All International Comments (Non-editorial) **International Comments on the First Committee Draft (1CD) of OIML R 117** "Measuring Systems for Liquids other than Water; Part 1: Metrological and technical requirements; and Part 2: Metrological controls and performance tests."	**Consolidated Intl Comments & Responses, Part of the 2CD Package, 06 Dec 2018** Ralph Richter Convener of the R117 Project Group ralph.richter@nist.gov
1 CD date: 01 April 2016	

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
Convener note				**International comments on the 1CD Package received from:** **Australia, Austria, Canada, Czech Republic, Denmark, France, Japan, The Netherlands, New Zealand, P.R.China, Singapore, Slovenia, South Africa, Sweden, Switzerland, United States, and CECOD.**			
CECOD-1 PCL	Termin ology T.a.1		Gen	CECOD suggests to insert definition of FMEA, a process that should be part of risk assessment	Add FMEA = Failure Modes and Effects Analysis. Tool for risk-assessment	M (1)	** This is not an item mentioned in the R117 recommendation and therefore it is deemed not needed to have a definition or abbreviation for this.

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CECOD-2 PCL	Terminology T.a.2		Tech	CECOD suggests to add some specific components in the list after : "Valves, Hoses"	Modify to "Valves, hoses, Swivels, none return valves, relief-valves"	M (1)	** The list as mentioned in T.a.1. is not limiting, it are just some examples. No change to text.
AU-2	T.b.2		gen	Bunkering can equally apply to LNG and is not the sole bailiwick of high viscosity fuels. We recommend the removal of the example for inclusivity	See change highlighted in red text including strikeout, below: T.b.2 Bunkering – Measuring systems for bunkering Measuring systems that are located on a marine vessel (ship or barge) and are used during the transfer of various liquids. ~~This type of measuring system is commonly found on a "bunker barge" that is used to deliver a very high-viscosity "bunker fuel" to fuel large ocean-going ships.~~	M	** See modified Terminology T.b.2 and T.L.1. Convenors note: to avoid confusion about the correct section to be used for LNG bunkering, added new definition of LNG measuring systems (T.L.1.)
NL-5	T.b.2		gen.	T.b.2 Bunkering – Measuring systems for bunkering Measuring systems that are located on a marine vessel (ship or barge) and are used during the transfer of various liquids. This type of measuring system is commonly found on a "bunker barge" that is used to deliver a very high-viscosity "bunker fuel" to fuel large ocean-going ships. Not in agreement with B 6-2 (see NL-2)	Need for two different definitions • Bunkering • Measuring systems for bunkering suggest last part change to a note	M	** See response to AU-2 and modified Terminology
CECOD-3 JS	T.b.2		Tech	The title not correct. This is a measuring system for a special application used on vessels. Change title to describe the use as made for all other special application measuring systems T.b.2 Bunkering – Measuring systems for bunkering	Change title to "Measuring systems on marine vessels"	H (1)	** Changed differently in the modified Terminology i.e. this is for the loading of the ships fuel, not bunker fuel as cargo. See response to AU-2 and modified Terminology
CECOD-4 JS	T.b.2		Tech	It is obvious that it is a measuring system for liquids by the title of R117-1, a hint to various liquids is not required. Measuring systems that are located on a marine vessel (ship or barge) and are used during the transfer of various liquids	Delete Measuring systems that are located on a marine vessel (ship or barge) to deliver very high viscosity fuels. and are used during the transfer of various liquids Definition of "very high viscosity" is needed.	H (1)	** Comment understood, new T.b.2 solves this issue. See response to AU-2 and modified Terminology
CECOD-5 JS	T.b.2		Tech	This sentence and the definition is contrary to the first sentence and is confusing in the Terminology section This type of measuring system is commonly found on a "bunker barge" that is used to deliver a very high-viscosity "bunker fuel" to fuel large ocean-going ships.	Delete the complete sentence	H	** Comment understood, new T.b.2 solves this issue. See response to AU-2 and modified Terminology

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CECOD-6 PCL	Terminology T.d.3		Tech	CECOD suggests to clarify this clause	T.d.3 Disturbance Influence quantity having a value outside the specified rated operating conditions of the measuring system. (For electronic measuring systems only.) If the rated operating conditions are not specified for an influence quantity, it is a disturbance. A systematic influence by design or by installation (eg: systematic air inlet) cannot be considered as a disturbance, and is part of the rated conditions	M (1)	** Agree in principle. But modified text is added as a *Note: A systematic influence by design or by installation (eg: systematic air inlet) cannot be considered as a disturbance*
NL-7	T.f.1		gen.	It is not true that a significant faults is only are applicable to electronic instruments. Since the new D 11 there is no such discrimination between electronic and non-electronic instruments	correct to the VIML definitions for significant fault and add definition for fault limit Delete the sentence in bold	M	** Agree: bold sentence deleted from T.f.1.
Convener	T.l.1		gen				Added definition for "LNG measuring system."
CECOD-7 PCL	T.s.5		Tech	Clarification needed	T.s.5 Settlement of a transaction A transaction is settled when the parties interested in the transaction have made their agreement known (explicitly or implicitly) regarding the amount of the transaction. This may be a payment, signing a credit card voucher, signing a delivery order, etc. In case of post-payment, this can be postponed to bank transfer and reasonable additional delay for both parties to get all relevant information by usually accepted means (eg: monthly bank account position report). (Note: Common practice is 3 months) The parties interested in a transaction may be the parties themselves or their representatives (for example, the employee in a filling station or the driver of a truck).	M (1)	** The definition in T.S.5. does not mention when the payment takes place, therefore the suggested change is already covered by the original text. No change to text.

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AU-3	1		gen	The definition of a "Cryogenic liquid" contained in OIML R81 is – "A fluid with a boiling point of less than 120 K (–153 °C) under atmospheric pressure conditions, which has been liquefied by refrigeration." With LNG being specifically included within OIML R 117, it must be identified in the Scope and not hidden within a table. NOTE R81 must be revised to clearly exclude LNG from its requirements. Without this amendment, the requirements for both R81 and R117 would legally apply. e.g. Dynamic measuring devices and systems for cryogenic liquids, excluding LNG	We suggest the following wording for the 2nd paragraph: "…this Recommendation applies to all dynamic liquid measuring systems fitted with a meter, whatever the measuring principle of the meters or their application, *and also includes the measurement systems for the cryogenic liquid LNG."*	H	*[General Team]* Disagree with proposed change. LNG is adequately included in the scope in sections 1.1 and 1.2. Convener will ensure that R81 specifically excludes LNG.
CH-1	Scope	Scope	G	"For waste water measurement …": is this OIML Recommendation actually used to regulate waste water, rather than an adaption of OIML R49 ?	National or international regulations are expected to clearly specify which measuring systems for liquids other than water are subject to legal metrology controls. ~~For waste water measurement, it is up to the national authorities to decide whether the use of measuring systems conforming to this Recommendation is mandatory, and which accuracy class is required.~~		*[General Team]* R49 only applies to potable and hot water – not applicable to waste water. However … agree to remove the last part of the sentence because of the possibility of mis-interpretation of "choosing" a non-standard accuracy class. For all water measurement system not covered by OIML R49, ~~For waste water measurement,~~ it is up to the national authorities to decide whether ~~the use of measuring systems conforming to~~ this Recommendation is mandatory. ~~, and which accuracy class is required.~~

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CECOD-8 PCL	1.1		Tech	In table 1, there is no reference to AUS32 - DEF	Place AUS32 – DEF in 5.6 or remove the word "potable" (because AUS32-DEF is not potable)	H (1)	** Disagree with adding AUS32-DEF to Table 1. There are <u>many</u> other liquids covered by R117 that are also <u>not</u> specifically mentioned in Table 1 or Table 2. (Can't mention all of them.) DEF will fall in class 0.5 of Table 2 although not mentioned specifically ("All measuring systems, if not differently stated elsewhere") in R117-1 and in R117-2 Annex A, Section A1 ("…can also be used for other liquid dispensers used at petrol station locations (such as: urea (AUS32/DEF) dispensers…"). Also: A new note was added to Section 5.1 concerning AUS32/DEF.
CECOD-9 JS	1.2		Edit	First bullet point: Bunker fuel belongs in general to liquid fuel. No reason to name it as a special liquid. liquid petroleum and related products: crude oil (and crude oil which may contain sediment and/or water), liquid hydrocarbons, liquefied petroleum gas (LPG), liquid fuel, lubricants, industrial oils, bunker fuel, liquefied natural gas (LNG), and etc.	Delete "bunker fuel" liquid petroleum and related products: crude oil (and crude oil which may contain sediment and/or water), liquid hydrocarbons, liquefied petroleum gas (LPG), liquid fuel, lubricants, industrial oils, bunker fuel, liquefied natural gas (LNG), and etc.	H (1)	*[General Team]* Disagree. Added on purpose here.
CECOD-10 PCL	1.2		Tech	Missing bullet for AUS332/DEF. Insert an extra bullet point before "• other liquids not listed."	Insert: • Special automotive/truck pollution reduction liquids such as AUS32/DEF (Urea in water), considered to be in "other foaming liquids"	M (1)	** See response to CECOD-8

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CA-1	1.2		gen	(1.2) says R117-2 is excluding cryogenics but includes LNG. I think this is only because Cryogenics are covered somewhere else (yes - R81)? Just want to point out that we have had circumstances where the evaluation performed on Cryogenic products has been used to justify the acceptance of the meters for LNG (based on meter calibration equivalency data) under our LNG T&C.			*[General Team]* Noted. No change. See response to AU-3, above.
AU-5	Table 1		gen	Gas Energy Australia does not understand the rationale behind separating bunkering into its own specific clause? Metering principals are, and should be consistent regardless of the fiscal transfer product medium.	Please provide rationale, explanation, or amendment.	M	** Adding special sections for bunkering in R117 was a specific component/purpose of the CIML-approved project proposal for this revision.
DK-7	2.1		Tech/ edt	Is vapor return really necessary for a correct operation ? For correct operation/measurement also consider - Non return, transfer point (nozzle, valve etc) delivery system (hose empty/full – pipe)	For Correct operation, it is often necessary to consider: • a gas elimination device • a filter • a pump • *non-return valve* • *transferpoint* • *empty/full delivering system* • vapor return • correction devices •		*[General Team]* Agree to add non-return valve only. (See also AU-6)
FR-4	2.1	/	T	The LNG measuring system needs a conversion device	Add "conversion" device after "correction device"		*[Team LNG and Fuel dispenser]* Rejected. The list is not limiting, it just gives examples.
South Africa-1	2.1			Paragraph number 3 sentence to be reconstructed to be technical correct.	The measuring system may be provided with other ancillary devices (see 2.2) and additional devices.		*[General Team]* Agree. Fixed.
CECOD-11 JS	2.3.2		Tech	For practical reasons change the required representation of MMQ to avoid big jumps in the MMQ The minimum measured quantity of a measuring system shall have the form $1 \times 10n$, $2 \times 10n$ or $5 \times 10n$ authorized units of volume or mass, where n is a positive or negative whole number, or zero.	Change to The minimum measured quantity of a measuring system shall have the form of whole numbers $(1, 2, 3 \text{ to } 9) \times 10^n$ authorized units of volume or mass, where n is a positive or negative whole number, or zero	H	*[General Team]* This is just historical precedent. No change.

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SLO	2.3.3.3 and multiple		gen	Ratios of flowrates shall be consistently stated either as numbers or either as textual description.	Where installed, the ratio between the maximum and the minimum flowrate may be smaller than 10 provided that it is not less than 5.		*[General Team]* Disagree. Change in text changes the meaning of the sentence.
NL-12	2.3.3.3		edit.	"Except for fuel dispensers, either for liquefied gases or not, this ratio may be less." unclear correct to clearly read what is meant	Suggest the following amendment: "2.3.3.3 The ratio between the maximum and the minimum flowrates of the measuring system shall be: •　at least 10 for fuel dispensers, other than liquefied gases, •　At least 5 for dispensers for liquefied gasses, •　at least 5 for other measuring systems. . Only in the latter case, the ratio may be less than 5 if the measuring system is fitted with.......	H	*[General Team]* Agreed, inserted sentence modified slightly. Discussed by PG. PG accepted proposed change.
FR-5	2.3.3.3	/	T	We have the case in Europe of automatic milk dispensers delivering 1 or 2 liters, with only one flowrate around 3 L/min (ie $Q_{max} = Q_{min}$). This case is not taken into account in this chapter.	Include the case		** Disagree. For type approval section 2.3.3.3. remains a requirement. It is recognized, however, that in the field the system is only used at one flowrate. This is similar to (for instance) an LPG dispenser where you press a button for dispensing the LPG and the user cannot alter the flowrate. No change to section 2.3.3.3.
South Africa-3	2.3.3.3			Section 5.7.1 indicates that the ratio may be less than 5 for measuring system in pipelines.	Reword to make it clear to which extent the ratio must be less.		** Section 2.3.3.3. significantly modified (See reaction to NL-12, above).

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CH-3	2.3.3.3		T	Ambiguous statements: "Except for fuel dispensers, either for liquefied gases or not, this ratio may be less."	Change to: "Except for fuel dispensers where technically not feasible, this ratio may be less."		** Section 2.3.3.3. significantly modified (See reaction to NL-12, above).
CECOD-14 PCL	2.3.3.4		Tech	This clause needs clarification on acceptable means added to instrument to allow controls. Suggest to improve clause to →	2.3.3.4　When two or more meters are mounted in parallel in the same measuring system, the limiting flowrates (Q_{max}, Q_{min}) of the various meters are taken into consideration, especially the sum of the limiting flowrates, to verify if the measuring system meets the provision above. In this case, special flow control devices (such as valves) must allow to check each meter individually during verifications. Having one of the various meters operating out of its flow rate limits should not be allowed. Special precautions must also be taken if the various meters do not have same source of liquid, such as blenders or tandem-pump-meters. In those cases, none return valves must be fitted to avoid backflow in meters and/or reverse counting failure modes. As per 2.13.4, failure of a none return valve must be detected to inhibit instrument when needed.	H	** Your proposal, while technically accurate, adds unnecessary complexity to this section. No change.
CECOD-12 JS	2.4 Table 2		Tech.	Description describe not the special installation site and specify all fuels, it is too imprecise Measuring systems for bunkering of bunker fuel and other fuel oil for ships (see 5.13)	Replace by "Measuring system on marine vessel for liquids of high viscosity (see 5.13)"	H	*[Team Bunker]* See also CECOD-3&4 Partly agreed; table 2 changed to reflect comment.
CECOD-13 JS	2.4 Table 2		Tech	This is a standard application of a measuring system for liquids other than water and needed no extra mentioned only for ships. Why 1.0 % accuracy? If lubrication oil is a special liquid then there is need for a general definition. Measuring systems for bunkering of lubrication oil (not fuel oil) (see 5.13)	Delete this definition	H	*[Team Bunker]* Agreed; lubricating oil deleted, see also CECOD-12.

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AU-8	2.4		techn	Table 2 indicates an MPE of 1.5% for LNG systems. LNG systems currently approved under OIML R 81 are subject to a system MPE of 2.5%. It is recommended that the current MPE of 2.5% be preserved for LNG systems now included in the scope of OIML R 117	We recommend the creation of a Class 2.5 for LNG systems.	H	** This issue of an accuracy class for LNG measuring systems has been heavily discussed by the project group. While this proposed change is understood, accuracy class 1.5 has been decided for these measuring systems. No change to the Table or the text.
CH-4	2.4		E	In Class 0.5 "LNG dispensers for vehicles" are explicitly excluded. They should therefore be listed under Class 1.5.	Add to Class 1.5 - LNG dispensers for vehicles		*[Team LNG and Fuel dispenser]* Rejected, ALL measuring systems for LNG are covered in accuracy class 1.5. See also response to AU-2 and the new definition for LNG measuring systems in T.L.1.
CA-2	2.4 And 5.14.7		gen	Accuracy Class – what accuracy class will be applicable to return vapour meter on LNG installation (if used)? MC is considering 5% LOE. How is this meter to be tested? MC has not determined suitable field test methods.			*[Team LNG and Fuel dispenser]* Accepted after a long discussion by team LNG in Delft. The result is given in AU-18.
DK-8	2.4		Tec/edt	2.4 Table 1 (R117-1 2007 E) – class 0.5: Add more common used liquids	Add: - lubricating oil - windshield washer fluid, Adblue (Urea)		*[General Team]* Disagree. There are <u>many</u> other liquids covered by R117 that are also <u>not</u> specifically mentioned in Table 1. (Can't mention all of them.) All measuring systems (if not stated elsewhere in the table) are 0.5 accuracy. See also response to CECOD-8.

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FR-6	2.4		/	T	What is the dynamic viscosity and the maximum flowrate of measuring systems for bunkering of lubrication oil?	If applicable, the case of bunkering of lubrication oil could be integrated into "measuring systems for viscosity higher than 1000 mPa or Qmax higher than 20 L/h" We suggest to introduce the maximum value of the dynamic viscosity (In order to prevent the presence of air into the viscous liquids).		** New definition of bunker fuel added in the terminology section T.b.2. Table 2 was modified in response to CECOD-13. Bunkering of lubrication oil moved into accuracy class 0.5 (measuring systems for bunkering).
JP-2	2.4 Accuracy class		Gen.	In regard to accuracy classes, there might be different opinions or regulations among the member countries. Therefore, Table 2 should be provided as a recommendation.	We request to change the expression of the first sentence as shown below: Taking into consideration their field of application, measuring systems are may be classified into four accuracy classes according to Table 2. In addition, the title of the second column of Table 2 should be changed by adding the word "typical" as follows: Present: Type of measuring system Proposed: Typical type of measuring system		** Disagree. At the bottom of Table 2, a sentence reads "A better accuracy class for a certain type of measuring system may be specified". We believe this sentence already reflects the flexibility requested by your comment. No change.
NL-13	2.4		gen.	Rephrase the sentence: "A better accuracy for a certain type of measuring system may be specified."	"The manufacturer may request to have his equipment evaluated against a better accuracy class than specified in table 2".	M	** Convenor agrees that the manufacturer may specify a better accuracy class. However, the convenor also believes that a better accuracy class may also be specified by a member state (see response to JP-2, above). Therefore, this proposed change is not accepted.

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South Africa-4	2.5.1			Table 3 Line A and Line B	Include word "Complete measuring system" after A (*) in table 3 and also the word "meter" after B (*) in table 3 to clarify requirements in without having to checking the requirement in 2.6 on the next page.		** Agree, in principle, but the text of the footnote is modified instead to implement the suggestion.
PRC-1	2.5.2		tech.	IF the MMQ is smaller than 2 L for LPG dispensers for motor vehicles, the maximum permissible errors on quantity indications are hardly satisfied.	Requirements in 5.1.8 are applicable to LPG dispensers for motor vehicles. The LPG dispensers shall have a minimum measured quantity not exceeding 5 L. For quantities smaller than 5 L, the maximum permissible errors, positive or negative, on quantity indications are as twice as much the value fixed in Table 2。		** Section 2.5.2. is for "normal" deliveries/transactions and is not applicable for the MMQ. No change.
NL-15	2.5.5.		gen.	As presented there may be misinterpretations the contents could better be moved to table 2	Delete the clause Add the text of the clause to 1.0 in table 2 as follows: - Measuring systems normally of the class 0.3 and 0.5 applied for liquid temperatures below -10 and above +50 °C , with the exception of bunkering systems.	H	** Agreed. Modified text added to Table 2. Section 2.5.5. deleted.
CECOD-56 JS	Table 2 + 2.5.5		Tech	Table 2, confusing with 2.5.5 For measuring systems with accuracy class 0.3 or 0.5 and measuring liquids with a temperature less than – 10 ℃ or above + 50 ℃ the maximum permissible errors for accuracy class 1.0 shall be applied.	Add the information of 2.5.5 to table 2, delete paragraph 2.5.5	H	** Modified text added to Table 2. See response to NL-15, above.
NL-17	2.6.2.		gen.	"If the meter is provided with an adjustment or correction device, it is sufficient to verify that the error curve(s) is (are) within a range of two times the value specified in line B of Table 3 during type approval.	This concerns the verification during type evaluation and could rather be a note. There is not yet a correction device required in the draft for this situation and therefore it is suggested to add phrase to : 3.1.4.1 see NL comment on 3.1.4.1	H	** Comment solved by the response to NL-24.
PRC-2	2.7.1.2		tech.	LNG delivery systems shall indicate quantity delivered in terms of mass, and no conversion device might be included. The provision of MPE of conversion device stilly need to be further discussed.			*[Team LNG and Fuel dispenser]* Rejected, but the manufacturer can always voluntarily choose a more strict accuracy class.

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CECOD-15 PCL	2.10.1		Tech	Needed clarification on how *"contribution of disturbance"* shall be understood. Suggest to add a note	The values specified in this section apply to the difference between: • the meter errors with air intake or with gas, and • the meter errors without air intake or gas (note) Gas elimination devices shall be installed in accordance with the manufacturer's instructions. *Note: if measuring instrument cannot operate without air intake by design or by installation, the above is to be read:* The values specified in this section apply to the difference between: • the meter errors with additional air intake or with additional gas, and • the meter errors without additional air intake or gas, operating as per design The above note means that, if by design, an instrument is systematically having air intake by design or by installation, the additional error of 2.10.1 is not applicable to the normal rated operating mode.	H	** Section 2.10.1 is not applicable for high viscous bunkering systems. See also amended section 2.10.4.2. No change.
South Africa-7	2.10.2		edit	Sentence to be reconstructed to be technical correct.	Bullet point 1: Gaseous formations in the form of air pockets are likely to occur because of thermal contraction during shutdown periods. Bullet point 2: If entrained gas or air pocket are likely to be introduced into the pipework when the supply tank becomes empty		** Agreed. Text modified slightly.
AU-9	2.10.4.2		gen	This clause should apply to liquids other than cryogenic liquids.	We suggest the following wording change to the titles of the clause: Viscous liquids – special requirements applicable to measuring systems for bunkering of liquid *excluding cryogenic fuels* (see also Section 5.13)	M	** Disagree, this issue is solved by changes in the terminology T.b.2/T.b.4.

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FR-8	2.10.4.2	/	G	A new concept not in line with actual basics of R 117 is introduced (Aerated phase metering does not comply with R117).	Delete point 2.10.4.2. It is necessary to make provisions to prevent entry of air (See point 2.10.4.1)		*[Team Bunker]* Disagree. Not in-line with CIML decision to include bunkering.
CECOD-16 JLLG	2.10.4.2		Gen.	Lack of metrological compliance for bunkering as required, see hereunder comment on specific requirements	Overall review or delete section		** See response to FR-8
CECOD-17 JS	2.10.4.2			First sentence: On measuring systems for bunkering (especially for the dynamic measurement of bunker fuel), the use of a gas elimination device is not required if the presence of air can be detected and corrected by the system to ensure that the required mpe is met. subject of R117, there is no need to repeat it. (especially for the dynamic measurement) "use of a gas elimination device is not required" is already defined in "2.10.4.1 Viscous liquids – general requirements", no need to repeat it "if the presence of air can be detected "and corrected"" Correction of a legal measuring result by what? To do it legal a two phase measurement is required.	 Delete Delete Delete	H	*[Team Bunker]* CECOD-17 heavily discussed by Team Bunker in Delft. Other team bunker members were unable to convince CECOD representative of consensus response to this comment. Consensus among everyone else was reached. Text of section 2.10.4.2 was heavily modified.
CECOD-18 JS	2.10.4.2		Tech	This is also in contradiction to 2.10.4.1 general requirements, third paragraph, first sentence "to stop the flow"		H	*[Team Bunker]* Text modified, see response to CECOD-17.

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CECOD-19 JS	2.10.4.2		Tech	Majority and minority quantity can only be determined after the measurement. According 2.5 it has to guarantee before the start of the measurement that the error is every time after the flow of Emin inside the accuracy class. If after the measurement the result is outside of the accuracy class because the minor part is too large the measurement can't be repeated and the result is illegal. This not in line with the general requirements of this recommendation and the legal requirements of the member states. Note: This clause is applicable when the majority of the received or delivered quantity of liquid is measured without the presence of any air and where only some minor part of the liquid will include air.	Delete	H	*[Team Bunker]* Note deleted as requested, see also response to CECOD-17.
CECOD-20 JS	2.10.4.2		Tech	This sentence is complete in contradiction to the paragraph mentioned before and could not be fulfilled because of the not solved two phase product measurement. Measuring systems on bunkering systems, even when measuring very high viscosity liquids, shall continue to meet the requirements of 2.4 to 2.6 with respect to the maximum permissible errors and the accuracy class of the measuring system.	Delete	H	*[Team Bunker]* Text modified, see response to CECOD-17.
CECOD-21 PCL	2.10.4.2		Tech	The "note" after first paragraph of clause 2.10.4.2 could be misleading and give the feeling that general MPE requirements can get benevolence	Remove "note"	H (1)	*[Team Bunker]* Note deleted as requested, see also response to CECOD-17.
CECOD-22 PCL	2.10.4.2		Tech	Second paragraph of clause 2.10.4.2 is not acceptable. Bunkering measuring systems are interruptible, meaning that result shall conform to MPE requirement anytime, not in relation with total (targeted) volume of transaction	Remove second paragraph	H (1)	*[Team Bunker]* Second paragraph removed as requested, see also response to CECOD-17.
NL-21	2.10.8		techn.	*A gas separator designed for a maximum flowrate lower than or equal to 20 m3/h shall ensure the elimination of **any proportion** by volume of air or gases relative to the measured liquid.* Potentially this clause could be unclear to some readers. Please add a note	Include the following note: *"note: consequently gas separators for flow rates up to 20 m3/h are of relatively larger size than those for higher flow rates"*	H	*[General Team]* Text modified, note added.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL-22	2.12.2.		techn.	*"Measuring systems may be of two types: "empty hose" systems and "full hose" systems. The term "hose" includes rigid pipework"* For several systems piping/hose may be partly filled, due to for instance evaporation.	Change to: *"With the exception of the systems mentioned in sub clauses 5.13 and 5.14 measuring systems may be of the following types: "empty hose" systems and "full hose" systems. The term "hose" includes rigid pipework* *.."*	M	*[Team LNG and Fuel dispenser]* Comment understood. A new section (2.12.2.4.) is added to cover this.
CECOD-23 PCL	2.13.4		Tech	Clarification of known/acceptable solutions for this clause	2.13.4 When reversal of the flow could result in errors greater than the minimum specified quantity deviation, a measuring system (in which the liquid could flow in the opposite direction when the pump is stopped) shall be provided with a non-return valve (solution A). If necessary, the system shall also be fitted with a pressure limiting device. Such non-return valve can be replaced by a software solution when applicable (solution B, ie: calculator and/or transponder capable of measuring amount of reverse flow, and compensating on next measurement). Technical choice implemented on measuring instrument must be described by manufacturer. If solution A is equipped with a pressure relief valve, or if failure of solution A not obviously visible to user, then solution B must be implemented together with solution A.	H (1)	** Before a "software solution" can be implemented, the rest of the systems needs to be capable of handling reverse flow. Therefore text of this "proposed change" needs improvement. Ask CECOD. Text modified to include the following sentence at the end of section 2.13.4. "System shall either prevent reverse flow or accurately account for reverse flow by appropriate means."
AU-10	2.16		techn	There may be a requirement to install pressure relief and this should be recognised in the document.	We suggest the inclusion of the following wording: In measuring systems intended to deliver liquids, no means shall be provided by which any measured liquid can be diverted downstream of the meter *excepting where there is a requirement to install a pressure relief valve (LNG or cryogenics). See 5.4.6*	M	*[Team LNG and Fuel dispenser]* Comment understood. An additional sentence is added to the end of section 2.16.1.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-11	2.16		techn	As a result of aviation safety regulations, it is understood that there is occasionally (although rarely) the need to install a pressure relief valve, or similar safety feature, downstream of the metering point. We would be interested in general discussions from the TC/SC regarding the relationship between metrological requirements and safety requirements in the design and operation of flow metering systems, particularly in the aviation industry.	See AU comment above on 2.16, noting the different application. Also see AU comments on clause 5.8.	M	** See response to AU-14 about section 5.8.
CECOD-24 PCL	2.16.1		Tech	Clarification about branches	Insert the following second paragraph

For measuring systems using locally made pipe works (eg: interconnections, or to position a remote transfer point), installation shall make sure that measurements are accurate, and this shall be reminded in installation instructions. | M (1) | ** Noted. |
| NL-23 | 2.16.3 | | techn. | In some cases (for instance for cooling the system) it may be needed to have a bypass to the meter. | Suggest to add.

"*Effective means shall be provided to prevent the passage of liquid through any such bypass during normal operation of the measuring system*" | H | ** Section modified. New note added at the end of section 2.16.3. |
| CECOD-25 PCL | 2.17.1 | | Tech | Clarification | Change clause to

2.17.1   If there is a risk that the supply conditions can overload the meter, a flow limiting device shall be provided. This device shall be installed downstream of the meter (solution A). It shall be possible to seal it. Alternative solution B by software is also acceptable (eg: software to abort flow if flowrate exceeds meter limits). Technical choice must be described by manufacturer. | M (1) | ** Accepted. |

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-26 PCL	2.18.2		Tech	Clarification	Change clause to 2.18.2 In the case of measuring liquid petroleum products, means for vapor recovery shall not influence the accuracy of measurements such that the maximum permissible error is exceeded. **If any intra-path leak between meter and transfer point above minimum specified quantity deviation (Emin) is possible and not immediately visible, measuring instrument must carry detection means, software and/or hardware, that will insure that instrument will be inhibited till leak is corrected.**	H (1)	****** The relation between the suggested change and the current section 2.18.2 (dealing with vapour recovery) is unclear. No change.
Convener	2.21				**Previous Section 5.12 "Unattended delivery" was moved from Chapter 5** because it is NOT a measuring system and NOT part of a measuring system. It was decided to move this section into the General Requirements of Chapter 2, new section 2.21.		
AU-13	3.1.2.3		techn	We generally support the concept of exempting meters without moving parts. However: The exemption is currently contained in a NOTE, meaning that it is not strictly enforceable and is provided for guidance and information only. In order for the Recommendation to be applied consistently across OIML members, we strongly recommend that the wording is removed from the NOTE and provided as a standalone clause. There is an argument that Coriolis meters do actually contain mechanical moving parts. We would suggest the wording of the clause more accurately reflect the intent to exclude certain meter types from endurance testing.	Remove the wording from the NOTE and replace with a standalone clause. Review the wording "without moving parts and parts under mechanical stress" and replace with wording that more accurately reflects the intent.	H	****** The requirements for endurance testing are found in section 6.1.5. and R117-2. The note has now been modified, to reflect the fact that the requirements are found there. See also response to AU-22.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
FR-9	3.1.2.3	/	T	A Coriolis meter includes moving parts and parts under mechanical stress	Delete Coriolis endurance exclusion		** Disagree. This issue has already been heavily discussed and decided by the project group. See also response to AU-13 and comments submitted on section 6.1.5.
CECOD-27 JLLG	3.1.2.3		Tech	A Coriolis meter includes moving parts and parts under mechanical stress	Delete Coriolis endurance exclusion	H	** Disagree. This issue has already been heavily discussed and decided by the project group. See also response to AU-13 and comments submitted on section 6.1.5.
CECOD-28 PCL	3.1.2.3		Tech	A note is only informative. Note is not adequate. There are moving parts in Coriolis meters etc…	Modify to Note: The endurance test is only applicable to meters with moving parts and parts under mechanical stress (this means that Coriolis, ultrasonic, and electromagnetic meters require proper risk-assessment to undergo adequate endurance test possibly excluding real-liquid testing).	H (1)	** Disagree with proposed change. Endurance testing requirements been heavily discussed and decided by the project group. See also response to AU-13 and comments submitted on section 6.1.5.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-29 PCL	3.1.3		Tech	Add a note to clarify technical acceptable solution	Add note below bullet points: • 0.05 % for meters intended for measuring systems with accuracy class 0.3; • 0.1 % for meters intended for measuring systems with all other accuracy classes. **Note: such means can be mechanical and/or electronic and/or software**	H (1)	*[General Team]* Discussed by PG. NO change. Don't believe proposal improves the text. *[Team Meter]* Rejected The Definition T.a.3 already clarifies that an adjustment device can be mechanical or electronic. Team Meter opposes any limits on these adjustments in the software (meter factor or k-factor).
NL-24	3.1.4.1		gen.	Where the meter is equipped with a correction device this should be registered in the certificate for type evaluation	add to this sub clause the following text: "*In case a correction device must be part of the meter this shall be registered in the certificate for type evaluation of the meter*"	M	** Agreed in principle. Text in section 3.1.4.1. is modified and a sentence is added to the end of this section. *[Team Meter]* Changes were made based on additional follow-up clarification by NL.
CECOD-30 PCL	3.1.4.4		Tech	Clarification of technical solution	3.1.4.4 All the parameters which are not measured and which are necessary for correcting shall be contained in the calculator (**or in pulser/transducer**) at the beginning of the measurement operation. The type approval certificate may prescribe the possibility of checking parameters that are necessary for correctness at the time of verification of the correction device.	H (1)	*[Team Meter]* Agree in principle, text modified with slightly different wording.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-31 PCL	3.2.3		Tech	Adjust second paragraph	If the device is capable of hiding a small number of "minimum increments of registration" at the beginning of a measurement, it must be possible during type approval and ~~initial~~ *any* verification to easily switch off this feature *(without breaking a seal).*	M (1)	** Disagree. Only type approval and initial verification are within the scope of the document.
Convener	3.9		Gen/ tech	New Section 3.9 "Self-service device (SSD)" was inserted.	*Convener note: Subject matter previously covered by Sections 5.10, 5.11, and 5.12 is now covered by new R117-1 Section 3.9.*		
CECOD-32 PCL	4.1.1		Tech	Technical clarification to prevent lost information/counting	After 4.1.1 clause (and before its note), insert the following paragraphs **Electronic calculators shall have a defined Safety Maximum Pulse Rate (SMPR) above which calculator and its software will start losing pulse information. Unless otherwise specified, SMPR is equal to rated maximum pulse rate.** **Electronic measuring system shall be designed and manufactured such that if the rated maximum pulse rate at calculator rated conditions (RMPR) is exceeded it will declare a significant fault if measured pulse rate exceeds (RMPR + SMPR) / 2.** **Electronic measuring system shall be designed and manufactured such that if the maximum flow rate of any active meter is exceeded by more than 10% during more than 10 seconds it will declare a significant fault.**	H (1)	*[General Team]* Discussed by the General Team. Not sure this is the correct place for this additional text (elsewhere in Chapter 4?) Problem making a new requirement for "**a defined Safety Maximum Pulse Rate (SMPR)"** when none of the Team is familiar with this term. Would not be possible to test the 3rd paragraph … as the test lab should not the run the instrument above the max flow rate.
CECOD-33 PCL	5.1		Tech	Secure E1 level on dispensers	Add a first line to clause 5.1 Fuel dispensers **Electrical disturbance tests (see A.11) shall be E1 or better upon choice of manufacturer.** Except where otherwise specified, the requirements in this section do not apply to LPG dispensers.	M (1)	*[Team LNG and Fuel dispenser]* Accepted. Table added in newly created section 6.1.2.2.4.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
Convenor -1	5.1		Gen				** Added new note in section 5.1 to explain that dispensers for several other liquids are able to use the requirements in 5.1.
CECOD-34 PCL	5.1.7		Tech	Correction to second paragraph	When two or more nozzles can be used simultaneously or alternately, and after the utilized nozzles have been replaced, the next delivery shall be inhibited until the **corresponding** indicating device(s) has (have) been reset to zero. Moreover, by design, the provisions in the first paragraph of 2.16.1 shall be fulfilled.	L (1)	*[Team LNG and Fuel dispenser]* Agreed
CECOD-35 PCL	5.1.14		Tech	Clarification	Add a last paragraph to clause **It must be possible, without breaking a seal, to disable such hiding function to allow:** - **verification of hose inflation volume** - **reduction of measuring errors during verifications (assessing hose inflation contribution)** - **checking that the device incorporated at the free end of the hose does prevent the draining of the hose during shutdown periods as per 2.13.6**	M (1)	*[Team LNG and Fuel dispenser]* Accepted. The comment is rephrased and added to the end of section 5.1.14.
CECOD-36 PCL	5.1.15		Tech	Replace word "device" by "function", because this can be done without any additional device and just a software function	5.1.15 All dispensers with electronic indicators shall be fitted with a time-out **function device** that terminates a transaction (i.e. the dispenser is reset to zero before delivery starts), should a period of inactivity (no flow) of more than 120 seconds occur during the transaction.	L (1)	*[Team LNG and Fuel dispenser]* Accepted

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-37 PCL	5.1.16		Tech	Add clause 5.1.16	5.1.16 When temperature correction system is associated to a fuel dispenser, it must be possible to disengage the system temporarily, without breaking a seal, to allow verifications of the measuring system. Such operating mode must be limited to one measurement (note) and software system must fallback into normal temperature correction at next reset of indication. Note: display must indicate (eg: by blinking, or using special indication) that the measuring system is operating without temperature correction, only for calibration purpose.	H (1)	*[Team LNG and Fuel dispenser]* Comment understood. A new section 5.1.16. has been added to include requirements about temperature compensation.
CECOD-38 PCM	5.2.2		Tech	Improve clause to have adequate MMQ	5.2.2 Tanks equipped with measuring systems may comprise one or more compartments. **The MMQ of the measuring instrument and the air separator must not exceed the volume of the smallest compartment (note 1). The MMQ of the measuring instrument and the air separator must not exceed 50% of the volume of the largest compartment (note 2).** **Note 1: it must be possible to reach MMQ when delivering full volume of any compartment** **Note 2: it must be possible to reach 2xMMQ when doing verification as per 2.5.1, 2.5.3 and 2.10.1**	H (1)	*[Team Meter]* Team Meter supports this comment. Proposed text is slightly modified and has been added to 5.2.2.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CA-3	5.4		gen	(5.4) it is interesting that they are reconsidering/debating the necessity of performing endurance testing of Coriolis meters. It sounds like they were not doing it in consideration for the absence of moving parts in the meter. Now some are reconsidering that definition, I guess the tubes are believed to move (torsion due to the liquid flowing through). Interestingly we have historically performed the endurance testing but were considering eliminating that test in consideration that OIML was not doing it. I guess we should stay tuned for more development on this before making any final decision. One thing we have been doing is performing a vibration test on Coriolis for truck mounted application, we were justifying the test based on the electronic devices nature of these meter & transmitters. (in fact we are having them mounted on trucks for 20,000km ride).			** First, we are not sure if your comment belongs to section 5.4 (Measuring systems for liquefied gases under pressure) since the second part of your comment specifically talks about truck mounted applications. In any case, endurance testing for various meter technologies have already been heavily discussed and decided by the project group. The decision has been that Coriolis meters will not be subjected to endurance testing. See also section 6.1.5. and R117-2. No change to the text at this time.
CECOD-39 PCL	5.5.1		Tech	Insert one sentence at start of clause	5.5.1 **Electrical disturbance tests (see A.11) shall be E1 or better upon choice of manufacturer.** Requirements in 5.1.1, 5.1.5, 5.1.6, 5.1.8 to 5.1.15, 5.4.1, and 5.4.2 are applicable to LPG dispensers for motor vehicles. Where installed, the ratio between the maximum flowrate and the minimum flowrate may be smaller than five provided that it is not less than 2.5.	M (1)	*[Team LNG and Fuel dispenser]* Accepted. Table added in newly created section 6.1.2.2.4.
PRC-3	5.5.3		tech.		Please add content as following A nozzle connection may be provided in the gas phase pipeline for circulation at the bottom of the meter.		*[Team LNG and Fuel dispenser]* Accepted. Modified text added to the end of section 5.5.3.
CECOD-40 OT	5.5.6		Tech	Correction of clause	5.5.6 A non-return valve, ~~downstream~~ **upstream** of the meter, is mandatory. The pressure loss caused by it shall be sufficiently low to be considered negligible.	M (1)	*[Team LNG and Fuel dispenser]* Rejected, the non-return valve should be downstream of the meter.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-41 PCL	5.6		Tech	Correction of Title of clause (remove word potable) and add AUS32/DEF	**5.6 Measuring systems for milk, beer, AUS32/DEF and other foaming potable liquids**	H (1)	*[General Team]* Disagree. 5.6 is the wrong place. It was decided that these dispensers are covered by section 5.1. There are many other liquids covered by R117 that are also not specifically mentioned in Table 1. (Can't mention all of them.) See also the response to CECOD-8. *[Team Meter]* Disagree. AUS32/DEF is not foaming and not potable.
DK-1	5.6.2		tec	Transfer point for receiving systems is defined as a constant level (only) - either a constant level tank, or a combined gas elimination device, and constant level tank. As also mentioned in R117-2 Annex E.6.1.1. 5th § - a level measuring function in the level tank of the MS can be present. In this case the transfer point will not be visible (no sight glass) – and can´t be checked – but will operate automatically.	5.6.2 The transfer point in reception installations is defined by a constant level air elimination system upstream of the meter. The air elimination device must make use of a constant level tank which is usually combined in one device but may be separate if the air elimination device is downstream of the constant level tank and before the meter. It must be possible to verify a constant level in the air elimination device before and after each measurement. The level shall be established automatically. In the case that the MS measures the level in the constant level tank automatically before and after a measurement (e.g. by a dipstick) and corrects the received quantity according to the levels, 5.6.2.4 does not apply.	M	*[Team Meter]* Agree, suggested text added with minor modification.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
DK-6	5.6.2.1		tec	When reading 5.6 – an air elimination device always seems necessary. However - the development of new technologies shall not be prevented. E.g. correction and calculation in accordance with a predefined tablework between a measurement based on two simultaneous measurements at different pressure	5.6.2.1 The Air elimination device may be placed either upstream of the pump or between the pump and the meter. The air elimination device is often necessary whether the meter is fed by gravity, buy emptying milk churns, by means of an auxiliary pump, or by means of a vacuum system. However, new technologies not including an air elimination device, e.g. systems with a correction function – shall not be prevented	M	*[Team Meter]* Agree in principle with this comment. Discussed by project group in Delft. New text has been added in this section to address this comment.
DK-4	5.6.2.3		tec	5.6.2.3 Does this requirement include, or not include hoses which are designed to be coupled to the outlet of the supply tank ? Specify in 5.6.2.3 Depending on the difference in height between the pump of the MS and outlet valve of the supply tank, - and the length and dimension of the receiving hose - the Danish experience is that more or less liquid will be present in the receiving hose, when the measurement is finished. As (if) the transfer point is defined by the markings and sight glass in the constant level tank, or the measured level difference in a level tank (e.g. by dipstick) – the costumer should be able to check this, and a notice plate drawing attention to this checking shall be provided	Proposal I: 5.6.2.3: In all installations for reception, the pipe work upstream of the air elimination device, and hoses designed to be coupled to the outlet of the supply tank, shall empty completely and automatically under rated operating conditions. Proposal II: 5.6.2.3: In all installations for reception, the pipe work upstream of the air elimination device shall empty completely and automatically under rated operating conditions. After measurement, any unmeasured liquid in hoses designed to be coupled to the outlet of the supply tank, is assumed to belong to the supply tank, and the costumer. It must be possible to check the emptiness of the hoses and a notice plate drawing attention to this checking shall be provided	M	*[Team Meter]* Discussed by Team Meter and project group in Delft. Proposal II is preferred. The receiving hose on the milk tanker is part of the pipework. Further changes were made based on additional proposals from DK. Modified text added to section 5.6.2.3.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
DK-2	5.6.2.4		tec	In case of a quantity correcting function of the MS – before and after a measurement – the requirement of a monitored constant level is not applicable (See the 5.6.2. comment above)	5.6.2.4 The constant level in the air elimination device/constant level tank is monitored by means of a sight glass or a level indicating device. The level is considered to be constant when it settles within a range defined by two marks at least 15 mm apart and corresponding to a difference in quantity of no more than twice the minimum specified quantity deviation. The requirement does not apply in the case that the MS automatically measures the level in the level tank, before and after the measurement.	M	*[Team Meter]* This issue is already covered in the text which was added in section 5.6.2.
South Africa-8	5.7.2			Is in contradiction to 5.13.3 for system which allows air during a minor part of delivery.	5.7.2 to include or make provision for the requirement allowed in 5.13.3		** Section 5.7. is related to measuring systems on land, and 5.13 is for systems on a ship. Therefore the requirements can be different. No change to text.
AU-14	5.8		techn	As a result of aviation safety regulations, it is understood that there is occasionally (although rarely) the need to install a pressure relief valve, or similar safety feature, downstream of the metering point. We would be interested in general discussions from the TC/SC regarding the relationship between metrological requirements and safety requirements in the design and operation of flow metering systems, particularly in the aviation industry.	For discussion only.	M	*[Team Meter]* Discussed by team Meter and project group in Delft (as requested). Agree that pressure relief valves can be incorporated into these systems due to temperature/pressure build up in the closed piping components of the system. A new section 5.8.1.4.is added to address pressure relief valves.
CECOD-42 PCL	5.8.2.4		Tech	Add a extra clause on hose for aircraft refuelling systems	5.8.2.4 The MMQ of Stationary measuring systems intended for refuelling of aircraft must take in consideration special hose length and hose retractors versus fuel dispensers.	M (1)	*[Team Meter]* Discussed by team Meter and the project group and it was decided to not add this new proposed section.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-43 PCL	5.9.1		Tech	Add extra information to allow for verifications	Add a second paragraph to clause The requirements of 2.3.3.4 are applicable here for verifications. It is highlighted that the mix of some fluids is not iso-volumic (ie: mixing 10 liters of fluid A with 10 liters of fluid B, does not always result in a final volume of 20 liters). Verifications on blenders must be possible meter by meter (see 5.9.3).	H (1)	*[Team LNG and Fuel dispenser]* Changed differently. Solved by response to comment SE-21
CECOD-44 PCL	5.9.3		Tech	Remove second bullet from 1st bullet point list of clause	Examples for such designations: • number of stars (2, 3, 4 stars); • ~~octane number (92, 95, 98 octane)~~ **(misleading example as this allows conclusions on ratio**); and • two stroke mixture (without designation such as 5 %).	H (1)	*[Team LNG and Fuel dispenser]* Partly accepted. Octane numbers removed from examples.
CECOD-45 PCL	5.9.3		Tech	Correct 3rd bullet of 3rd bullet point list of clause	To permit compliance with the requirement in 5.9.4 or 5.9.5 to be verified, it is necessary: • for multigrade dispensers to measure the quantities of both components; • for gasoline oil dispensers to measure either the quantities of oil and gasoline or the quantities of oil and mixture; and • for both types to make the separate collection of both components feasible during verification **or have adequate calibration procedure to check effective dispensed volumes.**	M (1)	*[Team LNG and Fuel dispenser]* Accepted

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
PG group discussion	5.9.5.			Change 5.9.5 This Recommendation should not include sections that deal with the quality of the product. When the additive is injected upstream of the meter, there is no influence on the volumetric accuracy of the delivered product. Replace the entire paragraph	Oil injected downstream of the meter. In this case, oil is not measured with the volume of gasoline, and oil mix/injection shall be disabled to perform the accuracy test. The contribution/volume of oil injected can be checked as additional volume dispensed when the oil injection is enabled. The accuracy of the total volume, with and without oil injected, shall both meet the MPE requirements. Note 1: if the influence of the additive injection is negligible the additive injection system shall be excluded from metrological control. Note2: If a non continuous system is used for oil injection the effect should not have an effect on the MPE		*[Team LNG and Fuel dispenser]* Accepted, delete the entire section and replace by the proposed change which was agreed by the project group in Delft.
CECOD-46 PCL	5.9.6		Tech	Correction in clause needed, starting with "unless…" Additional note after last paragraph for country specifics	5.9.6 If the blend dispenser is capable of delivering more than one mixture with the same nozzle and the blending ratios are being guaranteed, the installation of two hoses and a special blending device close to the transfer point is required **unless either:** **- instrument operates with an empty hose** **- or blending compensation is done over delivery of MMQ and allows to comply with applicable requirements of 5.9.4 or 5.9.5** **- or "higher" blend is armless and delivered for free over mixed volume of hose** If the blend dispenser can deliver only one mixture per nozzle, the blending device may be installed inside the dispenser, using a single hose per nozzle **(note: this might be allowed in some countries when more than one blending ratio is available)**	H (1)	*[Team LNG and Fuel dispenser]* This has to do with the quality of the product which is outside the scope of this recommendation. No change. It is agreed to add this sentence as a note.
PRC-4	5.9.7		tech.	If the blend dispenser is capable of delivering one or both single components (in addition to the mixtures) with a common nozzle	If the blend dispenser is capable of delivering more than one single components (in addition to the mixtures) with a common nozzle.		*[Team LNG and Fuel dispenser]* Comment is understood, but a note is added to T.b.1.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
Convener	5.10 5.11 5.12		gen		*Convener note: Subject matter previously covered by Sections 5.10, 5.11, and 5.12 is now covered by new R117-1 Section 3.9.*		
CECOD-47 PCM	5.10.3.1.1		Tech	Additional note to allow for pay-per-phone, in line with CECOD proposal to WELMEC WG10	5.10.3.1.1 The self service arrangement shall provide additional primary indications by means of: • a printing device for the issue of a receipt to the **customer (see note)**; and • a device (printing or memory) on which measurement data are registered for the benefit of the supplier. **Note : during transaction initiation, customer can be proposed a choice to get or not get a receipt with the printing device. In case the printed ticket is unavailable, customer is warned prior to transaction so he can abort process (see 5.10.3.1.2). The printed ticket is the legal format for the customer receipt. After choice for normal ticket is made, the customer can also be proposed to get an E-receipt (by Email, SMS, or other electronic format). In that case, E-receipt is only informative and is not under legal control. Customer shall be warned.**	H (1)	*[Team LNG and Fuel dispenser]* Discussed during the project group meeting in Delft. It was agreed to add a slightly modified note at the end of 5.10.3.1.1. *Updated Convener note:* *This section has been moved out of Chapter 5, and is now found in Section 3.9.3.1.1.*
AU-15	5.13.1		techn	The section applies to high viscous liquids and should not be applied to LNG. Potential for a separate reference for Cryogenic bunkering or to remove bunkering as a specific section of the Recommendation.	We suggest the following amendment to the wording: The following requirements apply to all *liquid, except for cryogenic fuel* measuring systems used in a bunkering application and not and/or utilizing a special bunkering vessel	M	** Agree in principle. Note 2 was added to 5.13.1. to clarify that systems that measure LNG in a bunkering application are covered by section 5.14.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
FR-10	5.13	/	T	If an aerated phase metering is to be introduced, specific requirements and tests should be recommended for such meters and such measuring system(MS) in order to assess the accuracy of the meter or of the MS, and in particular for both types of aerated phase (slug-flow or stripping and bubble flow). The section introduces detection and correction of the presence of air without measure of the quantity of air passing through the measuring system. The effect on the accuracy is calculated (and configured as parameter) and neither measured nor verified with the true quantity value of a reference standard. The indicating device of entrained air (air entrainment indicator) displays detection and correction and not measurement results. In addition, a measuring instrument which cannot be verified should not to be certified. Thus, these measuring instruments for bunkering fuel should conform to R 117, including the removal of gas, MPE…	Overall review or delete section		****** Heavy discussion within the project group and Team Bunker on the best way to implement measuring systems for bunkering into R 117. It is required that measuring systems for bunkering are implemented in R 117 as decided by the CIML. Section 5.13 has been heavily amended taking into account comments from France, Australia, South Africa and CECOD. *[Team Bunker]* During type evaluation air is measured, and the effect of air is determined & quantified. Manufacturers will provide an improved explanatory section for 2CD to prevent future confusion (to be inserted into Annex B of R117-1). Disagree, these systems can be verified, however, for now Initial Verification is not included in Annex K.
FR-11	5.13.1	/	E	The definition of bunker fuel is not clear	The technical characteristics shall be completed in this paragraph to prevent false interpretations		*[Team Bunker]* Agreed. Definition for Bunker Fuel added in terminology section T.b.2.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-48 JLLG	5.13		Gen.	The section and its complement in R117-2 (Annex K) introduce aerated phase metering, a new concept not in line with actual basics of R117 and not in force in legal metrology. Aerated phase metering does not comply with R117 that deals with liquid measurement and that focuses namely on air and gas elimination for all the MS (Measuring System) it specifies. If an aerated phase metering is to be introduced, specific requirements and tests should be recommended for such meters and such MS in order to assess the accuracy of the meter or of the MS, and in particular for both types of aerated phase (slug-flow or stripping and bubble flow). The section introduces detection and correction of the presence of air without measure of the quantity of air passing through the measuring system. The effect on the accuracy is calculated (and configured as parameter) and neither measured nor verified with the true quantity value of a reference standard. The indicating device of entrained air (air entrainment indicator) displays detection and correction and not measurement results.	Overall review or delete section	H	** Agree that the section introduces detection and correction of the presence of air. See also response to FR-10.
CECOD-49 JS	5.13		Tech	Second and third sentence The following requirements apply to all measuring systems used in a bunkering application and/or utilizing a special bunkering vessel (such as a "bunker barge"). These sentences reverse the first sentence of the paragraph and change the meaning of the first sentence. The most common application of these types of systems is a bunker barge that is used to deliver high-viscosity "bunker fuel" to fuel large ocean-going ships. Bunkering systems may also be used to deliver other liquids to the ship (such as marine diesel or lubrication oil).	Delete the second and third sentence of the paragraph	H	*[Team Bunker]* Agreed. Second and third sentence of 5.13.1 deleted. Note added to 5.13.1.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-50 JS	5.13.2		Tech	A bunkering vessel is used as a measuring device for back flow. What types a measuring device is the bunkering vessel? Do we talk about static measurement? Approval of a bunkering vessel for the measurement of reverse flow (see 5.7.3) must be fully documented. See also 2.10.4.2.	Only a dynamic metering system can be approved	H	*[Team Bunker]* Agreed; only bunkering systems are Approved; not Vessels. When a system is capable of bi-directional flow, it must be evaluated bi-directionally. Text added in 5.13.3.
CECOD-51 JS	5.13.3		Tech	This is not in line with this recommendation (all systems of this recommendation based measurements of liquid without air, otherwise two phase measurements). The minor part of the delivery is unknown and can only be defined after the measurement. The effect of air is estimated and not measured. The liquid to be measured in the system may include air during a minor part of the delivery period.	Delete this sentence	H	*[Team Bunker]* During type evaluation air is measured, and the effect of air is determined & quantified. See response to FR-10.
CECOD-52 JS	5.13.3		Tech	The result based on guessing and not measuring. This Recommendation deals with measuring and legal metrology. Using the required additional detection/correction provisions, the effect of air on the accuracy of the transferred quantity is calculated as the flow-weighted average and shall not exceed the quantity given in Line C of Table 3 of the total transferred quantity at completion of the delivery/transaction.	Delete this sentence	H	*[Team Bunker]* During type evaluation air is measured, and the effect of air is determined & quantified. See response to FR-10.
CECOD-53 JS	5.13.3		Tech	This requires a real measurement of the air and liquid but this is not the fact. Therefore this feature lead the customer to believe there is a measurement but in the case of an alarm the measurement is no longer in line with requirements of legal metrology. An alarm is required when the effect of the air on total quantity exceeds Line C of Table 3. (During the transaction, this effect may temporarily exceed Line C of Table 3.)	Delete this sentence	H	*[Team Bunker]* The alarm is part of the checking facility and has been implemented in 5.13.4. See also responses to FR-10 and South Africa-9.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-54 JS	5.13.3		Tech	Not the effect of air but the amount of air has to be measured. The measured amount of liquid has to be corrected with the measured amount of air. Not in line with the spirit of this recommendation. Note: The effect of air on the accuracy will be quantified during type evaluation to configure this as parameter within the system.	Delete this sentence	H	*[Team Bunker]* During type evaluation air is measured, and the effect of air is determined & quantified. See response to FR-10.
South Africa-9	5.13.3			Paragraph 2: Include requirement that a device should be fitted to indicate the presence of entrained air. Paragraph 3: What type of device is this refered to? Paragraph 4 (note) Explain how this should be quantified to fully understand the requirement.	Indicate checking facility type		*[Team Bunker]* Agreed. Should be type P, see amended text. See future explanatory section Annex B to give additional information about the bunkering procedure. See also response to FR-10.
JP-11	5.14 Meas. sys. for LNG	Annex L.1	Gen.	Scope of the measuring systems for LNG is not clear. Does it also include a system other than fuel dispensers? The first sentence of L.1 suggests that large industrial systems could be included. If so, what kinds of system are anticipated?	Target measuring systems should be clarified in 5.14. If systems other than fuel dispensers are included, several examples might be given.		*[Team LNG and Fuel dispenser]* Accepted, adding definition T.L.1.
AU-16	5.14.1		techn	Quantities of gas transferred via vapour return line need to be measured and subtracted from the delivered quantity as per 5.14.7. It is not clear how this can be achieved without a meter in the vapour return line.	This clause needs to consider allowing meters in the vapour state during measurement.	H	*[Team LNG and Fuel dispenser]* Rephrased: The design and operation of an LNG measuring system shall ensure that the product in the **liquid** meter remains in a liquid state during the measurement.
CA-4	5.14.3		tech	Comment. MC MMQ dispensers <= 20kg. MC has been approached to increase this value to 40 kg. How to define dispenser? Is there a need to differentiate between dispenser and refueller (hi-speed ≤ 225 lpm)?			*[Team LNG and Fuel dispenser]* Canada reconsiders, agrees with the current text of 5.14.3. and withdraws this comment.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CA-5	5.14.6		tech	– delivery hose should be expanded to include delivery hose and all piping downstream of the meter and up to the fill nozzle (transfer point). MC has run into issues where the hose volume was addressed, but not the rest of the piping causing significant measurement errors.			*[Team LNG and Fuel dispenser]* Accepted, all piping downstream of the meter should be taken into account. The first paragraph of section 5.14.6. has been modified to clarify this section.
CA-6	5.14.6		tech	5.14.6 – reset to negative value is not always accurate if hose is only partially emptied between deliveries. Is it acceptable to require total volume for completely empty or is actual volume required? Is a tolerance required in order to allow proper evaluation of this? The hose may not be completely empty at the start of a transaction. Delivery interruption is an issue that has been encountered. During this time, there is the potential for a delivery hose to drain and cause errors. MC is considering prohibiting delivery interruptions during a single transaction.			*[Team LNG and Fuel dispenser]* Accepted. The second paragraph of section 5.14.6. has been modified to clarify this section.
AU-18	5.14.7		techn	Some liquid is often transferred during fuelling. Therefore a vapour return meter should be installed to manage this circumstance. Meter lineal range is critical. Coriolis meters don't care what is passing through, but must not exceed max linear range.	Does the clause need to mandate the use of a meter on the return line?	M	*[Team LNG and Fuel dispenser]* This subject was heavily discussed during the project group meeting in Delft. Section 5.14.7 was heavily modified and extended.
CA-7	5.14.7		tech	5.14.7 "There shall not be an ability to flow liquid between the delivery tank and the receiving tank through the gas return line." Does this mean a physical impossibility or merely a prohibition?			*[Team LNG and Fuel dispenser]* Agree. The last paragraph of section 5.14.7 was modified.
AU-19	5.14.9		techn	Releasing significant quantities of vapour into the atmosphere should be avoided and would only be considered outside of normal operating activities. Remember, the customer has already paid for this product. Releasing it is wasteful and should not be supported by OIML, NMI or industry.	For consideration by the TC/SC. Should venting to atmosphere be allowed by this Recommendation?	M	*[Team LNG and Fuel dispenser]* Accepted. A note 2 was added to 5.14.9.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CA-8	5.14.10		tech	5.14.10 "In no case shall the outlets of the safety valves located upstream of the meter be connected to the safety valves located downstream by pipes (which would bypass the meter)." Suggested clarification in red.			*[Team LNG and Fuel dispenser]* Accepted: changed "safety valves" to "pressure relief valves". Also change this in 5.4.6 of R117-1 and Annex L.7.2.c of R117-2
AU-21	6.1.2.2		techn	With reference to both the 5th and 6th dot points. "Manufacturer's desired test severity level for electrical disturbance tests" &"…for temperature, humidity and mechanical tests" This is not usually up to the desire of the manufacturer but up to the requirement of the type approval authority. It should be made clear if this is really an option for the manufacturer. If not the required severity of the electrical disturbance tests should be specified.	The wording of the dot points should be revised to indicate that the severity levels may also be set by national type approval authorities.	M	** Within the context of R117, the manufacturer DOES need to decide severity levels for type evaluation testing. He makes this decision with the knowledge of the requirements that exist in countries where his instruments might be placed into service. A note was added at the end of section 6.1.2.2. to reflect this.
NL-29	6.1.2.2.		techn.	EMC requirements are missing	Add tables similar to the tables 2, 3 and 4 of OIML R 139-1	H	** While this is a good idea, convenor has decided to not implement this change because of concerns over confusion with having these testing requirements in R117-2. Further, R139 is a simpler recommendation in this regard because it does not allow for multiple severity levels.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL-30	6.1.2.2.	4; Annexes	gen. techn.	Guidance on which EMC/Climate/Vibration requirements have to be used on which installation is missing. In Part 2 clause 4 a copy is made of OIML D 11 .Choices shall be made on the applicability of test levels to the specific installations while specific installations can for technical reasons only be applied in specific environments. E.g. residential environment is probably not applicable to fuel dispensers and surely not to the installations mentioned in Annex F and Annex G. This implies that there is no complete free choice regarding the applicable test levels.	It is accepted that R 117 requires specifying different test levels, even per installation. The Annexes however should be more restrictive. Select for each Annex the applicable environmental classifications (Mx, Ex and Hx). For the format it is suggested to add a table containing all measuring systems similar to table 1 of this part 1 of the Recommendation and add the applicable (minimum) environmental classifications and the minimum temperature range.	H	** Accepted. Table added in newly created section 6.1.2.2.4.
FR-X	6.1.2.2.4		gen	Big Table currently in R117-2 Section 4.9.1.1 should be in R117-1	Move this table to R117-1		** Agreed to have this table in R117-1 See response to NL-30 above. Convenor has decided to have this Table also duplicated in R117-2 for convenience of testing authorities.
AU-x	6.1.2.2.4		gen	All tables should be numbered.	Number all tables.		** Agree, accurate chronologic numbers will be added before the official publication.
AU-22	6.1.5		techn	We generally support the concept of exempting meters without moving parts. However, there is an argument that Coriolis meters do actually contain mechanical moving parts. We would suggest the wording of the clause more accurately reflect the intent to exclude certain meter types from endurance testing. Secondly, the NOTE is somewhat confusing in that it potentially provides an argument for conventional mechanical meters to be exempted as well. Since they too will be subjected to over 100 hours during the other tests.	Review the wording "without moving parts and parts under mechanical stress" and replace with wording that more accurately reflects the intent. We suggest removing the NOTE entirely.	H	** Endurance testing for various meter technologies has already been heavily discussed and decided by the project group. The decision has been made that Coriolis meters will not be subjected to endurance testing. Agree with proposed change; suggested text slightly modified. Agree to remove note.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-55 JS	6.1.5		Tech	Where are the 100 h defined? Is this valid for all meters? Where are the parameters for the tests Note: The "durability" requirement is met without this endurance test because the meter will be running for more than 100 hours during the other tests.	Requirements are needed to define	H	*[General Team]* See R117-2 section 5.4 for the details of this test.
CECOD-57 PCL	6.1.5		Tech	Same as 3.1.2.3, but higher level as the assumption of no moving parts in some meters is now not under "note" (informative) level, but higher	Modify to The endurance test is applicable to meters with moving parts and parts under mechanical stress (this means that Coriolis, ultrasonic, and electromagnetic meters require proper risk-assessment to undergo adequate endurance test possibly excluding real-liquid testing), as per 3.1.2.3 note and	H (1)	** Endurance testing for various meter technologies has already been heavily discussed and decided by the project group. The decision has been made that Coriolis meters will not be subjected to endurance testing. Text of 6.1.5. concerning endurance testing has been modified.
NL-31	6.3		gen.	Amend the sub clause by adding some guidance	suggest to add: "*Subsequent verification may be performed in an identical manner as the initial verification*,"	M	** Agree, amended sentence added as a note..
CZ-3	6.2.2.1	Annex A, B, D?, G, K?, L	gen.	• *when necessary, a test of the variations of the internal volume of the hoses in full hose measuring systems, e.g. in the case of a hose reel*; Procedure of testing the variations of the internal volume of the hoses is the same for several kind of measuring systems.	to remove the description of testing variations of the internal volume of the hoses from those annexes, and place it as general procedure		** The current text provides enough information and does not need to be changed. No change to the text.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP

Convener					The following is a Summary of the software team's observations from the PG meeting in Delft:
					
					 1. There is information on testing of software missing in part 2.
					
					 Many of the Australian and New Zealand comments refer to giving information on what needs to be done during testing or on interpretation of the requirements.
					
					 Solutions suggested
					
					    a. Adding the missing testing part (2 tables and explanation of abbreviations)
					
					    b. Referring to OIML D 31 for background information
					
					 2. Some of the clauses that origin from OIML D 31 the comments are rather editorial.
					
					 Solution: no changes suggested
					
					 3. A few maybe needing some response from software (e.g. Welmec WG 7) experts
					
					 4. As a consequence of the AU and NZ comments it is suggested not to integrate the code inspection and walkthrough (this is yet only the case when software download is acceptable, as in described in R 139-2)		

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP

AU-24 NZ	Annex A		techn	Having looked at this Appendix and the associated OIML D31 we think that this approach to regulating the software used in liquid dispensers is flawed. It consists of a set of requirements that in many cases are specified to be correct if an observer reads the source code. This can show the intent of the code but events in other parts of the code can cause this to be untrue.
				
				I think that the intent of this appendix is twofold:
				
				   1) Ensure that the software operates correctly as specified.
				
				   2) Ensure that no fraudulent activity is going on.
				
				The only really sure way of doing this is by the use of verifiable and validated code and ensuring that the code is physically secure. This concept is shown in Diagram A below (following comments format).
				
				This approach would give everyone confidence that that the software was error free and had not been modified for fraudulent purposes.
				
				It is our view that this appendix should not be mandatory as it can prevent the introduction of innovative software functions and features that are the hallmark of progressive products and companies. In cases where fraud is a big problem then this appendix may be relevant, but it should not be introduced in all cases. Administrations with a fraud problem should be able to specify it but it should not be a requirement for conformance with R117.
						H	*[Team Software]*
							
							Any other organisation should generally consider the certificate rather than asking again the coding (which could be subjected to intellectual property).
							
							This section is mandatory, as the testing authorities need to check to make sure the software operates correctly and is supposed to perform what it is designed to do so.
							
							The team suggests the entity (who submitted the comments) to refer to D31 and R139 documents to see if it answers their concerns.
							
							The procedures in R117-2 for software testing are missing. The team suggest to include/copy Table 1 and Table 2 from the OIML R139-2.
							
							(these are now added in R117-2, Chapter 9)

AU-25	Annex A		techn	How do the requirements of Annex A impact upon the initial and subsequent verification of flow metering systems which incorporate some form of software? What level of interrogation is required at verification? Should software version be checked? Is there need for some form of software validation/verification?	For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117.	H	*[Team Software]* Suggest to add the tables 1 and 2 from R139-2 into OIML R117 (these are now added in R117-2, Chapter 9)

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL-32	Annex A		gen	Annex A better could be part of the "main document".	Consider to renumber to be clause 7 instead of Annex A.	M	*[Team Software]* This is an editorial change. The convener could deal with this. The team suggest that if this possible to change the Annex to a clause.
NL-33	Annex A.1.1		tech	It is not clear what to do if a (part of an) instrument has no display or printing capability	Amend by adding: *For small parts without a display and without bidirectional communication software identification by means of an inscription is permitted.*	H	*[Team Software]* amended using some different wording

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-26 NZ	A.1.1		techn	This may be complicated to specify. Legally relevant software may exist on more than one processor in the equipment. If a processor is running legally relevant code and non-legally relevant code the build of that code running on that processor could change due to changes in non-legally relevant code. This could entail re-approval for non-legally relevant software changes. If there is an operating system involved so that some functions of the legally relevant software depend on the operating system should the operating system code be declared? The problem in particular with approval of operating systems is that security maintenance is an ongoing issue, which drives routine changes, major and minor. The point of sale system that communicates with the measuring system (e.g. a fuel dispenser) is a factor in the code required to communicate with it. This code will be legally relevant as it sends the quantity of fuel delivered and the price to the point of sale system. The fundamental problem with POS communication is that POS systems are not necessarily designed/manufactured by dispenser manufacturers, i.e. these manufacturers have zero control over the POS system design. A multiplier on this problem is that there are many suppliers of POS systems, each with its own unique set of challenges. Operation with a different point of sale system can have "unknown" outcomes and so the point of sale system and point of sale software should be defined. The code in an encoder may be running as a standalone system. It might be read that the encoder must be required to provide version information to the dispenser controller electronics. Is this the intention of the wording? Giving the identification of the encoder code would be meaningless as it will be difficult to check.	The comment is provided for discussion and consideration by the TC/SC. However the requirements regarding legally relevant software as specified should be reviewed given the potential difficulties encountered in enforcing compliance in all instances.	H	*[Team Software]* Information in part 2 is missing May be for details contact the correct software expertise (may be WELMEC) New Chapter 9 is added in R117-2
CECOD-58 JS	A.1.1		Tech	How to deal with equipment which has neither a display nor a printer port.	For equipment which has no standard communication interfaces for displaying or printing auxiliary equipment can be used for verification.	H	*[Team Software]* See NL-33

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-59 JS	A1.2		ed	Specify the type of algorithms and functions in the title.

A.1.2 Correctness of algorithms and functions

Delete measuring, it is now in the title

The measuring algorithms and functions of the measuring system and/or its constituents shall be appropriate and functionally correct.

It shall be possible to examine algorithms and functions either by metrological tests, software tests or software examination. | Change to

Correctness of metrological algorithms and functions

Delete measuring when the title is changed

Change to

It shall be possible to examine algorithms and functions either by testing the measuring system with simulated inputs or software examination. | H | *[Team Software]*

Accepted

Accepted to change to:

It shall be possible to examine algorithms and functions either by functional testing the complete measuring system or stimulating testing or software examination. |

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| AU-27 NZ | A.1.2 | | | We understand the requirement for wanting to be sure that the algorithms or functions do what their specification says that they do. However we see that this is very difficult to check.

This section says that it can be done by:

 Metrological tests.

This can check that the function is carried out in terms of say measuring the quantity dispensed. However this will not show that under some situations a buffer overflow, integer rollover, divide-by-zero, dangling pointers, race conditions, resource deadlocks could occur and values written into other variables or code thus causing problems.

Software tests.

This is a rather loose term. It usually refers to checking that the function that you expect to happen did happen. Again it will usually not pick up buffer overflows or problems with values being stored in inappropriate variables.

Software examination.

By this method the code would be manually inspected. This will only show the reviewer the intent of the code, not the problems that could be encountered if an invalid value is returned, or what happens if values are out of range. This method also has the issue of intellectual property rights being protected. If the code is made available for inspection the intellectual property of the company may be being compromised. Companies will be reluctant to take this risk unless eg. inspection is done on company premises with no retention of the source code by the inspector.

Examination of code or software testing can never prove 100% coverage whereas software verification can. Edsger Dijkstra is quoted as saying:

"Testing shows the presence, not the absence of bugs"

Dijkstra (1969) J.N. Buxton and B. Randell, eds, Software Engineering Techniques, April 1970, p. 16. Report on a conference sponsored by the NATO Science Committee, Rome, Italy, 27–31 October 1969. Possibly the earliest documented use of the famous quote. | For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117. | H | *[Team Software]*

The table from R139-2 details the type of testing

This will be added to R117-2

Now added in Chapter 9 |

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-28	A.1.3.1		techn	If the software is physically sealed or restrained it means that it is going to be impossible or extremely difficult to upgrade the code for future enhancements. Is there a criteria for what is acceptable in terms of mechanical sealing? For example would a bar over the top of a memory chip and locked in place with a lead or plastic seal be acceptable?	Advice and guidance should be provided regarding the minimum criteria for sealing and compliance with this clause.	M	*[Team Software]* No change The manufacturer should provide a solution and the Authority should verify whether this solution is acceptable. The WELMEC guide may be used for guidance.
CECOD-60 JS	A.1.3.1		Tech	Software protection (against fraud) The software has to be secured anyhow and not only against fraud A.1.3.1 (Second sentence) In addition to mechanical sealing, technical means may be necessary to protect measuring systems equipped with an operating system or an option to load software. Why secured by mechanical sealing. It is not written in the first sentence.	Title: Delete (against fraud) Delete to mechanical sealing A.1.3.1. In addition to mechanical sealing, technical means are necessary to protect operating systems against loading not authorized software during start-up.	H	*[Team Software]* Not accepted This clause is copied from D 31 We should not change clauses especially if they are taken from a reference doc like D 31
AU-29 NZ	A.1.3.2		techn	Looking at the documentation for a function does not prove that it cannot be used in a fraudulent manner. It is possible to see the intent of the function but identifying how it will be used fraudulently and preventing it is a different matter. This also impinges on the security of the Intellectual property of the company in the code. If one company has a clever idea of how to prevent fraudulent activity they should be able to capitalise on this.	Advice and guidance should be provided regarding how compliance with this clause could be achieved.	H	*[Team Software]* Further information is provided in D31 and R139 documents. The team suggests including the applicable two tables in the R117-2 document. D31: Section 6.3.2.1(5) details *"When it is not clear how to validate a function of a software program the onus to develop a test method should be placed on the manufacturer."* This allows the manufacturer to come up with a feasible checking solution.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-61 JS	A.1.3.2		Tech	Sometimes the combination of parameters can cause unexpected behaviour and has nothing to do with fraudulent use Only clearly documented functions (see A.3) are allowed to be activated by the user interface, which shall be realized in such a way that it does not facilitate fraudulent use.	Change to Only clearly documented functions (see A.3) are allowed to be activated by the user interface, which shall be realized in such a way that it does not facilitate fraudulent use.	H	*[Team Software]* No change necessary The proposed change is the same as the original content.
AU-30 NZ	A.1.3.3		techn	This is a rather simplistic view of the situation. In some cases static parameters are acceptable and could be secured. However many parameters are dynamic and can change with operation of the equipment. For instance, the valve settings required to open a flow control valve in a closed loop system can be dynamic and adjusted based on fuel pumping pressure and the opening of the fuel delivery nozzle. The parameter has to be accessible to the code to change its settings based on other inputs to the system. How do you control this? How does displaying or printing its value help? Does this rule out the use of adaptive algorithms for some functions?	The wording of the clause should be reviewed to account for exactly which 'legally relevant characteristics' of the system are to be completed secured, and which can be changed during normal conditions of operation.	H	*[Team Software]* The comment is not within the scope of the clause A.1.3.3. Further information can be found in document OIML D 31 and the added clauses in R 117-2 A sentence is added in the beginning of the Annex to indicate that the software requirements are as per D 31.
CECOD-62 JS	A.1.3.3		Tech	Add a sentence for devices which have neither a printer nor a display but are set up via a special factory interface.	To be specified	H	*[Team Software]* No change required. The clause gives the option for the manufacturer to provide this information on other external devices.
AU-31 NZ	A.1.3.4		techn	Would unauthorised intervention also include people accessing internal cables. This appears to just be a statement. There is no guidance on how impossible the intervention must be.	Advice and guidance should be provided regarding how compliance with this clause could be achieved.	M	*[Team Software]* Cannot give specific guidance. The manufacture has to take care of providing all necessary means to secure the software.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-32 NZ	A.1.4		techn	This falls into two categories, Faults in the measuring system as a whole (hardware faults or mechanical faults) and faults in the software. The detection of mechanical faults and the documentation of how to detect them seems sensible. For detecting faults in software looking at parameters and reviewing the code is not very satisfactory. Some sort of software verification is required.	For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117.	H	*[Team Software]* Software verification is detailed (Refer to C3 of R139-2 and Description in sec 6.3.2.2 of D31) *"The approval test methods is not aimed primarily at validating the software, the test result can be interpreted as a validation of some software parts, in general even the metrologically most important. If the tests described in the relevant OIML Recommendation cover all the metrologically relevant features of the instrument, the corresponding software parts can be regarded as being validated. In general, no additional software analysis or test has to be applied to validate the metrological features of the measuring instrument."*

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-63 JS	A.1.4	.	Tech	I do not really understand the requirement The detection by the checking facilities of faults as to prevent significant faults to occur may be achieved by software. In such a case, this detecting software is considered legally relevant. The documentation to be submitted for type evaluation shall contain a list of parameters which may generate faults and will be detected by the software including the expected reaction and in case necessary for understanding the detection algorithm, its description.	My understanding would be The detection of faults or significant faults by the checking facilities and how to act upon it may be achieved by software. In such a case, this detecting software is considered legally relevant. The documentation to be submitted for type evaluation shall contain a list of parameters and their valid and controlled ranges which may generate faults Faulty parameters and will be detected by the software including the expected reaction and in case necessary for understanding the detection algorithm, its description.	H	*[Team Software]* Accepted using some different wording Software may be involved in the checking facilities used for the detection of faults and to act upon significant faults or to prevent these significant faults to occur. In such a case, this detecting software is considered legally relevant. Further suggested change has typo, to change as below: The documentation to be submitted for type evaluation shall contain a list of parameters and their valid and controlled ranges which may generate faults and will be detected by the software including the expected reaction and in case necessary for understanding the detection algorithm, its description.
AU-33 NZ	A.2.1		techn	How do you determine what is inadmissibly influenced? In hardware this may be possible but in software it is more difficult. A buffer overflow in one part of the code could affect a variable in another piece of code. This could be inadmissibly influencing a function of the system and software verification is required. Please refer to AU's comments to A.1.2 above.	It is suggested that software validation/verification procedures are required in order to determine compliance with this clause.	H	*[Team Software]* In R 117-2 the software verification has been added (See sub clause 6.3.2.2 of D31)
CECOD-64 JS	A.2.1		ed	First sentence no in line to the title Metrologically critical parts of a measuring system -	Change to Metrologically relevant parts of a measuring system -	M	*[Team Software]* Accepted, it is suggested to change as below: "Metrologically **relevant** parts of a measuring system….."

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-34 NZ	A.2.1.1. a		techn	This should be identified in the form of the diagram in B.1.3	Please provide a diagram similar to that in B.1.3.	M	*[Team Software]* Cannot provide specific diagram, it is up to the manufacturer and type evaluation authority to identify legally relevant constitute.
CECOD-65 JS	A.2.1.1. b		ed	It shall be demonstrated that the relevant functions and data of constituents cannot be inadmissibly influenced by commands received via an interface.	Add legal It shall be demonstrated that the legal relevant functions and data of constituents cannot be inadmissibly influenced by commands received via an interface.	M	*[Team Software]* Accepted, change to: It shall be demonstrated that the **legal** relevant functions and data of constituents cannot be inadmissibly influenced by commands received via an interface.
AU-35 NZ	A.2.1.1. b		techn	How do you demonstrate that data cannot be inadmissibly influenced in a fool proof way? How do you certify this? The only way we can see is by the use of verifiable software.	For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117.	H	*[Team Software]* In R 117-2 the software verification has been added (See sub clause 6.3.2.2 of D31)
AU-36 NZ	A.2.1.2. a		techn	We think that in our case all our software may fall into the category of legally relevant. This is an issue as it would mean showing all of our intellectual property. If new code is being written to allow new features that do not affect the metrology of the system how can this be done and let the system retain its certification.	For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117.	H	*[Team Software]* It is generally speaking not required to provide the software code as part of approval evaluation The onus is on the manufacturer to design the software so the legally relevant part is differentiated from non-legally relevant part.
AU-37 NZ	A.2.1.2. b		techn	In clause 3 it says that the software interface shall not be circumvented. How would this be determined? It needs to be specified how this would happen.	Advice and guidance should be provided regarding how compliance with this clause could be achieved.	M	*[Team Software]* We cannot give guidance. The manufacturer has to come up with options to fulfil this requirement and it's their discretion on how to restrict this happening.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-38 NZ	A.2.1.2. d		techn	If there is an operating system running how do you handle interrupts? Interrupts are all but essential in reactive realtime embedded systems. If an interrupt occurs while a piece of legally relevant software is running what is the situation?	For consideration and discussion by the TC/SC in the ongoing development of Annex A of OIML R 117.	H	*[Team Software]* If the manufacturer envisages an event (an exceptional case) that there is a possibility of prioritising the non-legally relevant software, in such case the manufacturer is expected to document this with the evaluating authority.
CZ-7	A.2.2		techn	*A display or printout may be employed for presenting both information from the legally relevant part of software and other information.* There is advisable to avoid the confusion of information.	After the first sentence to **add:** *The information generated by the legally relevant part of software shall be shown such a way that confusion with the other information is avoided.*		*[Team Software]* Accepted:
AU-39 NZ	A.2.3.1		techn	*A.2.3.1 The measurement value stored or transmitted shall be accompanied by all relevant information necessary for the future legally relevant use.* What extra data needs to be sent? This should be defined.	What extra data needs to be sent? This should be defined.	M	*[Team Software]* Accepted. Something similar as detailed in T.2.8.1 of R76-1 document could be included.
Information							*[Team Software]* **R76-1** **T.2.8.1 Legally relevant software** Programs, data, type-specific and device-specific parameters that belong to the measuring instrument or module, and define or fulfill functions which are subject to legal control. *Examples:* Final results of the measurement, i.e. gross, net and tare / preset tare value (including the decimal sign and the unit), identification of the weighing range and the load receptor (if several load receptors have been used), software identification

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-40 NZ	A.2.3.2		techn	If error correction is built into the data or communication between modules would this be an acceptable way of guaranteeing this? It should be specified as to acceptable methods of ensuring this.	Advice and guidance should be provided regarding how compliance with this clause could be achieved.	M	*[Team Software]* The manufacturer should come up with a suitable solution.
AU-41 NZ	A.2.3.3		techn	If cryptographic means are used to communicate over an open network then key security is important. The method of handling keys and key physical security should be defined .	The method of handling keys and key physical security should be defined.	M	*[Team Software]* The manufacturer should come up with a suitable solution.
AU-42 NZ	A.2.3.5		techn	Does this mean that a manual dispense cannot be performed if the communication with the Point of Sale is lost? Is it permissible to make deliveries as long as the internal memory can record the data?	Could clarification be provided perhaps in the form of a NOTE?	M	*[Team Software]* Accepted: Replace, "The measurement process should be stopped to avoid the loss of measurement data." With *"If there is a risk of loss of measurement data, the measurement process should be stopped."*
AU-43 NZ	A.2.4		techn	What does normal storage conditions mean? It says "all data that are necessary for the calculation must be automatically stored" It is not clear to what level this applies. Can we record that the encoder measured 20 litres or must we record how many encoder pulses were received on each of the quadrature channels?	Could clarification be provided regarding the type of data required to be stored?	M	*[Team Software]* Storage conditions could be device specific. So cannot give specific advice on 'normal storage conditions'. Several parameters could be involved in calculating a measured value. E.g. temp, density etc. So it is up to the testing authority to determine the various parameters to be stored.
AU-44 NZ	A.2.5		techn	This appears to conflict with A.2.3.5 particularly in the case of a POS communication failure.	Could clarification please be provided.	M	*[Team Software]* Actioned, refer to AU42.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-66 JS	Annex B		Tech	Reference in table B1.3 "associated measuring devices" to paragraph 2.6.2 was made but this paragraph deals only with meters	Correct table B1.3	L	This table will receive further review before Cape Town.
CECOD-67 PCL	Annex B.5.1.3		Tech	Paragraph 1 of B.5.1.3 needs improvement with requirements in documentation.	Suggest to add the following at bottom of B.5.1.3 Installation requirements linked to air intake/minimum level in storage tank must be specified in installation manual, and manual must highlight the risk of non-conformance of measuring instrument if installation conditions not respected.	H (1)	*[General Team]* Disagree. Don't need this additional "documentation requirement" in the "Advice Annex."
				End of Part 1 comments. Part 2 comments begin below.			
NL-34		1	gen.	"*National or international regulations are expected to clearly specify which measuring systems for liquids other than water are subject to legal metrology controls. For waste water measurement, it is up to the national authorities to decide whether the use of measuring systems conforming to this Recommendation is mandatory, and which accuracy class is required.*" As written this is an instruction which should not be part of a scope. The text probably is intended to be informative and some advice to the national authorities. However in the case of "waste water" it does not provide any information.	start this paragraph to read "note" This Recommendation may also be applied for jurisdictions where waste water measurement is under legal control	M	** The scope was brought in line with the scope of the R117-1.
AU-45		1	gen	The definition of a "Cryogenic liquid" contained in OIML R81 is – "A fluid with a boiling point of less than 120 K (–153 °C) under atmospheric pressure conditions, which has been liquefied by refrigeration." With LNG being specifically included within OIML R 117, it must be identified in the Scope and not hidden within a table. NOTE R81 must be revised to clearly exclude LNG from its requirements. Without this amendment, the requirements for both R81 and R117 would legally apply. e.g. Dynamic measuring devices and systems for cryogenic liquids, excluding LNG	We suggest the following wording for the 2ⁿᵈ paragraph: "…this Recommendation applies to all dynamic liquid measuring systems fitted with a meter, whatever the measuring principle of the meters or their application, *and also includes the measurement systems for the cryogenic liquid LNG.*"	H	*[General Team]* See response to AU-3 related to section 1 of R117-1

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
DK-9		Annex: Initial verification	gen	An annex describing the generic and common procedures/requirements during initial verification. This to avoid different description, and different possibilities in what should be the same requirements for all types of instruments. Furthermore, not all measuring systems/ instruments are covered in an annex e.g. stock measuring systems – so for these systems a common initial verification annex is preferable and good to have – despite not having a specific description of possible special conditions. In the instrument specific annex – additional special conditions during initial verification, can be described.	Add an Initial verification Annex with procedures/requirements for the initial verification, which are common for all types of MS	H	** Discussed by General break-out team and also discussed by PG. Volunteers have not come forward to develop an Initial verification annex and so a new annex has not yet been produced. If proposer is able to develop such an annex, it will be reviewed by the PG.
AU-47		2.2	gen	We encourage and recommend that further drafting work be undertaken by the Committee and that it be issued for further public comment.	NA	L	** Noted
JP-13		2.2	Gen.	The scheme of initial verification is usually specified by the national authority of each member country. We therefore propose adding a note about the initial verification.	Add a new note as proposed below for example. Note: Requirements and procedures for the initial verification may be specified by the national authority.		** Agree, note added.
NL-37		3	gen.	Confusing having certain symbols mentioned (defined) more than once	Suggest to at least split up symbols, units and equations in 3 sub clauses	M	noted
NL-38		3	gen.	Added Symbol Viscosity is wrong see: http://ciks.cbt.nist.gov/~garbocz/SP946/node20.htm	Apply correct symbol for viscosity η or υ plus definition	M	done
NL-40		3	gen.	"Range" is a too generic word to restrict the definition only to an error range	If necessary to define it is suggested to apply "Error range"	H	** Line modified in section 3.
AU-48		4	gen	For the purposes of influence tests and disturbance tests, should the Recommendation define a "reference flowrate" for all testing to be performed at? For example, 0.7*Qmax or a flowrate defined under 5.3.2.1?	For consideration and discussion by the TC.	M	*[General Team]* Discussed by project group in Delft. Since most of this testing is done using "simulated flow", it was decided to not change the text of section 4.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL-41		4.2	gen./ edit.	"When a test is conducted, the expanded uncertainty of the determination of errors on indications of volume or mass shall be..". By the way formulated in plural it could be interpreted that each separate error in one test is to be approached separately. The concept of measurement uncertainty evaluation is to establish the combined uncertainty related to the error of indication.	Suggest to change to: When a test is conducted, the expanded uncertainty of the determination of the error on indication of volume or mass shall be..".	M	** Agree Text amended.
NL-42		4.2	gen./ edit.	$k = 2$ does not necessary mean a 95 % coverage. It only applies for normal distribution and no dominant component of uncertainty having a different distribution curve.	Change $k = 2$ to 95 % coverage	M	Text modified.
NL-44		4.2.2.	edit	There has been some discussion about the term "reduced MPE" because the MPE remains the same, but the acceptance criteria are reduced.	Replace "Reduced MPE" by "Acceptance criteria"	M	Comment understood. However "reduced "MPE" has common usage. No change at this time.
PRC-5		4.2.2	tech.	When calculating the expanded uncertainty, the resolution but not the repeatability of the EUT shall be included.	When calculating the expanded uncertainty, the bigger value of the resolution or the repeatability of the EUT shall be included.		Disagree.
SE-2		4.8.6	tech	"The power to the EUT shall be switched off before the temperature is raised." This is not correct, the EUT shall be powered during the complete test.	Change to "The power to the EUT shall be switched on." or delete the sentence.		Sentence deleted.
SE-3		4.8.7	techn	Damp heat cyclic still looks like an influence test (MPEa) in table 4.8.7 (but as a disturbance test in 6.1.4, 6.3.1.3, 6.3.2.3, 6.4.3 and 8.2.2). MPEa is fine with me, but can it be combined with a disturbance test? Under "Test procedure in brief" it is stated "During the test, the EUT shall be in operation", but in all other places the EUT shall be switched off..	Delete "During the test, the EUT shall be in operation".		Decision on this in Cape Town.
SE-4		4.9.1.1.	techn	Note (1) in table with severity levels states a different test procedure for integrating instrument; NSFa. This is in contradiction with the text in 4.9.5, 4.9.7, 4.9.8 and 4.10.3 where it is stated that the EUT shall be in operation at one flow rate (NSFd). The wording "analog" and "digital" is out of place, not from D11:2013.	Delete note 1. (In D11:2013 this procedure is referred to for water meters etc but not for MS for LOTW.) and note (2), and change to NSFd.		Decision on this in Cape Town.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
SE-5		4.9.1.1.	techn	For 4.9.10 the table states NSFa, but in 4.9,10 it is NSFd (same error in D11:2013, table 5 and 27).	Change from NSFa to NSFd for 4.9.10 in the table 4.9.1.1..		Decision on this in Cape Town.
JP-14		4.9.1.1 (Second table)	Tech	In the second table, only test level (index) 3 of OIML D 11 is specified in some test items. Levels 1 and 2, which are included in D 11, should be also allowed.	Test levels 1 and 2 should be added to the test items in which only level 3 is specified at present.		Disagree.
JP-15		4.9.1.1 (Second table)	Tech/ Edit	'**Test Level for class**' for the row '4.9.2.2' in the second table should conform to the requirement in '**Applicability**' in Table 4.9.2.2 (DC mains voltage variation in p.26), which specifies the test level (1) for the class E2. This comment also conforms to the descriptions in 8.4.1 and 12.1 of D 11 (2013).	Add a test level (1) to the class E2 in the row '4.9.2.2' as shown below (in bold). Test Level (Severity Level) for class / Test E1 / E2 / E3 / R117-2 Section 1 / 1 / -- / 4.9.2.1 -- / **1** / -- / 4.9.2.2		Agree.
SE-6		4.9.5	tech	Only direct application for electrostatic discharge is included.	Add indirect discharge to horizontal and vertical coupling plane.		Discuss in Cape Town.
SE-7		4.9.5	tech	According to 61000-4-2 chapter 5, air discharge is performed at all levels; 2, 4 and 8 kV (for contact discharge the product standard rules; R117).	Add 2 and 4 kV for air discharge.		Disagree.
SE-8		4.9.7	tech	Cable length exceeding 10 m (according to D11table 29) or 30 m (according to R117-1:2007)? Both lengths are stated in 4.9.7.	Choose either 10 or 30 m.		10 m. Possible discussion in Cape Town.
SE-10		4.9.11.1	tech	A note according to D11:2013, table 33 that 26-80 MHz can be performed conducted is missing.	Add note.		Discuss in Cape Town.
NL-45		4.9.11.2	gen.	Inconsistency noticed in frequency ranges. (3)	correct	M	Discuss in Cape Town.
SE-11		4.9.11.2	tech	According to note (2) test level 3 is only used if the manufacturer states a minimum distance from the EUT to a transmitter, otherwise level 4 is used..	Delete note (2) or add level 4.		Plan to add level 4, but will discuss in Cape Town.
SE-12		4.9.11.2	tech	Is the maximum frequency 3 (according to frequency range) or 6 MHz (according to note (3))?	Delete note (3) or change from 1-6 MHz to 1-3 MHz in note (3).		*[General Team]* Probably delete note.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-49		Table 5.1	techn	We generally support the concept of exempting meters without moving parts from endurance testing. However, there is an argument that Coriolis meters do actually contain mechanical moving parts. We would suggest the wording of the clause more accurately reflect the intent to exclude certain meter types from endurance testing. Secondly, the NOTE is somewhat confusing in that it potentially provides an argument for conventional mechanical meters to be exempted as well. Since they too will be subjected to over 100 hours during the other tests.	Review the wording "without moving parts and parts under mechanical stress" and replace with wording that more accurately reflects the intent. We suggest removing the NOTE entirely.	H	** Endurance testing for various meter technologies has already been heavily discussed and decided by the project group. The decision has been made that Coriolis meters will not be subjected to endurance testing. Agree with proposed change; suggested text in table 5.1 slightly modified. Agree to remove note.
CECOD-68 PCL		5.1	Tech	In table 5.1, the assumption of no moving parts in some meters is not correct, and shall be bound to risk-assessment Line 5.4 shall be modified from "Only for meters with moving parts/parts under mechanical stress (this means that Coriolis, ultrasonic, and electromagnetic meters are not required to be tested under 5.4)."	To "Meters with moving parts/parts under mechanical stress (this means that Coriolis, ultrasonic, and electromagnetic meters require proper risk-assessment to undergo adequate endurance test possibly excluding real-liquid testing under 5.4).	H (1)	** Text in Table 5.1 edited. See response to AU-49, above.
NL-45		5.1; 5.3.5 5.3.5.6; 5.3.6.4; 5.4	gen	Concerning this sub clause most of the decisions made concerning the comments by NL, (CA and SE) as presented by the convener in the last column of the compilation of comments on the 1CD have not yet been implemented.	Please implement as indicated in this last column of the compiled comments ion the 1CD	H	*[Team Meter]* All NL comments from 2014 are present in 1CD and therefore this comment is no longer applicable.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
SE-14		5.3.1	edit	The text "The test for reading at zero flow rate…" is not good.	Change to "The meter reading at zero flow rate compared to minimum flow rate should not exceed line C, R117-1, Table 2 (OIML R117-1 3.1.5.4)."		*[Team Meter]* Agree with change, proposed text in section 5.3.1. slightly modified. Deleted 5.3.1 from the note as redundant.
SE-15		5.3.1	tech	Vortex meters do not have a "fake" signal at zero flow rate.	Delete vortex in note.		*[Team Meter]* Agree, "vortex" has been deleted from the note and "massflow" is changed to "Coriolis".
SE-16		5.3.2.1	tech	For MPE reference is made to line B of R117-1,Table 2, which is correct for meter sensors. But where is reference made to line A for the complete MS?	Add reference to Line B of R117-1, Table 2 in R117-2 Annex A-L, and in R117-3?		** Disagree, section 5 covers only testing of the meter.
NL-47		5.3.2.1	edit.	1 Fill in test report _____ (R117-3). 2 Draw an error-curve with v_i as a function of Q for each liquid and each unit price (optional)	Delete while this concerns instructions which should be part of part 3	M	*[Team Meter]* Agree. Deleted. Also deleted in sections 5.4 and 5.5.
PRC-6		5.3.2.1	tech.	For different type flow meters, such as electromagnetic flowmeter, ultrasonic flowmeter, vortex-shedding flowmeter and turbine flowmeter, the maximal flow velocity is 10m/s, but the capability of measurement and calibration in P.R.China is 7m/s.	$Q(1) = 1.00 \times Q_{max}$ $(0.70 \times Q_{max} < Q(1) < 1.00 \times Q_{max})$		*[Team Meter]* Comment withdrawn by PRC.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL-48		5.3.3.	techn.	Add limits within which you should test, like previously listed in part 1 section B.A.6.2	Testing at the limits of the rated operating conditions may not be required when these limits have a negligible effect on the specific meter technology. When it is determined that the rated operating conditions will affect the accuracy of the meter, the following may be considered: ☐ tests at the limits of pressure are not needed if the maximum liquid pressure is equal to or below 10 bar; ☐ tests at the limits of pressure may be conducted within ± 10 bar of the actual limit; ☐ tests on a liquid with a viscosity up to 1 mPa·s may be used to represent liquids with viscosities up to 2 mPa·s; ☐ tests at the limits of viscosity > 2 mPa·s may be within ± 20 % of the actual limits; ☐ tests at the limits of liquid density may be within ± 100 kg/m3 of the actual limits. ☐ tests at the limits of liquid temperature may be within ± 5 °C of the actual limits. Where the measuring system is intended to measure liquid quantities at temperatures from – 5 °C to + 35 °C, only one accuracy test at one temperature between – 5 °C and + 35 °C is suggested.	H	*[Team Meter]* This is already included in X.5.3.3, (with the exception of the last proposed bullet on limits of liquid temperature). This bullet has been added and other minor modifications were made. A reference is now made from section 5.3.3. to X.5.3.3. It is decided that this section will remain in X.5.3.3. NL now agrees.
AU-50		5.3.4	techn	To ensure consistency of test procedures and comparability of results, it is suggested that the flow disturbance "generators" are more explicitly defined.	The TC/SC should consider inclusion of specifications such as those found in OIML R 137 and/or OIML R 49.	H	** Decision was made that an appropriate amount of flexibility in test procedures is desirable in this section. No text change.
NL-49		6.2	edit.	Concerning this sub clause most of the decisions made concerning the comments by NL as presented by the convener in the last column of the compilation of comments on the 1CD (2011) have not yet been implemented.	Please implement as indicated in this last column of the compiled comments in the 1CD (See next comment and reply from convener. It was agreed by team 6 to delete references to R 117-3)	M	** See reponse to NL comment 2011, below.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
NL comment 2011		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 117-3		*[General Team]* Agreed. References to R117-3 deleted.
AU-51		6.3	techn	With reference to the testing of conversion devices and correction devices, it is suggested that the test procedure and associated test report format include the actual results of conversions and corrections performed by the device under test. It is also suggested that the input values used as part of the test are also recorded.	Please include a step in the test procedure regarding the recording of both input values and the quantities calculated by the EUT.	H+	*[General Team]* This issue was discussed by the project group in Delft. There is an issue of "trust" between test labs. Project group consensus is that too much data is/could be a problem. No text change at this time.
NL-51		Annex A Annex A-I Annex A-LPG Annex A-LPG-I	gen.	Due to the degree of detail this entire section is likely to be too restrictive for its purpose The annexes should be more harmonized Moreover decreasing part-2 will also decrease the size of the test report (part 3)	Amend and describe in general terms the test procedure	H	*[Team LNG and Fuel dispenser]* The comment is a great comment and greatly appreciated. The Annexes related to dispensers have been modified extensively during the project group meeting in Delft. Deletions found in Sections A.6.3., A.6.4., A.6.5., A-I.7.1., A-LPG., A-LPG-Iwere discussed and approved by the project group in Delft.
NL-52		All Annexes	gen.	The annexes should be more harmonized	advice: set up a group to produce a template to be used for all annexes	H	*[Team LNG and Fuel dispenser]* The comment is a great comment and greatly appreciated. The Annexes related to dispensers have been modified extensively during the project group meeting in Delft.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
South Africa-13		A-1.7.1.2 (e) and (h)		MPE requirement incorrectly refered to	Should be R 117-1,2.5.1,line A of Table 3		** Agree, but not relevant anymore since this line has been deleted.
NL-50		A.6.1	techn.	a) All tests to be performed with maximum hose length, hose uncoiled. b) All tests to be done on a complete dispenser. c) If remote nozzle arrangement is part of the type evaluation request (secondary transfer point, usually used on High Speed Truck lines), testing shall confirm that requirements of OIML R117-1 section 5.1.7 are fulfilled. Concerning b) Not in all cases it is necessary to require this test to be performed on a complete dispenser.	Necessary amendment: a) All tests to be done on a complete dispenser if not yet covered by any previous evaluation or by simulation. b) All tests to be performed with maximum hose length, hose uncoiled c) If remote nozzle arrangement is part of the type evaluation request (secondary transfer point, usually used on High Speed Truck lines), testing shall confirm that requirements in Part 1 section 5.1.7 are fulfilled.	H	*[Team LNG and Fuel dispenser]* This comment is withdrawn by the Netherlands because it was already implemented in the 1CD.
SE-21		A.6.5.1.1	tech	These construction requirements are missing in R117-1.	Add corresponding requirements in R117-1 such as special sampling point and sealing.		*[Team LNG and Fuel dispenser]* Moved the second and third paragraph of A.6.5.1.1.to R117-1, section 5.9.5.
SE-22		A.6.5.1.2	tech	"…old mix/injection.."? The volume of gasoline and oil together shall meet MPE, but the oil injection is disabled during test????	Clarify please.		** In the first sentence of A.6.5.1.2. the word "old mix" (a typo) is replaced by "oil" for clarification. Section 5.9.5. was heavily modified and now referenced by section A.6.5.1.2.
DK-10		Annex A-I	gen	The proposed Annex A-I is detailed on aspects which would be relevant for other types of MS as well. Annex A-I could be a good starting point for a common Initial verification Annex for all types of MS and a good Qmax should be defined if the approved Qmax 80%		H	Convenors note: this would be a great idea if team LNG had not decided to remove ¾ of Annex A-I. *[Team LNG and Fuel dispenser]* Rejected, the annex is rewritten otherwise.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
DK-11		A-I.7.1.2	gen	During initial verification, the flowrate of the MS as stated (marked) on the name plate of the MS - should meet the same requirements as for the accuracy test of the meter sensor (R117-1 Annex A.6.1) - which means the highest flowrate during initial verification shall be between 0,8 x Qmax(actual) and Qmax(actual). Further more Qmax(actual)/Qmin, as stated on the name plate of the MS, should fulfill the requirements of 2.3.3		L	*[Team LNG and Fuel dispenser]* Agreed. Text of A-I.6.1.2. modified to require a maximum flowrate of between 80% of Qmax and Qmax. Text also added concerning the Qmin.
South Africa-13		A-I.7.1.2 (e) and (h)		MPE requirement incorrectly refered to	Should be R 117-1,2.5.1,line A of Table 3		*[Team LNG and Fuel dispenser]* Comment understood. This line of procedure has been deleted.
DK-12		A-I.7.1.3		Agree that MMQ shall be tested during Initial verification			*[Team LNG and Fuel dispenser]* Rejected, MMQ is not needed for initial verification, only for type approval.
DK-13		A-I.7 A-I.7.1 A-I.7.1.s	gen	Is it relevant to specify the conditions of the manufacture during an initial verification ? In case – this should be described for the initial verification of other MS as well			*[Team LNG and Fuel dispenser]* Yes, this gives additional guidance and information which is considered useful. The initial verification of dispensers is often performed at the factory of the manufacturer, due to the high number of dispensers produced. Since this is common practice, and it is good to stipulate this here. It is not needed to describe this for other measurement systems as well since they are usually produced in much lower numbers.
CA-9		A-I.7.1.3 d	tech	Measurement Canada procedure is 10 seconds			*[Team LNG and Fuel dispenser]* Comment understood. This comment is no longer applicable because this line of procedure has been deleted.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CA-10		A-I.7.1.3 e	tech	Measurement Canada procedure is 30 seconds. In operation, many systems will time out before 2 mins reached.			*[Team LNG and Fuel dispenser]* Comment understood. This line of procedure has been deleted.
NL-53		A-LPG.6.1	techn.	Same comments as for A 6.1 (NL-33) apply This issue is to be solved. The restriction as described in the 2CD (2012) is not acceptable for The Netherlands	Amend similar to NL-50 entailing that not in all cases it will be required to perform the test on a complete dispenser.	H	*[Team LNG and Fuel dispenser]* This comment is withdrawn by the Netherlands because it was already implemented in the 1CD.
AU-53		Annex B	techn	With reference to NOTE 1: Re' liquefied gasses under pressure; Where wet hoses remain, there is no requirement to provide special metering guidance. There needs to be further clarification on whether the Annex is referring to LPG or LNG. LPG road tanker deliveries occur continually using wet hose method providing reliable (correct measure) each time. LNG deliveries are more complex so need specific guidelines.	The inclusion of a future annex is supported; however guidance is required regarding the scope and the specific requirements for each application.	M	*[Team Meter]* Agree, revised the entire opening paragraph to exclude liquids covered by other individual Annexes. The same change has also been made in R117-1, Section 5.2.
CECOD-69 JS		Annex B	Ed	Title: These tests are only applicable on road tankers for liquids of low viscosity. Testing procedures for measuring systems on road tankers	Change to Testing procedures for measuring systems on road tankers for liquids of low viscosity.	L	*[Team Meter]* Disagree. Current description is adequate.
AU-54		B.2.3	techn	LNG has a tendency to 'flare' and so may always contain a small vapour component. With respect to testing procedures for gas elimination devices, it is not practical to eliminate gas from cryogenic liquids and therefore gas elimination devices are not relevant. Gas elimination devices are not relevant for LNG.	Suggest the following addition to the clause: B.2.3 Testing procedures for gas elimination devices Testing is completed in accordance with OIML R 117-2, 7. *Excepting for liquefied gasses where a pressure differential valve is fitted upstream of the meter.*	H	*[Team Meter]* LNG road tankers are not in the scope of Annex B but are covered by Annex L. No change.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
CECOD-70 JS		B 3.5	Tech	The empty hose is not under legal control. The point of transfer with a valve / sight glass combination is direct downstream of the meter for checking to be empty. The hose is not fixed mounted to the measuring system and is stored after the delivery in a cabinet. Complete emptying of the hose (empty hose measuring system only)	With the change of the title by adding "for liquids of low viscosity" delete the complete paragraph B3.5.	H	*[Team Meter]* Submitter argues that empty hose is not part of the MS, which ends at the sight glass downstream of the meter (transfer point). Although the purpose is to check repeatability, there are no actual repeatability parameters. Repeatability, per R117-1, applies to volume equal five times MMQ, but the test is done at MMQ. The carry-over comments from 2014 from AT: Acc. to R117-1, 2.14 the residual quantity shall not exceed ½ Emin. I doubt that the test method (by delivering MMQ with MPE = Emin) is capable to identify the applicable MPE = ½ Emin for the residual quantity. SE adds that there is no demand on repeatability. ==Convenor will decide whether to keep, move to Annex X or completely delete section B.3.5.== Discuss in Cape Town.
AU-55		Annex D	gen	In theory, Annex D could apply to LNG. Is this the intent or are all LNG systems covered by Annex L?	Could clarification please be provided?	M	** Alle LNG systems are covered by Annex L.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
DK-3		E.6.1.1 5th§	tec	(see also DK-2 on R117-1, Section 5.6.2.4) E.6.1.1 5th§ "In the case that the MS measures the level in the constant level tank automatically before and after a measurement (e.g. by a dipstick) and corrects the received quantity according to the levels, 5.6.2.4 does not apply" Comment: Is the use of a dipstick to measure a (static) volume, by measuring the level before and after the (dynamic) measurement of the volume by the meter sensor – to be considered as two volume measurements – to the same measurement ? Or is the dipstick to be considered as an associated measuring device ?	Proposal I: The dipstick device shall be tested according to requirements in OIML R81 Proposal II: The dipstick shall be tested according to applicable requirements (inspiration) from OIML R81 Proposal III: Test during type approval is not required, if the volume measured by the dipstick always will be less than a volume corresponding to a difference in quantity of no more than twice the minimum specified quantity deviation.		*[Team Meter]* Agree in principle. A combination of Proposals II and III has been used to add text to E.6.1.1. and reference to OIML R81 is corrected to OIML R80. The use of level gauging devices is mentioned instead of dipsticks.
DK-5		Annex E.6.1.x	tech/gen	(See also DK-4 on R117-1 Section 5.6.2.3) If the requirement of 5.6.2.3 include the hoses designed to be coupled to the outlet of the supply tank, to empty completely and automatically under rated operating conditions – a test during type approval should be described in R117-2 Annex E. Any systematic residual liquid (milk) in the receiving hose at the finish of the first measurement, will not be detected, when following the description in Annex E.6.1.1 6th §: "Before the start of each measurement test sufficient milk shall be passed through the MS to ensure that the MS is completely filled as foreseen"			*[Team Meter]* No technological solution to empty the pipework (including the hose) automatically. How to test the degree of emptiness? Further changes were made based on additional proposals from DK. See text
AU-56		Annex G	gen	Gas Energy Australia does not follow the rationale for a specific aircraft re-fuelling procedure? This process involves wet hose, non-vaporising liquid transfer with dry break coupling to the aircraft. GEA refers to comments re- bunkering. Why is there a specific procedure for metering in aircraft refuelling?	Could clarification, explanation or amendment be provided?	M	*[Team Meter]* The R117 approach is that there is an annex for each type of the MS listed in R117-1 Table 1.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
FR-13	/	Annex K	G	The application is known as being particularly tricky due to conditions of use and to conditions of installation of the measuring system for bunkering.	R117-2 gives detailed recommendations for test procedures for gas elimination devices and for foaming liquids; Annex K should give detailed recommendations for test procedures for the effect of entrained air and the measurement of air quantity and the verification compared to true value of reference standard.		*[Team Bunker]* Detailed procedures for tests performed with entrained air are found in Annex X.K. Clause K.3 provides the reference to Annex X.K.
CECOD-71 JS		Annex K	Tech	Complete This Annex described tests of a system which allow a unmeasured gas / liquid mixture is used for determine the legally amount of volume or mass. This system not in line with the basic requirements of R117-1 dealing with entrapped air and gas.	Delete Annex K	H	** Comment understood. Heavy discussion within the project group and Team Bunker (over the last 3 years) on the best way to implement measuring systems for bunkering into R117. It is required that measuring systems for bunkering are implemented in R 117 as decided by the CIML. Annex K will not be deleted.
CECOD-72 JLLG		Annex K	Gen.	The application is known as being particularly tricky due to conditions of use and to conditions of installation of the MS. R117-2 gives detailed recommendations for test procedures for gas elimination devices and for foaming liquids, annex K should give detailed recommendations for test procedures for the effect of entrained air and the measurement of air quantity and the verification compared to true value of reference standard.	Overall review or delete annex	H	** See response to FR-13 and CECOD-71 above.
SG-1		K.1 (Para 3)	Gen	What comprises the Measuring systems (MS)?	Suggest to illustrate the system (MS) with a diagram indicating the comprised items	H	*[Team Bunker]* Improved explanatory section for Annex B to be provided by manufacturers.
SG-2		K.1 (Para 4-6)	Gen	Type evaluation of meter (instrument) only or the measuring system (barge delivery system), including the meter tested onboard?		H	*[Team Bunker]* Section K.3 (and X.K.3) present the type tests performed with entrained air.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
SG-3		K.1 (para 6-9)	Tech n	There is currently no publication to show the reliability of air entrainment measurement (or air index measurement) by Coriolis flow meter. Due to the different measurement methods developed by different manufacturers, it is not possible to standardise the measurement values and put them as the requirements. Some issue may arise such as Annex K requirement stating that the air index value is too high. - "What value is considered as too high?" Different vendors may provide different values and thus would not consistent.	Suggest to monitor and minimise the stripping and line-packing quantities to the total delivery quantity ratio instead of air index value measurement.	H	*[Team Bunker]* Team bunker clarified this comment through discussion in Delft. Further information is needed in the explanatory section, Annex B of R117-1. Details to be provided by the manufacturers. See also South Africa-9
SG-4		K.2.1	Gen	There is no indication on Reynolds number or measurement by Corioils mass flow meters, the operational person may have issue in controlling the delivery process to be above the lowest Reynolds number requested.	Suggest to use the control to be based on the lowest flowrate, operational temperature and fuel type.	H	*[Team Bunker]* This is checked during the Initial Verification of the measuring system. This was confirmed by the Singapore delegation during the Delft meeting. No change to text of Annex K.
SG-5		K.2.1 (para 3)	Gen	What is the maximum acceptable values of each parameter in order to meet the MPE requirement?	Propose to specify based on each maximum acceptable value and standardise	H	*[Team Bunker]* See response to South Africa-9, related to section 5.13.4 (previously 5.13.3)
SG-6		K.3	Tech n	How are the tests are being conducted? It is on board test? How to conduct test for bubble flow? Should the conditions (ie. bubble flow, slug flow and line clearing) be considered on its own or several conditions may present at the same time.		H	*[Team Bunker]* See X.K. Team bunker will develop clearer sections on bubble and slug flow to be included in X.K. Change "slug flow" into "air entrainment due to emptying tank".
SG-7		K.3	Gen	Clarification "complete systems". Referring to Measuring systems (MS) or the MS with installation on the tanker barge?		H	*[Team Bunker]* See response to SG-1.

Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
SG-8		K.4	Gen	What comprises the initial verification?		H	*[Team Bunker]* See K.4 sub-clauses.
CECOD-73 JLLG		K.4.1	Gen.	OIML recommends initial verification for R117 Measuring Systems.	Delete sentence saying initial verification procedures are not mandatory	L	*[Team Bunker]* Agree, sentence deleted.
FR-14	/	K.4.1	G	OIML recommends initial verification for R117 Measuring Systems.	Delete sentence saying initial verification procedures are not mandatory. Include the administrative verification and information about the tests.		*[Team Bunker]* Agree, sentence deleted. Third paragraph of K.4.1. modified.
SG-9		K.4.2.1	Gen	Would prefer a generic zero setting procedures. Not to restrict to only the meter manufacturer's instruction as featured in this clause. The zero setting and its verification may be conducted by an authorised personnel other than the manufacturer since this clause and procedures applies to the subsequent verification as well.	Suggest to use the general requirements for zero setting conditions.	H	*[Team Bunker]* Agreed. Text modified in a slightly different manner to reflect the intent of the comment, as decided in Delft. Text of bullet 2 amended. Text of bullet 3 to refer to R117-1, section 3.1.5.4.
SG-10		K.4.2.1, 4)	Gen	Not all Coriolis flow meter have the function to measure liquid density	Suggest to have alternative method, if the meter is not capable to measure density	H	*[Team Bunker]* Bullet 4 in K.4.2.1. has been deleted.
FR-15	/	K.4.3	T	The value of 0,71% is not compliant with class 0.5	Review or delete this paragraph a		*[Team Bunker]* Agree, paragraph "for vessels" was deleted.
SG-11		K.4.3	Tech n	For barges, this is usually called meter-in-meter-out (MIMO) testing. The results of this testing should not exceed ±0.2%. Referring to what kind of results from which tests? Clarification of "complete measuring system".	Proposed "either the performance test not to exceed ±0.2% or the MS able comply with 0.5%" (See Table 2 of OIML R117-1, Accuracy class, A Line)	H	*[Team Bunker]* Clause K.4.3 is re-written and made optional Is deleted in revised section K.4.3. See response to SG-1.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-57		Annex L	gen	We have no concerns on the guidance provided in Annex L it has adequate references to other aspects of metering system procedures which are consistent with dynamic measurement of LNG. However it is suggested that diagrams of LNG systems be included to aid in the application of the Recommendation.	It is understood that previous version of R81 contained appropriate graphics and should be included in this document. The lost graphic showed a vapour outlet venting to atmosphere during testing. Please find attached below a proposed graphic, Diagram B, for consideration (following comments format).	M	*[Team LNG and Fuel dispenser]* The provided diagrams are added to Annex X.L and a reference to these diagrams is made in the first paragraph of section L.1. in Annex L.
FR-16	/	X.5.3.3	T	This sentence is technically wrong, because it is proven that viscosity has an influence on a mass flow meter : *"For example, it would not be necessary to test a mass flow meter at the limits of viscosity"*	Delete the sentence.		*[Team Meter]* Clause deleted.
NL-54		X.5.3.4	gen.	Concerning this sub clause, referring to the comments by NL as presented by the convener in the last column of the compilation of comments on the 1CD, most of these decisions made appear not yet been implemented.	Please implement as indicated in this last column of the compiled comments ion the 1CD	M	*[Team Meter]* All NL comments from 2014 are present, NL withdraws his comment.
NL comment 2011		X.5.3.4	techn.	Change sentence in the 2nd bullet	Change the 2nd bullet as follows"……and two elbows **out of plane** upstream of ……"		** NL withdraws this comment.
AU-58		Annex X.5.6	techn	**Meter curve, Coriolis meters** Does the principle as specified for LPG apply equally for LNG and other liquids?	If it is proved during a type evaluation that the effects listed above are negligible or properly corrected for, a Coriolis meter's curve can be determined on a liquid which is not similar to the one in the end application. In that case a meter curve determined on water could for example suit an application on LNG.	M	** Agree, in section X.5.6. (Meter curve, Coriolis meters) it is added that this can also be possible for other liquids.
AU-59		Annex X.L.1 Para 1. Bullet point 2	techn	We support delivered quantity in mass with supplemental energy content information The variability of product composition makes the transference of units to litres or units of energy difficult and the calibration is done in mass and supplemental information on energy can be provided based on product properties.	For consideration by the TC/SC in the revision or OIML R 117. Could advice be provided in relation to the calculation of energy units for LNG.	M	*[Team LNG and Fuel dispenser]* All samples of LNG will have different energy content. Therefore, a direct conversion/calculation of energy units is not possible without an analysis of the energy content of that sample. This is considered to be outside the scope of R117. For LNG custody transfer in R117, mass is the only legally acceptable transaction unit.

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Country Code/ Org	R117-1 Section	R117-2 Section	gen./ edit./ techn	COMMENT	PROPOSED CHANGE	Priority	OBSERVATIONS OF THE PROJECT GROUP
AU-60		Annex X.L.1 Para 2. Bullet point 2	techn	Referring to AU comments on Annex L: This is why a return meter measuring vapour provides reliable delivered quantity value. It's called 'subtractive total' where the molecular mass is translated to KG which is deducted from the liquid delivery value for true delivered quantity.	Please see AU comments regarding the use of a meter on the return line.	M	*[Team LNG and Fuel dispenser]* This issue was covered in several previous comments including the response to AU-18.
AU-61		Annex X.L.3	gen	GEA supports reliability testing and validation to verify Master Meters. How these large 'master meters' are calibrated is a barrier to these being implemented. The practicality of this will restrict functionality in the field resulting in un-reliability. The correction curve cannot be validated when removed from a consistent product transfer proving loop or test rig.	For consideration by the TC/SC as part of the revision of OIML R 117.	M	** Not understood what is requested by this comment. No text changed.
CH-18		X.L.3	E	Specifying a specific size does not add information: "o This method is typically only practical for delivery systems up to 80 mm (3 inches) in size…."	Change to: "o This method is typically only practical for smaller delivery systems …."		*[Team LNG and Fuel dispenser]* Agree, actual pipe size put in parenthesis.
AU-62		Annex X.K	gen	General comment: The method of product transfer is complex and does not reflect non vapourising liquids, and in particular LNG. Both LNG and LPG are only transferred using wet hose methods, it's the non vapourising liquids which complicate correct measure as on many occasions these start out dry, and end up wet or semi wet. In this Appendix it is worth remembering that someone has paid for the product which remains in the hoses.	Potentially should appendix X.K should have provision to identify that LPG and LPG use wet hose transfer and that product can remain in the hose.	H	** Annex X.K. does not cover bunkering of LNG, that is covered by Annex L. Bunkering of LPG is not excluded specifically from annex K, but there are no known systems where the vessel actually runs on LPG. No change to text.
AU-63		all	gen	Gas Energy Australia contends that the basis for reliable metering has been laid out in R117. In field testing and the practical application of the requirement to deliver correct measure is not a significant challenge for industry. We have the basis of reliable metering clearly laid out in both part of R117 which only needs to be transferred to LNG intelligently.	NA	M	** Noted, no changes to text.

Diagram A – from Australia

Software verification is testing performed to check that the progressive decomposition of requirements to code has been done correctly

Software validation is the testing of the integrated software code to prove that it meets the system requirements