some useful hints for these 2 methods (these hints are not in 7.2).		ok, see new doc 7.2.1
NL	7.2	Techn.	4 th paragraph: For fuel dispensers the air intake takes place upstream of the air separator pump unit			ok, see new doc 7.2.2.1
JP	7.2	Tech.	Please insert the paragraph on the right column between the 4 th and 5 th paragraph.	<i>The gas/air is injected into the test liquid of the EUT...at atmospheric pressure. (4th paragraph)</i> <i><u>In a suction pump system for a fuel dispenser, gas/air is drawn into the test liquid at a point upstream of the pump. In this case, the pressure measurement can be omitted because the gas/air is drawn at the atmospheric pressure. (X10 Figure1)</u></i> <i>A sight glass has ... (5th paragraph)</i>		missing in new doc; will be added to new doc 7.2.1.1

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NL	7.3	Edit	Title not clear	Change to "Required test conditions"		ok, see new doc
NL	7.3 and 7.4	Gen.	It is not clear for which tests these clauses are applicable			ok, see new doc
SE	7.3	edit	One word too much.	Delete "of" in "...with a flowrate of greater than..."..		ok, see new doc
Slovenia	7.3	tech.	»The maximum additional error« is not properly defined. It is not clear what is the »basic« error to which this additional error is added. It is also unclear what is the total error (MPE in the case of liquid with gas): is it a sum of »basic« and additional error or something else.	Define the maximum additional error and the total MPE for the case of gas in the liquid.		ok, see new doc 7.1
			•	•		
Austria	7.4	tech	<ul style="list-style-type: none"> The test steps are accurately described. The test steps refer to the methods with 2 meters Z1 and Z2. 	<ul style="list-style-type: none"> Introduce 7.4 adequately into Annex B1.2. Also allow reference standards other than the meter Z2. 		ok, see new doc 7.1
SE	7.4	tech	Step 10 only valid for $Q_{max} > 20$ m ³ /h.	Add " and up to 100 % for $Q_{max} \leq 20$ m ³ /h.		ok, see new doc 7.2.1.1
CECOD UK Mike	7.4	Tech	Z1 and Z2 are not defined prior to 7.4. In any event measuring the inlet flow of liquid with Z1 seems superfluous since the liquid is dispensed into a scale/proving can. The prover can/scale should be used as the reference for the liquid dispensed as it will not carry the higher errors associated with a meter	Z2 is a meter used to measure the flow of air from the gas separator liquid outlet Delete Z1		ok, see new doc 7.2.1.1
CECOD UK Mike	7.4	Edit	V _p is PRINTED VOLUME V _m is MEMORIZED VOLUME. These are the wrong symbols. Probably best to compare V _s of the standard capacity measure against V _i the metered volume V _{air} should be symbol V _a	Test step 7. Read the volume dispensed from the prover can/scale V _s , and the measured volume V _s of Z2 Test step 9. Calculate the ratio V _a /V _s and the error (V _i -V _s)/V _s		ok, see new doc 7.2.1.1
CECOD UK Mike	7.4	Tech	Equation for the amount of added air is wrong. In any event the testrig measures V _a so why calculate it?	Delete section of calculating the amount of added air		ok, see new doc 7.2.1.1
JP	7.4	Tech.	Please add the following sentence to Test step 8. "(This step can be omitted for a suction pump system.)"	8. Calculate, with the help of the value of compressed air, the amount of air V _{air} at atmospheric pressure. <i>(This step can be omitted for a suction pump system.)</i>		missing in new doc; will be added to new doc 7.2.1.1

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JP	7.4 Test step 10	Tech.	Please describe Test step 10 in detail as shown in the right column.	Before: Repeat step 3 to 9 in several steps up to 30 %. After: Repeat step 3-9 by increasing the gas/liquid ratio. This procedure shall be terminated under the condition of either a) or b): a) when it covers the entire range of gas/liquid ratio V_{air}/V_p (up to 30 % for gas separators with a flowrate greater than 20 m ³ /h); b) when discharge stops automatically.		ok, see new doc 7.2.1.1
CECOD UK Mike	7.4	Tech	The results cannot be regarded as valid if the flowrate falls below the Qmin of the meter	Add in another step between 10 and 11 "Disregard any results where the flowrate of meter Z2 falls below Qmin of the meter"		missing in new doc, will be added to 7.2.1.1
Austria	7.4.1	gen	7.4.1 (test on gas extractors) is more detailed than Annex B1.3, but figures 2 and 3 of 7.4.1 are not as simple and general than fig.4 of Annex B1.3.	Use the simple and general fig.4 of Annex B1.3 as a base for the test procedure of 7.4.		ok, see new doc
Austria	7.4.1	tech	7.4.1, last paragraph deals with a slug air test, which is not a necessary test because it is covered by the air pocket test. Furthermore, the slug air test is not contained in Annex B.1.3.	Delete the slug air test		ok, see new doc
NL	7.4.1	Techn.	4 th paragraph: Where is the value 2 bar coming from?			ok, see new doc 7.2.1, note "If the liquid pressure is too high ..."
SE	7.4.1	edit	References incorrect?	Change figure 1 to figure 2 in the second paragraph Change figure 2 to figure 3 in the 8th paragraph		ok, see new doc
Slovenia	7.4.1.1	tech.	It is not clear what is the requirement for the gas elimination device: e.g. in the case of the class 0,5 system, is it 0,5% (MPE – as stated in the first paragraph), is it 1%, as stated in the second paragraph or is it 1,5% - as a sum of both.	Clarify and rewrite this section.		ok, see new doc 7.1
Austria	7.4.1.3	gen	7.4.1.3 (test on gas extractors, with air pockets) is more detailed than Annex B1.3, but should be explained more simple acc. to fig.4 of Annex B1.3	Use the simple and general fig.4 of Annex B1.3 as a base for the test procedure of 7.4.1.3.		ok, see new doc 7.2.1.2
Austria	7.4.1.4	gen	slug air test, which is not a necessary test because it is covered by the air pocket test. Furthermore, the slug air test is not contained in Annex B.1.3.	Delete the slug air test		ok, see new doc 7.2.1..3
SE	7.4.1.4	edit	Reference missing	Add reference to Figure 3? in heading		OK

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Austria	7.5	gen	7.5 strongly reflects the design of a special test bench, whereas R117-1995, B.1.4 is general.	Keep R117-1995, B.1.4 as it is and add all infos by the author of 7 not yet contained in R117-1995.		ok, see new doc 7.2.1..3
NL	7.5 to 7.10	Gen.	No such specific and in detail described type of testing equipment/installation shall be implemented as being required for performing a test. Description is too much detailed.	Move to the annex X-7 (informative Annex)		ok, see new doc 7.2.1
Austria	7.5.1	tech	Second paragraph: The interruption of the flow is not a necessary requirement for the special gas extractor.	Delete second paragraph		ok, see new doc 7.2.1..3
Austria	7.5.2 7.5.3	gen	Annex B.1.4 is more clear and simple.	Delete 7.5.2 and 7.5.3 and keep B.1.4 instead.		ok, see new doc 7.2.1..3 and 7.1
Austria	7.5.4 7.6.1 7.6.2	tech	The tests • “residual discharge from storage tanks (B1) and (B2)” • “empty compartment test” are questionable when the special gas extractor complies with the test of gas pockets.	Delete these 2 tests		NOT accepted. See tests in new doc, 7.2.1.4
NL	7.5.4, graph	Techn.	There is no requirement concerning a linear relation between % injected air and the error. The requirement only states a MPE of 0,5%, resp. 1,0% for a maximum air inlet of 5%.	Delete this new “requirement” of linearity between air inlet and error.		ok, see new doc 7.1
Austria	7.55 to 7.6.4	gen	7.55 to 7.6.4 refer to the scheme fig.3 which is a very special one (seems to be a manufacturer specific scheme). The description of the tests follows this special scheme.	The description of the tests shall be made general and simple as in Annex B1.4.		ok, see new doc X.7
NL	8	Gen.	The tests for self service devices described in this section are not in line with the WELMEC guide 10.7	Try to harmonize with EU test approach; to be discussed	A	To be discussed - harmonise with EU test approach; WELMEC guide is European, OIML is International
NL	8	Gen.	Climate tests (dry heat, cold and damp heat cyclic) and the vibration test are missing	Add tests 4.8.5, 4.8.6., 4.8.7. and 4.8.8		It is envisaged that the devices in Section 8 are DIGITAL and so these tests would not be considered applicable. Where the device is ANALOGUE then it is considered that this is addressed in a separate chapter, which would include tests 4.8.5, 4.8.6., 4.8.7. and 4.8.8
Austria	8.1	edit	Memory device is denoted by several different names.	Denote it only as “memory device” as in R117-1		Editorial

Country Code	Section	gen./ edit./ techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
Austria	8.1	tech	Electronic ancillary devices shall not only be tested for disturbance, but also for influence factors (possibly denoted in the text as "Environmental tests").	Mention influence factor tests		It is envisaged that the devices in Section 8 are DIGITAL and so these tests would not be considered applicable. Where the device is ANALOGUE then it is considered that this is addressed in a separate chapter, which would include tests 4.8.5, 4.8.6., 4.8.7. and 4.8.8
Austria	8.1	tech	Sentence "The testing laboratory shall ensure ..": The lab need not only ensure, but it shall actually perform the tests.	Change sentence into: "Electronic ancillary devices shall be tested for influence factors. The environmental conditions specified by the manufacturer shall be considered by the persons in charge of the tests; these conditions shall comply with the intended use of the device and be stated in the TEC."	B	It is envisaged that the devices in Section 8 are DIGITAL and so these tests would not be considered applicable. Where the device is ANALOGUE then it is considered that this is addressed in a separate chapter, which would include tests 4.8.5, 4.8.6., 4.8.7. and 4.8.8 N/A, R117-2 is "Test Procedures", the "requirements" should be in R117-1
SE	8.1 and 8.2	edit	Repeated text	Refer to 4.9.1.2 (battery powered), 6.1.3 (influence factors) and 6.1.4 (electronic disturbances) instead		OK - but needs consideration
Austria	8.2	edit	8.2 gives the impression that only disturbance test are necessary. The same applies to 8.3.1, 8.4.1, 8.5.1.	Mention influence factor tests	-	Influence factor tests to be mentioned where the device is ANALOGUE It is envisaged that the devices in Section 8 are DIGITAL
Austria	8.3	edit	First paragraph, second sentence: "The test <u>consists of</u> exposure of the EUT to .." is a bit misleading.	Change sentence into " <u>During the test</u> the EUT shall be exposed to ..."		Editorial
Austria	8.3	edit	second paragraph, first sentence:	Delete "from"		Editorial
Austria	8.3	edit	third paragraph: has nothing to do with testing	Put it into a remark or delete it		Editorial, change paragraph into "procedure" (and include relevant R117-1 reference)
Austria	8.3	tech	In the same way as it is done in 8.4 for memory devices, there shall be a guidance how the device is expected to react when it ceases to operate; see my remark on 8.4, fourth paragraph		B	N/A, R117-2 is "Test Procedures", the correct functioning is in the "requirements" of R117-1
NL	8.3	Techn.	2 nd sentence: tests are not only related to the power	Delete "power":EUT to the specified power environmental condition.....		Editorial

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NL	8.3	Techn.	2 nd sentence: "normal atmospheric conditions" is not defined	Change "normal atmospheric conditions" into "reference conditions"		Editorial
NL	8.3	Edit.	Rewrite 2 nd paragraph for readability reasons	When the printing device is tested separated from the measuring system or the simulator, these shall not be subject to the test conditions.		Editorial
SE	8.3	edit	Last paragraph concerning identification is a statement.	Rephrase to a requirement		Editorial, change paragraph into "procedure" (and include relevant R117-1 reference)
SE	8.3.1	tech	Missing test points	Add one test point (one printout)		Editorial, change paragraph into "procedure"
NL	8.3 /8.4	Edit.	Make the 1 st sentence of the last paragraph of 8.3 and 8.4 specific for a printer respectively memory device Moreover this last paragraph is written in the style of a note.	8.3 Note: The use of a recording device (printer or storage) makes sense only if the measurement result used for the transaction is printed, or recorded , together with some form of identification (e.g. time & date). 8.4 Note: The use of a recording device (printer or storage device) makes sense only if the measurement result used for the transaction is printed, or recorded , together with some form of identification (e.g. time & date).		Editorial, change paragraph into "procedure"
NL	8.3.1	Techn.	4 th paragraph only applicable if the printed value is compared with the indication of a calculator with pulse transmission to the device to which the printer is connected	Replace the paragraph by the R 137-1 (5.10.1.3) paragraph.		Editorial
Austria	8.4	edit	First paragraph, second sentence: Same as for 8.3, first paragraph, second sentence			Editorial
Austria	8.4	edit	third paragraph: has nothing to do with testing	Put it into a remark or delete it		Editorial
Austria	8.4	tech	Fourth paragraph: "if the recording device ceases to operate ...": For influence factors and for disturbances the reaction of the device shall be as in R117-1, 4.1.1, 4.1.1.1 and 4.1.1.2	Either delete this sentence or give a remark concerning the reaction of the device acc. to R117-1, point 4.	B	N/A, R117-2 is "Test Procedures", the correct functioning is in the "requirements" of R117-1
SE	8.4	edit	Paragraph concerning identification is a statement.	Rephrase to a requirement		Editorial, change into "Procedure"

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NL	8.4.1	Techn.	Maximum deviation is missing (see also 8.3.1)	Add the R 137-1 (5.10.1.3) paragraph (same as for 8.3.1) to this paragraph		N/A, e.g.: R117-1 10.1.3 The primary indications on indicating devices and printing devices of the self-service arrangement shall not indicate any mutual differences. {e.g. R76-1 D.1.2.1 Fraction of error limits Digital data processing devices, terminals and digital displays are purely digital modules. For these modules, the fraction is $p = 0.0$ of the maximum permissible error of the complete instrument it is intended to be used with.
SE	8.4.1	tech	Missing test points	Add one test point (one storage and one restoring)		Editorial
Austria	8.5	edit	second paragraph, second sentence: Same as for 8.3, first paragraph, second sentence			Editorial
SE	8.5.1	tech	Missing test points	Delete 8.5.1 Add a reference in 8.5 to 6.3-6.5, replacing “indicated value” with “output value” from ECD		Editorial For ANALOGUE device add reference to 6.3 – 6.5, replacing “indicated value” with “output value”. For DIGITAL device only limited tests are necessary as ECDs do not contribute to measured value
SE	A.1	edit	Test procedures for blend dispensers missing. Flow range for blend dispensers at least 1:5.	Add note: Blend dispensers not yet included	A	Agree, missing from the document. See edited text.
SE	A.1	edit	Clarify text	Add “test reports” in “When....type approval documentation/test reports/drawings...”.		Agree

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Austria	A.2	tech	Bullet 4 - - non return valve configuration ... This testing is not a matter of testing the meter. Back flow must not occur at all because of R117-1, 2.13.4 ("A measuring system in which the liquid could flow in the opposite direction to that of normal flow when the pump is stopped shall be provided with a non-return valve,, when reversal of the flow could result in errors greater than the minimum specified volume deviation.")	Delete bullet 4		Team A: 4 th bullet is converted to a comment "During meter testing, system implemented to cope with reverse flow shall be assessed, and recorded in type approval file (description of solution, eg: combination of non-return valve and/or reverse pulse counting)"
NL	A.2, B.2	Techn.	Re-edit the 4 th bullet	4 th bullet: "Non return valve configuration or reverse count detection		Same as above
SE	A.4	edit	Reference missing	Add reference to Figure 1 in Annex X.10		Agree
CECOD NL Hans	Annex A A.4	Tech	Additional requirements A.4	Test procedure special for fuel dispensers. <ul style="list-style-type: none"> • Determine the measuring points. (Typical meter for fuel dispenser is, 4- 40 lpm, or 4 – 80 lpm) • Adjust the flow to the found measuring points, flow regulated by air inlet. • Repeat measuring points without air inlet, flow regulated by valve. • Stop test when there is 10 seconds no flow, because of air inlet. • No measuring point below 10% of lowest maximum flow. Important: Every measurement must start with the air inlet closed, the hose full and pressurized!	A	Team A: See below response on CECOD UK Mike proposal

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CECOD UK Mike	Annex A A.4	Techn	Additional requirements A.4 on gas separation	<p>Test procedure special for fuel dispensers.</p> <ul style="list-style-type: none"> Determine the flowrates through meter Z2 associated with the measuring points. There shall be no measuring points below the Q_{min} associated with the meter Z2. (A typical meter for a fuel dispenser will have a flowrate range of 4- 40 lpm, or 4 – 80 lpm) Commence tests with maximum liquid flow. Then introduce air and adjust the flowrate through meter Z2 to the measuring points above, regulating the flow using the air inlet throttle valve. Follow the test procedure of section 7.4 <p>Important: All measurements must start with the air inlet closed, and the hose full and pressurized.</p> <ul style="list-style-type: none"> Stop the tests if there is >10 seconds no flow Perform meter accuracy measurements at the flowrates associated with the measuring points, without air, regulating the flow using the flow control valve. Results shall take into account the meter accuracy curve. 	A	Section heavily edited.
Czech Rep	A.6.2	tech	There is insufficient description of the necessary tests of the complete fuel dispenser during the type approval and first verification (see OIML R118)	It is important to test complete fuel dispenser at least accuracy at Q_{min} , Q_{max} , MMQ, also the flow interruption (A.6.1). It shall be described similar way as in Annex B.		Section heavily edited.
Austria	A.6.2	tech	Following R118 the variation in the internal volume of full hoses shall be tested. The corresponding MPE is in R117-1, 2.15. There is no link in R117-1 between the MPE for hose variation and 5.1.14 (increments of registration at the beginning of the delivery).	For the MPE of hose variation refer to R117-1, 2.15. Delete the sentence “The hose dilation and vaporization quantity ...”.		See above
JP	A.6.2	Edit.	The cited clause “R117-1-5.1.14” is a misprint. Please show us the correct clause.	Wrong: <u>R117-1-5.1.14</u> Correct: Please show us the correct clause.		Text of 5.1.14 extends to next page. That is the important part here

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SE	A.6.3	tech	More functionalities to be tested	Add: several customers on a multihose dispenser, several hoses used by one customer simultaneously, influence of vapour recovery (may be included in checklist in R117-3)	B	Team A: Disagree with comment Several hoses cannot be used simultaneously by one customer unless they are separate instruments (with own display) Vapor recovery influence is tested in A.6 new proposal from Team A
USA (MB)	Annex A A.6.3	Gen.	Second bullet requires fuel dispensers have temperature compensation functionality tested. Not all jurisdictions require temperature compensation.	Add "(where required)" to the end of this bullet.		Team A: Agree, put in A.6 proposal from Team A
CECOD Jens	B1, B6		The general information in B.1 are not enough. It should be written under B.6	These tests are not necessary if all parts (meter + gas separator) are successful separately tested.		Agree, moved to new initial verification section B3
SE	B.1	edit	References missing	Add references also to section 6 and 8 in the 4 th paragraph		agree
SE	B.1	edit	One word too much in the last sentence in the 4 th paragraph	Delete "if".		Agree, deleted
Austria	B.2	tech	Same as A.2			Agree, moved to new initial verification section B3
Austria	B.6.1 B.6.2	tech	This is about testing the gas elimination device (GED) under other conditions than in R117:1995, Annex B. The first question is whether these 2 tests are necessary ones when the GED has passed the air pocket test on the test bench (air pocket \geq MMQ). Are there any test results on road tankers (which passed the air pocket test but failed one or both of these 2 tests), which justify such tests ? If YES then the second question is how representative these 2 test on a specimen during type approval are for the road tankers during verification (their piping and chamber shapes etc. will in each case be somewhat different from the specimen and therefore the conditions of flow, which have an impact on the GED, might be somewhat different from the specimen).	Put these tests into the future tests for initial verification. By doing so, the GED is tested individually on each measuring system (and not only on a specimen).		Agree, moved to new initial verification section B3
NL	B.6.1	Gen.	Alternative methods are missing	Add: Alternatively a weighing instrument may be used to perform the tests		Agree, but text should be added in the general section

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SE	B.6.1	edit	One "full stop" too much.	Delete the "full stop" after flowrate in the first sentence.		Agree, deleted
DE Thomas	B.6.3	Gen	Variation in the internal volume of the hose (full hose measuring systems only): a) In case of unknown hoses (hose to be put on site of use), test may be performed at putting into use b) a simple version for test shall be suggested (details later) Process: switch on high resolution on counterhead, open nozzle, close nozzle, start measuring and pump up hose, stop measuring, read volume of "pump up"		B	a) agree, moved to new initial verification section b) Do not agree Alternative test methods are covered by the sentence "Alternative test installations with similar performance may be used."
Austria	B.6.3	tech	Test procedure: Road tankers usually have a MMQ ≥ 200 L, thus the MPE (acc. to R117-1, 2.15 for the hose on a reel) is $\geq 2 * E_{min} = 4$ L. For determining such a big MPE = 4 l, the test procedure and the test facility is too complicated. For fuel dispensers, we have quite smaller MMQs (e.g. 2 liters, 5 litres), but nevertheless we check the hose variation in X.A.6.2 by a much more simple method.	State that the given procedure is an example how to perform the test and that alternative methods are acceptable, following X.A.6.2, such as: Pressurize uncoiled hose (thus yielding the max hose variation), then coil the hose on the reel with open valve (thus yielding the minimum hose variation after the max hose variation), uncoil the hose again (which is now depressurized at its maximum), reset the indication and start the pump with closed nozzle, read the offset of indication from zero, thus giving the volume of maximum hose variation.	B	Do not agree Alternative test methods are covered by the sentence "Alternative test installations with similar performance may be used."
CECOD DE Jens	B.6.3		If the length, quality, type, brand, length etc. cannot be defined because the type differs from the application, the variation of the hose volume has to be tested during the first verification of each measuring system	Alternative, if the hose is not defined for type approval testing and data from former installations are not available the variation of the hose volume has to be tested during the first verification of each measuring system.		Agree, moved to new initial verification section B3
Czech Rep	B.6.3	tech	This procedure is the same for more kind of measuring systems (see Annex A, B, D, E and G)	Description of this procedure shall be either copied to other annexes, or be moved to Annex X (Interpretation)		Agree, should be copied to other sections as applicable
SE	B.6.3	tech	Test procedure for hose reel missing.	Add for hose reel: difference in internal volume between coiled without pressure and uncoiled with pressure		Do not understand this comment

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DE Thomas	B.6.4	Gen	Complete emptying of the hose (empty hose measuring system only): In some cases, cannot be performed at type test (except using blow down)		B	Agree, moved to new initial verification section B3
Austria	Annex X.5	tech	Advice to chapter 5 concerning the meter types Meter curve, ultrasonic flowmeters The acoustic damping of the liquid: Whereas for the other effects, the reasons for the effects are well known and the test person can cope with them adequately, for the acoustic damping a hint is missing where the effect comes from and how to cope with that.	State that damping may occur at high viscosities and that damping is proportional to the square of the signal frequency f .		OK. Add under acoustic damping:: Damping may occur at high viscosities and is proportional to the square of the signal frequency f .
SE	X.5	edit	Improve text Incorrect spelling	Change “possibly” to “frequently” under Low-Flow-Cut-Off Change “to” to “too” under Ultrasonic meters		OK
NL	X.5.3.4	Techn.	Change sentence in the 2 nd bullet	Change the 2 nd bullet as follows”.....and two elbows out of plane upstream of”		Change to: two elbows out of plane upstream the EUT;
SE	X.5.4	edit	Numbering incorrect	Change to X.5.3		OK
USA (MB)	Annex X X.5.4	Edit.	Unclear whether this is advice for Section 5.3 or 5.4.	Verify that numbering of this section matches the intended content of Section 5.		Change to X.5.3
Canada	x.5.4.3	tech	The table list mass flow meters, is this meant to include all types of mass flow meters or just coriolis meters ? Although viscosity, orientation and flow profile may affect the performance of coriolis effect mass flow meters, the effect of these influence factors are usually assumed to be small in relation to the meter tolerance. The table list all these as factors as important. The text in section x5.4.3 mentions that mass flow meters are not sensitive to viscosity and then further in the section that they may be sensitive to very high viscosity. For magnetic flow meters, the effect of the product Reynolds number or viscosity is usually assumed to be small in relation to its tolerance. This is contrary to the table and the text under “meter curve , electromagnetic flowmeter” I would suggest that turbine meter be tested over a Reynolds number range that is representative of the rated flow rate and viscosity range.		B	Change table from mass flow to coriolis. Change table for Coriolis to: viscosity no, orientation no, profile no. Add text in advice concerning meter types. Change table for Mag to: viscosity no Agree to test turbine meter over a Reynolds number range that is representative of the rated flow rate and viscosity range. Add text in advice concerning meter types.

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Austria	X.5.4.3	tech	Table <ul style="list-style-type: none"> Mass Flow – Temp amb: rather “n” (the effect of Temp Liq is certainly much higher than Temp amb) Mass Flow – Flow Profile: rather “n” (the ingoing flow profile is distorted anyway by the change of pipe diameter to meter diameter; a disturbed ideal flow profile has normally no numerable effect). 	<ul style="list-style-type: none"> Change to “n” Change to “n” 	B	Agree, add text in advice concerning meter types, concerning temperature difference between ambient and liquid.
Austria	X.5.4.3	tech	First paragraph: The example with the mass flow meter and its test at the limits of viscosity is not a good example because acc. to the table, the meter technology is affected by viscosity.		B	Change table for Coriolis to: viscosity no. Add text in advice concerning meter types, concerning very high viscosities
NL	X.5.4.3.	Gen.	Change some values in column “Mass flow” in the table	Reynolds/Viscosity N** Flow profile N ** Only at extreme low Reynold numbers Coriolis meters will be influenced	B	OK, but text will be in advice concerning meter types
NL	X.5.4.3	Gen.	The formulation in X 5.4.3 (continued) is such that it could be misinterpreted	Reformulate		Inherited from R117-1
SE	X.5.4.3	edit	Numbering incorrect	Change to X.5.3.3, also for (continued)		OK
SE	X.5.4.3	tech	PD meters are sensitive to temperature (but fairly predictable). I do not understand the note *unless outside the prescribed range (normal use). Does this refer to -5 to +35 °C?	Change n to y in the table for P.D. Clarify note.		OK for change in table Delete note
USA (MB)	Annex X X.5.4.3	Edit.	X.5.4.3 advice section X.5.4.3 is intended to provide advice on section 5.3.3.	Renumber X.5.4.3 with X.5.3.3 in both places.		OK
USA (MB)	Annex X X.5.4.3	Edit.	Title below table has an extra word “the” inserted	Remove first “the” from “Table showing the whether the meter”		OK
USA (MB)	Annex X X.5.4.3	Gen.	Table uses upper and lower case “y”, “Y”, “n”, and “N” without defining the meaning of the lower case symbols.	Add a to the legend definitions for lower case “y” and “n”.		Use lower case n and y everywhere
USA (MB)	Annex X X.5.4.3	Techn.	Unclear what is meant by listing “zero flow” as an operating condition that affects meter technology. How would you explain a range or an extreme of “zero flow”?	Remove “Zero Flow” row from table.	B	No, it is not a range, it is if a meter displays a flow rate at no flow condition. Change text in table to “Indication at zero flow”.

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USA (MB)	Annex X X.5.4.3	Techn.	Some designations are incorrect within the table for PD and Mass flow.	PD: Pressure should be “some”; Mass Flow: Temp amb=n, Temp Liq=n, PressLiq=some, Reynolds/visc=some, Density= some, Orientation=n, Flow Profile (dist)=n, External vibration=some	B	PD: no change, add text in advice concerning meter types Coriolis: Temp amb=n agree, Temp Liq=n no change, PressLiq=some change to no, add text in advice concerning meter types, Reynolds/visc=some change to no, add text in advice concerning meter types, Density= some change to no, Orientation=n agree, Flow Profile (dist)=n agree, External vibration=some change to no
SE	X.5.4.3	tech	Mass flow meters are sensitive to viscosity (at high viscosities).	Delete “..a mass flow meter at the limits of viscosity or..” in the first paragraph on page 97.		Text from R117-1, no change
SE	X.5.7	edit	Numbering incorrect	Change to X.5.6.3 in first headline Change to X.5.6.3.1 for influence tests type A Change to X.5.6.3.2 for influence tests type B		OK
USA (MB)	Annex X X.5.7	Edit.	No Section 5.7 to correspond with X.5.7	Change number of X.5.7 to match intended section (5.6?).		Change to 5.6.3, 5.6.3.1 and 5.6.3.2
USA (MB)	Annex X X.5.7	Techn.	Under Low-Flow-Cut-Off on page 99 of 113, the advice is given to set the low-flow-cut-off to zero “during most performance tests”. This is not recommended use for many meters, and the manufacturers recommendations on how to use the meter properly should be adhered to. Setting the low-flow-cut-off to zero during performance tests (ESPECIALLY flying start/stop tests) will often result in erroneous results because the test method may not account for the uncharacteristic meter configuration.	Remove all text including and after the words “During testing, in most cases, it is desirable...”	B	Change performance test to influence and disturbance tests. See also **Comment from Keilty
NL	X.A.6.1	Gen	Alternative methods are missing	Add: Alternatively a weighing instrument may be used to perform the tests	A	Discussed in Paris
Austria	X.A.6.2	tech	<ul style="list-style-type: none"> In steps 1) and 10) the text “hose dilation” is used, but meant is “increments of registration at the beginning of the delivery” acc. to R117-1, 5.1.14. Step 5) MPE for MMQ is defined as Emin. Steps 7) to 10) test the hose variation and whether the set increments of registration at the beginning of the delivery are ≤ Emin, but there is no MPE foreseen for that test in R117-1. 	<ul style="list-style-type: none"> Change accordingly Change accordingly Either delete steps 7) to 10) or introduce a corresponding requirement in R117-1. 	B	See edits in text.
SE	X.A.6.2	tech	Hose reel not considered	Step 3: Add “uncoil the hose in case of hose reel”		OK
NL	X.A.6.3	Gen.	Third bullet	“Electronic calibration” is to be defined		OK

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USA (Keilty)	X	gen	Annex X takes strong points against electronic metering devices. The section addresses “Coriolis” separately from “mass flow meters” as described in the body of R117.	Add influence factors and testing advice and special testing requirements for PD and turbine flow meters.		Mass flow meter is changed to Coriolis. Chapter 5 only concerns the flow measuring part, not a mass flow meters consisting of a volume + density. Advice will be added for PD and turbines.
USA (Keilty)	X	Tech	<p>Table</p> <ol style="list-style-type: none"> 1. Mass flow is not affected by ambient temperature. 2. All flow meter electronics may be affected by extreme ambient temperatures. 3. Coriolis measurement is not affected by liquid temperature. 4. Mass flow from PD, turbine, ultrasonic, magnetic with density measurement may be affected by liquid temperature. 5. Mass flow is not affected by liquid pressure. 6. All flowmeter measuring chambers may be affected by changes in liquid pressures. 7. Mass flow, ultrasonic and mag not affected by Reynolds/viscosity. 8. PD, turbine, ultrasonic and mag may be affected by Reynolds number and viscosity influences as the influences impact flow profile. 9. Coriolis mass flow measurement is not affected by density. 10. Mass flow from PD, turbine, ultrasonic, magnetic with density measurement is affected by density. 11. Mag flow is not affected by conductance. There is a low conductivity limit for magnetic flowmeters by design. 12. Coriolis is not affected by orientation. 13. Mass flow from PD, turbine, ultrasonic, magnetic with density measurement may be affected by orientation. 14. Coriolis is not affected by Flow Profile (disturbed) 15. Mass flow from PD, turbine, ultrasonic, magnetic with density measurement may be affected by Flow Profile (disturbed) 16. Ultrasonic is not affected by Zero Flow 17. Mag is not affected by Zero Flow 18. All devices may be affected by vibration 19. All devices may be affected by endurance 		A	<ol style="list-style-type: none"> 1. Effected by difference between ambient and liquid.add text in advice concerning meter types, 2. True 3. False 4. Not applicable 5. True for most models 6. Yes, in extreme cases 7. Not true for ultrasonic 8. PD and turbine directly dependent on viscosity, ultrasonic and mag indirectly by flow profile 9. True 10. Not applicable 11. True, change text in advice concerning meter types 12. Probably not, if zero point adjusted after change of installation 13. Not applicable 14. True for most models, but not all! 15. Not applicable 16. Usually not, but in theory (from R117-1) 17. Usually not, but in theory (from R117-1) 18. Maybe broken, but not misreading. Coriolis is sensitive in theory, but not in practice, add text in advice concerning meter types. 19. Only meters with moving parts! Table reviewed in Paris

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USA (Keilty)	X	tech	<p>Also keep in mind that in some liquids, bubbles will appear for example by dissolving air. Especially when testing ultrasonic flowmeters, this could cause ultrasonic signals to be interrupted, which is an undesired effect.</p> <p>This text does not provide the reader with guidance. Gaseous voids cause measurement interruption in all electronic metering devices. Gaseous voids cause inaccuracies in all measurement technologies. Bubbles are commonly present in flowing liquid streams. The threshold of bubbles to voids is difficult to define.</p>	<p>Change text</p> <p>Gaseous voids in a liquid stream cause measurement interruption in all electronic metering devices. Gaseous voids cause inaccuracies in all measurement technologies.</p>		<p>Change text to: Also keep in mind that in some liquids, bubbles will appear for example by dissolving air. Gaseous voids in a liquid stream cause measurement interruption in all electronic metering devices. Gaseous voids cause inaccuracies in all measurement technologies.</p>
USA (Keilty)	X	tech	<p>Ambient temperature tests for ultrasonic flowmeters:</p> <p>Ambient temperature tests for electromagnetic flowmeters</p> <p>Ambient temperature tests for Coriolismeters:</p> <p>As stated, the topic changes from ambient temperature influences to meter body temperature. The issue here is isolating the temperature influence.</p>	<p>Change text</p> <p>An electronic flowmeter may be fitted with an internal temperature transmitter to perform corrections for changes in the meter body dimensions due to temperature expansion and contraction. Temperature influences on EUTs electronic signal processor must be isolated from the temperature tests which are conducted on the measuring chamber.</p>		OK
USA (Keilty)	X	tech	<p>Ambient temperature tests for Coriolismeters:</p> <p>When one pickoff coil is connected in parallel to both applicable inputs, the mechanical effect of temperature changes is eliminated.</p> <p>This may not be true for all Coriolis flow meters.</p>	Delete text		Change preceding text to: “.can be eliminated in most meter models. ”

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USA (Keilty)	X	tech	<p>Low-Flow-Cut-off Possibly in electronic meters a so-called low-flow-cut-off is installed. This feature will consider flowrates below this value not be a measurement. Once a flowrate higher than this value is registered, will the flowrate (without subtraction of the low-flow-cut-off value) be registered as a measurement. During testing, in most cases, it is desirable to see all flow indications, even if below the normal low-flow-cut-off value. Therefore, during most performance tests the low-flow-cut-off should be set to zero. Please note that in practice an indication other than zero is needed during testing. Generally the value in practice depends on the zero-stability of the meter, the minimum measured quantity of the complete measuring instrument / system and the application itself.</p> <p>Needs clarification.</p>	<p>Change text</p> <p>Low-Flow-Cut-off Electronic flowmeters meters have a programmable noise filter which prevents false totalizer incrementation when there is no flow. This feature called a low-flow-cut-off or no-flow-cut-off. Flow rates below this value are not indicated and are not totalized. When the flow rate increases from zero and beyond the programmed setting, the flow rate and totalization indication will begin.</p> <p>In practice, flow indications below the normal low-flow-cut-off value are a part of the overall error of the flow meter.</p> <p>Please note that during testing at low flow rates near the flow meter minimum flow rate or when performing a minimum measured quantity test, the error may be larger than that determined at other flow rates. The flow meter may need to be re-zeroed in order to reduce these errors.</p> <p>The low-flow-cut-off setting is often set during the manufacturing process and is never adjusted. The value depends on the zero-stability of the meter. Manufacturers typically program the low-flow-cut-off at a value of less than 0.5% of the flow rate range of the meter. A manufacturer may provide an indication menu to view the flow rate “noise” at zero flow. A manufacturer may be consulted as to the requirements of zero setting.</p>	B	<p>**</p> <p>1st proposed paragraph: OK. 2nd proposed paragraph is not included 3rd proposed paragraph is modified to: Please note that during testing at flow rates near the flow meter minimum flow rate or when performing a minimum measured quantity test, the error may be larger than that determined at other flow rates. Make sure the flow meter is re-zeroed if required according to installation instructions, in order to reduce these errors. 4th proposed paragraph is modified to: The low-flow-cut-off setting is often set during the manufacturing process and is (for mag meters and ultrasonic meters) never adjusted. The value depends on the zero-stability of the meter. Manufacturers typically program the low-flow-cut-off at a value of less than 0.5% of the flow rate range of the meter. A manufacturer may provide an indication menu to view the flow rate “noise” at zero flow.</p>
USA (Keilty)	X	tech	<p>Meter curve, electromagnetic flowmeters Meter performance of an electromagnetic flowmeter is typically determined by the electric conductivity of the liquid and the flow profile.</p> <p>This is not correct.</p>	Delete text		Change text to: Meter performance of an electromagnetic flowmeter is typically determined by the flow profile.

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USA (Keilty)	X	tech	<p>Meter curve, ultrasonic flowmeters Gas bubbles and solid particles: If the flow is interrupted quickly enough, the effect of gas bubbles and/or solid particles can be reduced to acceptable proportions.</p> <p>There is not enough information to resolve the problem. Is this a fault alarm that initiates the shutdown? How is the “effect...reduced”?</p>	Delete text		Modify text: If the detection of bubbles is used as a “gas elimination device”, specific tests is necessary to prove that effects are within acceptable limits (R117-1, chapter 2.10).
USA (Keilty)	X	tech	<p>Meter curve, ultrasonic flowmeters Gas bubbles and solid particles: The sensitivity of an ultrasonic meter to gas bubbles and/or solid particles will depend on many factors. Therefore, specific tests would need to be done to prove that effects are within acceptable limits.</p> <p>There is not enough information to resolve the problem. The reader is given no recommendations.</p>	Delete text		Modify text: If the detection of bubbles is used as a “gas elimination device”, specific tests is necessary to prove that effects are within acceptable limits (R117-1, chapter 2.10).
USA (Keilty)	X	tech	<p>Meter curve, Coriolis meters Typically liquid density and/or liquid pressure may have an effect on the device’s metrological characteristics.</p> <p>Not a correct statement. Liquid density is a metrological influence for PD, turbine, ultrasonic and magnetic meters which use a density measurement to calculate mass flow. Liquid density is a metrological influence for Coriolis meters which use a density measurement to calculate volume flow.</p> <p>Changing liquid pressure may influence all types of flowmeter.</p>	Delete text		Modify text: Liquid density and/or liquid pressure have usually no effect on the device’s meter curve, only in extreme situations.

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USA (Keilty)	X	tech	<p>Meter curve, Coriolis meters Installation effects on Coriolismeters: The meter's installation dependent zero setting affects the metrological behaviour of the device. Therefore it must be checked that the zero setting is correct, once the device is installed. The documentation, manuals, Type approval certificate must state when zero setting must be performed (for example when the installation has been disturbed, change of liquid, change of temperature).</p>	<p>Edit for clarity</p> <p>A Coriolis meter may have an installation dependent zero setting which could affect the metrological behavior of the device, depending on the flowmeter design. Therefore the flow meter zero may need to be checked or adjusted once the device is installed. The documentation, manuals, must state when zero setting must be performed (for example when the installation has been disturbed). The type approval certificate should state that the meter shall be sealed to prevent adjustment of the zero.</p>		Proposed text modified to: A Coriolis meter may have an installation dependent zero setting which could affect the metrological behavior of the device, depending on the flowmeter design. Therefore the flow meter zero may need to be checked or adjusted once the device is installed. The documentation, manuals, must state when zero setting must be performed (for example when the installation has been disturbed). The type approval certificate should state if the meter shall be sealed to prevent adjustment of the zero.
USA (Keilty)	X	tech	<p>Coriolis sensor: All Coriolismeters basically consist out of two sensors: one flowsensor (usually consisting out of one or two parallel measurement tubes) and a temperature sensor for the benefit of performing temperature corrections on the vibrational properties of the flowsensor.</p>	<p>Change text:</p> <p>Coriolis flow meters are designed and constructed of either a single flow tube or two parallel flow tubes. A temperature sensor is attached to the external surface of the tube to adjust for the change in tube stiffness with changing liquid temperature.</p>		OK
USA (Keilty)	X	tech	<p>Coriolis sensor:</p> <p>The primary measurement signals of a Coriolismeter are the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> a time difference related to the mass flowrate through the flowsensor <input type="checkbox"/> a resonant frequency related to the density of the liquid in the flowsensor <input type="checkbox"/> a resistance related to the temperature of the measurement tube(s) <p>Temperature is not a primary measurement.</p>	<p>Change text:</p> <p>The primary measurement signals of a Coriolis flow meter are the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> a time difference related to the mass flow rate through the flow tube, and <input type="checkbox"/> a resonant frequency related to the density of the liquid in the flow tube. 		OK

Country Code	Section	gen./ edit./ techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
USA (Keilty)	X	tech	<p>Coriolis sensor:</p> <p>The measurement tube(s) is/are set into motion (a sinusoidal vibration) by means of an alternating current through one or more so-called drive coils. The movement of the measurement tubes is detected using at least two pick-off coils. In principle these coils are considered to be electronic components, thus making a Coriolis flowsensor an electronic device, on which the applicable performance tests need to be performed.</p> <p>However, the measurement tubes themselves are purely mechanical components. Only when it is proven that these coils are sufficiently insensitive to the effects of the test conditions, is it allowed not to submit the Coriolis flowsensor to influence/disturbance tests.</p>	<p>Change text:</p> <p>The flow tube(s) is set into motion (a sinusoidal vibration) by means of a signal from the controlling electronics through one or more so-called drive coils. The movement of the flow tubes is detected using at least two coils mounted on the flow tube.</p>		<p>OK to proposal.</p> <p>Keep :Only when it is proven that these coils are sufficiently insensitive to the effects of the test conditions, is it allowed not to submit the Coriolis flowsensor to influence/disturbance tests.</p>
USA (Keilty)	X	tech	<p>Density measurement:</p> <p>In principle all Coriolismeters perform both a mass flowrate and a density measurement.</p> <p>Both the mass and/or the volume of liquid can be the bases for the measurement transaction. If so desired by the applicant, both the mass and volume output of the equipment under test can be tested against legal requirements. In the case of a Coriolismeter, volume is calculated from measured mass and measured density. So once it is determined that the calculation of volume operates correctly, verification of the mass and density determination suffices to guarantee the correctness of the Coriolismeter's mass and volume outputs.</p>	<p>Change text:</p> <p>Coriolis mass flow meters measure the mass flow rate and density measurement and density of the liquid. The mass flow is measured directly. The Volume flow of the liquid can be calculated from the mass flow rate and density to determine the quantity of the transaction. The applicant may submit the Coriolis mass flow meter for both mass and volume approval against legal requirements.</p> <p>PD, turbine, ultrasonic or magnetic flowmeter systems which use a density measurement to determine mass flow must similarly be tested.</p>		<p>Proposed text modified to: Coriolis mass flow meters measure the mass flow rate and density of the liquid. The mass flow is measured directly. The volume flow of the liquid can be calculated from the mass flow rate and density to determine the quantity of the transaction. The applicant may submit the Coriolis mass flow meter for both mass and volume approval against legal requirements.</p> <p>:</p>

Country Code	Section	gen./ edit./ techn.	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE SECRETARIAT (on each comment submitted)
USA (Keilty)	X	tech	<p>Effect of liquid properties: Some Coriolismeters may be affected by the density of the measurand, in which case the meter curve will shift dependent of the liquid density. Extremely high liquid viscosities also may have an effect. This is thought to be caused by the liquid absorbing the vibrational energy of the measurement tubes, thus reducing the amplitude of the vibration. In extreme cases such a reduction will cause the measurement signals to become too small for correct processing. Such effects occur especially when the flow is started.</p> <p>Not correct.</p>	<p>Effect of liquid properties: PD, turbine, ultrasonic and magnetic flowmeters using density measurement to calculate mass flow may be affected by the density of the liquid whereby the meter curve will shift dependent of the liquid density.</p> <p>Extremely high liquid viscosities also may affect all flowmeter technologies measurement performance. Highly viscous liquids tend to trap air thus creating increasingly larger volume measurement errors, density measurement errors. Turbine, ultrasonic and magnetic flow meters may be affected changes in the flow profile because highly viscous liquids create greater pressure drops and influence the flow rate. Ultrasonic flowmeters may be affected by the scatter if the signal traversing the flow tube. Coriolis flow tubes may have difficulty vibrating..</p>	B	<p>Proposed text modified to: Extremely high liquid viscosities also may affect all flowmeter technologies measurement performance. Highly viscous liquids tend to trap air thus creating increasingly larger volume measurement errors, density measurement errors. Coriolis flow tubes may have difficulty vibrating.</p> <p>To be included in other paragraphs: Turbine, ultrasonic and magnetic flow meters may be affected by changes in the flow profile. Ultrasonic flowmeters may be affected by the scatter from the signal traversing the flow tube.</p>
SE		gen	Bibliography is missing			Will be added (part of R117-1)

Table USA – Section 4.9.8

Annex A

Proposed Format Change for Table in Paragraph 4.9.8

CURRENTLY SHOWN

Test severities:		The following severity level shall be specified:	Unit
Voltage dips	Severity level	1 (test applicable only to E2 environments)	
	Test levels	40 and 70	% of the rated voltage
	Duration	0.1	s
Short interruptions	Test condition	High impedance and/or low impedance	
	Test levels	0	% of the rated voltage
	Duration	0.01	s
Voltage variations	Severity level	1	
	Test level	85 and 120	% of the rated voltage
	Duration	10	s
Notes:		1) If the EUT is tested for short interruptions, it is unnecessary to test for other levels of the same duration, unless the immunity of the equipment is detrimentally affected by voltage dips of less than 70 % of the rated voltage. 2) This test is only applicable to equipment powered by DC mains supply and is not applicable to equipment powered by a road vehicle battery.	

PROPOSED CHANGE

Test severities:		The following severity level shall be specified:	Unit
Severity level		1 (test applicable only to E2 environments)	
Voltage dips	Test levels	40 and 70	% of the rated voltage
	Duration	0.1	s
Short interruptions	Test condition	High impedance and/or low impedance	
	Test levels	0	% of the rated voltage
	Duration	0.01	s
Voltage variations	Test level	85 and 120	% of the rated voltage
	Duration	10	s
Notes:		1) If the EUT is tested for short interruptions, it is unnecessary to test for other levels of the same duration, unless the immunity of the equipment is detrimentally affected by voltage dips of less than 70 % of the rated voltage. 2) This test is only applicable to equipment powered by DC mains supply and is not applicable to equipment powered by a road vehicle battery.	