



Agenda item 14.1: Publications for approval by the CIML

Agenda item 14.1.2: Reconfirmation of OIML R 139:2018
Compressed gaseous fuel measuring systems for vehicles

**57 CIML Addendum 14.1.2**2022-07-01

1 Introduction

In accordance with the procedures detailed in subclause 6.12 of OIML B 6-1:2019 *Directives for OIML technical work. Part 1: Structures and procedures for the development of OIML publications*, OIML Recommendations are subject to periodic review.

2 High priority publications

In October 2021, the CIML approved the list of high priority publications (CIML Resolution no. 2021/29). High priority publications undergo periodic review two years after approval or reconfirmation so OIML R 139:2018 *Compressed gaseous fuel measuring systems for vehicles* was identified as requiring periodic review.

As OIML R 139 is a publication of relevance to the OIML Certification System (OIML-CS), the OIML-CS Management Committee was responsible for conducting the periodic review.

Periodic reviews shall result in a proposal to the CIML to *reconfirm, update, revise* or *withdraw* the relevant OIML publication.

3 OIML TC 8/SC 7 consultation

To aid the periodic review being undertaken by the OIML-CS Management Committee, OIML TC 8/SC 7 was consulted in order to obtain the opinions of the TC 8/SC 7 members. The result of the TC 8/SC 7 consultation is shown in Annex A.

4 Ad-hoc Working Group proposal

Based on the opinions obtained from the TC 8/SC 7 consultation, the OIML-CS Management Committee ad-hoc Working Group for periodic reviews concluded that OIML R 139:2018 should be *reconfirmed*. Information on the ad-hoc Working Group proposal to *reconfirm* OIML R 139:2018 is shown in Annex B.

5 OIML-CS Management Committee vote

The OIML-CS Management Committee voted to approve the proposal from the ad-hoc Working Group to *reconfirm* R 139:2018. The result of the Management Committee vote is shown in Annex C.

6 CIML approval

In accordance with OIML B 6-1, 6.12.8, the CIML is asked to approve the OIML-CS Management Committee proposal to *reconfirm* OIML R 139:2018.

If the CIML approves the proposal, in accordance with OIML B 6-1, 6.12.9 a) "... the BIML shall amend the cover page of the publication and references to it on the OIML website to indicate both the original date of publication and the latest date of reconfirmation, and notify all CIML Members accordingly, ...".



Annex A

OIML TC 8/SC 7 consultation responses

Result of online consultation – periodic review

OIML R 139:2018 *Compressed gaseous fuel measuring systems for vehicles*

TC 8/SC 7

Country	Opinion	Comments
AUSTRALIA	RECONFIRM	No
AUSTRIA	RECONFIRM	No
BELGIUM	RECONFIRM	No
DENMARK	UPDATE	Yes
FRANCE	REVISE/UPDATE	Yes
GERMANY	RECONFIRM	Yes
IRAN	RECONFIRM	No
JAPAN	RECONFIRM	No
KOREA (R.)	REVISE	Yes
NETHERLANDS	RECONFIRM	Yes
NORWAY	REVISE	No
SLOVENIA*	RECONFIRM	No
SOUTH AFRICA	UPDATE	Yes
SWITZERLAND	REVISE	No
UNITED KINGDOM	REVISE	Yes

* O-member

Summary of P-member responses

Update: 2.5 (FR indicated both update and revise in their response)

Revise: 4.5 (FR indicated both update and revise in their response)

Reconfirm: 7

Withdraw: 0

Country	Opinion	Comments	Response
Denmark	Update	<p>OIML R139-1 :</p> <p>Page 16: "4.1 Constituents of the measuring system "</p> <p>The majority of the Metrology Module (MM) within NEL products is located in the Dispenser, but the pressure/flow control device is positioned in the Station modules. This means that a dispenser cannot be "stand-alone" certified, but certification needs to be done in conjunction with other modules.</p> <p>4.1.1 b) should be erased or moved to section 4.1.2 (or just mention that we comply with the relevant fueling safety standard)</p> <p>Page 20: 5.3.1.2</p> <p>During the fueling of Hydrogen, leak checks are performed for safety reasons. While leak checks are being performed the flow is zero, and thus below Qmin. Flow will be established to a level above Qmin when the ramp resumes.</p> <p>It is a requirement from other standards regarding safety that a Minimum required leak check mentioned in HGV/ANSI standards.</p> <p>Should be noted for hydrogen dispenser there is no minimum flow rate since we need mandatory leak check for fuelings.</p> <p>Page 21: "(1) These temperatures refer only to the ambient temperature. The temperature of the gas may be different but the range shall cover at least +10 °C to +40 °C".</p> <p>For hydrogen, this is not possible since the gas is cooled down to approx. -40°C for a T40 system.</p> <p>Page 25: "6.1.2 Measuring systems may consist of more than one bank of vessels differing in maximum compression level "</p> <p>clarification is needed since a measuring system does not consists of "banks" according to fig 1.</p> <p>Page 27: "6.3 Storing of measurement results (memory device; hardware) "</p> <p>Needs to be clarified, 6.3 states that a measuring result shall be recorded but 6.3.1 and fig 1 states that measuring systems may be fitted with a memory device.</p> <p>It should be clearly defined what a memory device is. Is it a part of the metering system or the ancillary device?</p> <p>It Could be part of a POS (Point of Sale) system and is not necessarily part of the scope for an equipment's manufacturer providing a Measuring system.</p> <p>Page 37: "8.1 The instructions for operation of each individual measuring system shall be made available to the user by means of a printed or printable instruction manual. "</p> <p>Needs to be clarified:</p>	

Country	Opinion	Comments	Response
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		<p>The measurement system shouldn't be required to have a specific instruction manual – it should be optional. But as minimum an instruction manual on dispenser level should be provided to be possible to operate the dispenser. A lot of information already exist elsewhere for example on name plate or it is not relevant for operator or it is more related to installation.</p> <p>A general comment to OIML R139-1 Safety and performance are for hydrogen fueling station very strict outlined through requirement for fueling protocol and boundaries through SAEJ2601, HGV 4.3 And ISO 19880-1. It therefor gives hydrogen stations metrology limited freedom in controlling the measurement system flow, media temperature and pressure since control of flow, temperature and pressure is given through these fueling protocol standard. It should be considered to reference fueling protocol and standards outlining these has higher priority for safety and performance.</p> <p>OIML R139-2: Page 12: Table 3 the volume for a test receiver is not possible for measuring hydrogen. Page 19: editorial correction in 3.1.4; e) self-service device (see 3.11.4 it is correctly 3.11.5); f) printing devices (see 3.11.5 it is correctly 3.11.6). Page 21: editorial correction in 3.2.4 "laid down in the R 139-1,5.5"it is correctly "laid down in the R 139-1,5.8" Editorial correction in 3.3.2 "presented in Tables 9, 12 and 13." Is correctly "presented in Tables 9, 12 and 19."</p> <p>Page 27: 3.7.2 a) It is not possible to perform fueling test indoor in controlled temperature environment, humidity etc. with hydrogen. HRS equipment located inside a room leads to significant potential hazards. Recommend expanding allowable ambient conditions to include normal "good-weather" outdoor conditions. E.g., Temperature span, RH span, max wind speed / gusts etc. or making it a could requirement (doesn't influence results as we see it).</p> <p>Page 36: 3.9.4.2test level spec. Frequency range up to 6 GHz</p> <p>OIML R139-3: Page 11: Missing F4, the numbering wrong there should be from F1 to F20 Page 14: Missing F4, the numbering wrong there should be from F1 to F20 Page 20: 5.3.1.2 belongs to the cell below</p>	
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Country	Opinion	Comments	Response
		<p>Page 43: table referring to 2.2.7.3 the correct is 2.2.7.4 Page 44: table referring to 2.2.7.5 the correct is 2.2.7.6 Page 45: table referring to 2.2.7.6 the correct is 2.2.7.7 Page 46: table referring to 2.2.7.7a the correct is 2.2.7.8a Page 47: table referring to 2.2.7.7b the correct is 2.2.7.8b Page 48: table referring to 3.5.3 the correct is 3.5.4</p>	
France	Revise/ Update	<p>R139-1 §7 Markings :</p> <p>Compulsory markings are the same for measuring system and sub-assembly (§7.1). It is proposed to reduce compulsory marking for sub-assembly with a specific paragraph in addition to §7.1 (similar to R117 §2.19.2). Each component or sub-system for which type approval has been granted shall bear the following information:</p> <ul style="list-style-type: none"> • serial number; and • type approval number. <p>R139-1 §7 Markings :</p> <p>It is proposed to add a requirement related to sub-assembly not granted by type approval. Each component or sub-system for which type approval has not been granted shall bear the following information:</p> <ul style="list-style-type: none"> • manufacturer's identification mark, trademark or name; • designation selected by the manufacturer, if appropriate; • year of manufacture; • serial number; <p>R139-2 §4.6.6 Initial verification / Alternative procedure Recommendation defines a theoretical maximum flow rate available in the particular refueling station and requires to reach 80% of this flow rate during verification. Experience shows that :</p> <ul style="list-style-type: none"> - Conditions for verification are sometimes not relevant to reach 80% - Theoretical flowrate on site is difficult to define - Flowrate to be reached depends on the size of the test bank <p>It is proposed to review conditions for performing verification tests taking into consideration experience for years in CNG and hydrogen.</p> <p>Definition of a specific informative annex in R139-2 to perform tests (like for R117) would be appreciated.</p>	

Country	Opinion	Comments	Response
		<p>R139-2 §2.2.5.2.1 Table 3 has been probably established for CNG but is not relevant for hydrogen testing (range of mass flow rates) and should therefore be updated.</p> <p>Note also that distinction should be made between Qmax for the meter and Qmax for the measuring system.</p> <p>R139-1&2 Recommendation distinguishes 2 configurations with and without sequential control. Regarding experience with CNG this distinction which leads to distinguish type and verification tests should be rediscussed since :</p> <ul style="list-style-type: none"> - there is no evidence of critical impact, <p>imposing sequential control makes controls more complicated to organize</p> <p>R139-2 Table 9 If H2 dispensers don't use multibanking, test 0 in table 4 should not be performed for H2 applications.</p> <p>R139-2 Table 4 Change title with 'Tests with sequential control '</p> <p>R139-2 §4.6 Verification process for CNG and hydrogen station can take time (up to 1,5 day for H2) which is not compliant with owner expectations.</p> <ul style="list-style-type: none"> - Today use of 4.6.6 procedure can be considered as not applicable for H2 verification whereas it would be appreciated to use it (as an alternative to 4.6.7). Writing of this part of the recommendation could be improved. <p>Performance of repeatability tests should be analyzed regarding performance of Coriolis technology.</p> <p>R139-2 §4.6.6 Reference to 5.2.3 is wrong. It has not been updated after 2018 revision and should now refer to §5.2.1.</p> <p>R139-1 §5.3.2.1 Fixed MMQ 1 kg for H2 CGF looks very low for future uses with trucks and bus.</p> <p>Definition of the MMQ value should be updated in the same way as R117.</p>	

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		<p>R139-2, §4.5 resolution (R 139-1, 5.1.4); but the 5.1.4 does not exist. It probably refers to R139-1, 5.1.2</p> <p>R139-2, §4.5 completeness of hardware such as durable storage/printing device and its compliancy with the approved type (R 139-1, 6.3, 6.2.9); but 6.2.9 does not exist. It probably refers to R 139-1, 6.2.8.6</p> <p>R139-2, 2.2.7.2 Accuracy test involving three banks. From the expertise of on field verifications, it appears that sequential control is not adapted to the hydrogen refueling station and should only be considered for CNG</p> <p>R139-1 §4.1.2 The notion of « satellite » (additional dispenser) should be integrated.</p> <p>R139-1 § 6.10.3.2 Cyclic redundancy checks (CRC 16) -> Any checksum algorithm should have a key length of at least 2 bytes; a CRC-32 checksum with a secret initial vector (hid-den in the executable code) would be satisfactory.</p> <p>R139-1 §6.12.3.1.1 Printing of the customer's receipt is mandatory. But in fact, agreement between two parts (BtoB) does not require a printing (record of the measurement seems to be enough).</p> <p>R139-2 §4.5 Future dispensers (especially for BtoB) will use less printings and paper. Control of « printing device and type of paper » should be optional Printing device and type of paper (R 139-1, 6.2.9.6); but the 6.2.9.6 does not exist. It probably refers to R139-1, 6.2.8.6</p> <p>R139-2 §4.6.7 This test does not detail flowrate that have to be reached during the test (contrary to 4.6.5 and 4.6.6). It is proposed to define more precisely the conditions of the tests (especially regarding maximum and/or mean flowrates)</p>	
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Country	Opinion	Comments	Response
		<p>R139-3</p> <p>There is no matching between references mentioned in «table of contents » page 11 and those mentioned in part « F. Performance tests » (F9 vs F10 for Vibration test).</p>	
Germany	Reconfirm	R 139:2018 shall remain as it is (no revision)	
Korea (R.)	Revise	<p>In R139-1:2018, 5.2 Maximum permissible error(MPE), Table 1 – MPE values, it is necessary to another class for hydrogen, for example 10%, excess 5% in service inspection under rated operating conditions. It is explained that the capability of different maximum permissible error at note 3, but it will be useful if the table 1 changed. USA and Japan also use the another class for hydrogen.</p> <p>In R139-1:2018, 5.2.3, if another class is accepted, table 2 – Emin new accuracy class(for example 10%) will be added.</p> <p>in R139-1:2018, 5.3.2.3</p> <p>The maximum value of the MMQ for all types of hydrogen CGF measuring systems is 1 kg. And minimum measured quantity(MMQ) can not to exceed 1 kg. It will be needed that more specific explanation between maximum and minimum value of MMQ.</p> <p>NEL, CESAME and METAS laboratories tested the flow meter.</p> <p>Table 1 – MPE values for the flow meter is 1.5%. this was achieved for the laboratory calibrations with nitrogen and air, errors were generally with 0.5% to 1%. But how can we transfer to the field conditions with hydrogen?</p> <p>In R139-2, 1.3 Uncertainty</p> <p>* expanded uncertainty k=2 type evaluation : 1/5 of the applicable MPE, verifications : 1/3 of the applicable MPE * if No.1 can not met, reduced acceptance criteria shall be applied type evaluation : $\pm (6/5 \text{ MPE} - U)$, verifications : $\pm (4/3 \text{ MPE} - U)$</p> <p>What is the comparable confidence interval? more explanation is necessary.</p>	

Country	Opinion	Comments	Response
Netherlands	Reconfirm	In our view, the (technical) text in R139:2018 fulfills the needs of stakeholders. Reconfirming the international recommendation would provide all stakeholders (regulators, assessment bodies, manufacturers) with much needed stability in terms of regulation.	
South Africa	Update	Reconfirm R139 Part 1 to 3, but request to include a Part 4: Verification, to deal with all verification requirements.	
United Kingdom	Revise	<p>In OIML R139, the sections relating to testing and verification methods could be greatly improved, now that portable primary standards have been built and operated at several refuelling stations.</p> <p>MMQ for hydrogen is 1 kg for all vehicle sizes. Current testing apparatus is based on a gravimetric approach, which works well for the light-duty (4-6 kg total capacity) vehicle ranges. However, verifications are increasing difficult for the larger vehicle sizes if MMQ is fixed at 1 kg.</p> <ol style="list-style-type: none"> 1) As the volume and temperature changes differ between different gases, should there be any requirements on the metering device to be isothermal and isobar? (the latter to the extent it is possible). 2) This might not be necessary, as the code speaks of 'mass' measurement, which would be independent of the above; nevertheless, the text mainly speaks of 'meters' without specifying what parameter (flow, volume, mass) is being recorded 	



Annex B

Ad-hoc Working Group proposal

OIML-CS Management Committee

Proposal for periodic review

OIML publication:	R 139:2018 <i>Compressed gaseous fuel measuring systems for vehicles</i>
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Name	Preferred option	Comments
Member 1	Reconfirm <input checked="" type="checkbox"/> Revise <input type="checkbox"/> Update <input type="checkbox"/> Withdraw <input type="checkbox"/>	Our preference is for the Recommendation to be reconfirmed at this time. With a revision to occur at the next periodic review of the Recommendation. We note that Reconfirmation received the most votes from the TC/SC survey conducted earlier this year (results attached for background). In addition, the Secretariat of TC 8/SC 7 supports Reconfirmation.
Member 2	Reconfirm <input checked="" type="checkbox"/> Revise <input type="checkbox"/> Update <input type="checkbox"/> Withdraw <input type="checkbox"/>	While compelling reasons for a revision were given by the countries voting for a revision, there does not seem to be enough support/evidence submitted at this time to require a revision. In that regard it is my recommendation to reconfirm the Recommendation 139 with the comments submitted by the members of TC 8/SC 7 archived for consideration as part of any future update/revision.
Member 3	Reconfirm <input checked="" type="checkbox"/> Revise <input type="checkbox"/> Update <input type="checkbox"/> Withdraw <input type="checkbox"/>	OIML R139:2018 is not very old. Based on the TC/SC survey conducted in 2022, I suggest reconfirming the Recommendation.
Member 4	Reconfirm <input type="checkbox"/> Revise <input type="checkbox"/> Update <input checked="" type="checkbox"/> Withdraw <input type="checkbox"/>	Originally, I believed that I will vote “reconfirm”, however after reading the comments I vote “update”.
Member 5	Reconfirm <input checked="" type="checkbox"/> Revise <input type="checkbox"/> Update <input type="checkbox"/> Withdraw <input type="checkbox"/>	I agree [with Members 1, 2 and 3] that the correct course of action on R139 is “reconfirm.” The Secretariat of TC8/SC7 (Netherlands) also recommends a reconfirmation. I personally worked on the last two revision cycles of R139, and I believe that the document remains “OK” for a couple more years. Please ensure that all of the comments submitted by members of TC8/SC7 are retained for the next revision cycle.

The proposal is to **RECONFIRM** R 139:2018 *Compressed gaseous fuel measuring systems for vehicles*.

Note 1: RECONFIRM is recommended by the TC 8/SC 7 Secretariat following the consultation with the TC 8/SC 7 members.

Note 2: The result of the consultation and the feedback from TC 8/SC 7 members is shown on the following pages.



Annex C

OIML-CS Management Committee vote result

OIML-CS Management Committee Voting

Periodic review of R 139:2018 - proposal to RECONFIRM

Participating members (P): 22

Observers (O): 0

Liaison (L): 0

Country	Action	Comment
AUSTRALIA	Agreed	-
CAMBODIA	Agreed	-
CANADA	Agreed	-
COLOMBIA	Agreed	-
CZECH REPUBLIC	Agreed	-
FRANCE	Agreed	-
GERMANY	Agreed	-
JAPAN	Agreed	-
KOREA (R.)	Agreed	-
NETHERLANDS	Agreed	-
NEW ZEALAND	Agreed	-
SOUTH AFRICA	Agreed	-
SWITZERLAND	Agreed	-
UNITED KINGDOM	Agreed	-