



### **Fourth Committee Draft**

Project: Review of OIML D5  
Title: Principles for the establishment of hierarchy schemes for measuring instruments (Info-file)  
Date: 2021-05-27  
Document number: TC4\_P2\_N024  
Supersedes document:  
Project Group: OIML TC 4/p 2  
Convenership: Slovakia  
Convener: Mr. Stephan Kral

Circulated to P- and O-members and liaison international bodies and external organisations for:

☒ Information:

☐ Comments by:

☐ Vote (P-members only) and comments by:

## Result of online voting and comments on 3 CD

### TC 4: Measurement standards and calibration and verification devices

p 2: Revision of D 5: Principles for the establishment of hierarchy schemes for measuring instruments

PG phase: 3 CD circulated to PG for vote and comment

Deadline: 2020-04-03


Status: Closed

Voted Yes: 10

Voted No: 2

Abstain: 1

Country	Action	Comment
AUSTRALIA	Voted Yes on 2020-03-19	
AUSTRIA	Voted No on 2020-03-13	
CUBA	Voted Yes on 2020-03-06	
FRANCE	Voted Yes on 2020-03-18	
GERMANY	Voted No on 2020-03-03	
IRAN	Voted Yes on 2020-03-18	
JAPAN	Voted Yes on 2020-03-16	
KOREA (R.)	Voted Yes on 2020-03-10	
POLAND	Voted Abstain on 2020-04-03	
RUSSIAN FEDERATION	Voted Yes on 2020-03-13	
SLOVAKIA	Voted Yes on 2020-02-03	

Country	Action	Comment
SOUTH AFRICA	Voted Yes on 2020-03-18	
UNITED STATES	Voted Yes on 2020-03-19	

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Date:2020-04-06

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AU 001					There are several different concepts being discussed which would be better presented as separate sub-clauses	<p>Suggest rewording as follows</p> <p>4.6 Documentation</p> <p>4.6.1 Reference and working standards and means of dissemination of units have to be provided <del>by</del> with documentation in accordance with the valid regulations.</p> <p>4.6.2 The basic document for these measurement standards and means of dissemination of units is a valid calibration certificate issued either by an accredited calibration laboratory or by a laboratory demonstrating metrological traceability to the national measurement standard.</p> <p>4.6.3 Other important parts of metrological traceability documentation are calibration or verification methods and procedures, which must clearly describe the metrological traceability of the measurement results. That is, the procedures have to clearly define which measurement standards and means of dissemination of units are used for the traceability. These procedures must also state the detailed procedure for evaluating uncertainties of calibrated or verified measuring instruments.</p>	Accepted. The text was modified accordingly.
IR 002	1		Figure 1	te	Some countries do not have a National Metrology Institute or National Laboratory and are using another countries national metrology institute services to establish traceability. Figure 1(Hierarchy of calibrations), should therefore show a scheme to link accredited calibration laboratories or legal metrology laboratories of these countries to an foreign national metrology institutes.		Not accepted.  Explanation: It is true, that some countries do not have a National Metrology Institute or National Laboratory. In the case that some countries do not have a National Metrology Institute or National Laboratory, the accredited calibration laboratories or legal metrology laboratories of these countries may be connected to a national

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							metrology institute or National laboratory of other country. But they are still generally called “National metrology institute or National laboratory” irrespective of the place of sitting. The scheme given in Fig. 1 does not strictly prescribe that the accredited calibration laboratories or legal metrology laboratories shall be connected only with a National metrology institute or National laboratory of the same country as the country origin of accredited calibration laboratory or legal metrology laboratory. The scheme given in Fig. 1 is general and accredited calibration laboratory or legal metrology laboratory may be connected with any National metrology institute or National laboratory (also “foreign”), but we still call them “National metrology institute or National laboratory”. I would like to avoid to define another terms (e.g. “foreign national metrology institute”).
RU 003	1	00		ed	Frequent use of different terms in different contexts (e.g., verification – calibration – legal control) complicates the understanding of their interrelations and relations of equivalence, affinity and subordination in the text of this document.	To illustrate the relationships of the terms used in the document in the form of a chart (similar to the one in ISO/IEC Guide 99:2007 (VIM), ISO 9000 and others)	Partially accepted. To illustrate the relationships of the terms is not necessary because there are clear definitions of the verification and calibration in Chapter 3 (clause 3.4, 3.24). The term “legal metrological control” was added in the Chapter 3 and the term “legal control” was replaced by the term “legal metrological control” in the entire text

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							of the document to keep terminology VIM and VIML.
US-1 004	1	00		gen	<p>The US has voted “yes” on the 3CD of D5.</p> <p>We note, in general, thoughtful responses to the international comments received on the 2CD. We also note a 3CD that is much improved over the 2CD.</p> <p>Because at least two countries have voted “no” on the 3CD and several countries have submitted non-editorial comments on the 3CD ... we suggest that the PG Convener work with the BIML to implement the (fairly new) “minor change procedure” that is detailed in Clause 6.5 of OIML B6-1:2019.</p>		This possibility will be discussed with BIML
DE 005	1	Entire document		Ed	<p>We agree with the comment 0003 on 2CD to clarify the wording concerning traceability. However, we are not in favour of changing from “traceability of an instrument” or “traceability of a calibration” to “traceability of measurement values” as it was implemented. According to VIM No. 2.41 metrological traceability is a property of a measurement result and therefore this wording should be adopted.</p>	Please revise the document again and adapt the wording according to VIM 2.41, i.e. replace “measurement value” by “measurement result”.	Accepted. The wording was changed in points 1.2, 1.4, 1.6, 4.7.1, 5.4.1.
AU 006	1	1		ge	<p>The introduction does not include reference to the role of metrology for industry/trade. Including such a reference would help to explain how traceability fits in with the broader role that metrology plays in development of a product/process/service.</p>	For legal metrology, the text on the <u>OIML webpage</u> “What is Legal Metrology?” may provide some of this broader context.	Accepted. Following text was added in the clause 1.1: “Metrology plays a key role in the adoption of scientific and technological innovations, the design and efficient manufacture of products that comply with

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							<p>the needs of the marketplace, and the detection and avoidance of non-conformities. It also provides the basis for fair trading in a domestic economy and international trading in the global market place.”</p> <p>“Internal markets as well as the globalization of trade, industry and society require comparability of calibration, measurement and test results through traceability to the International System of Units (SI), which represents the coherent and long-term stable fixed anchor points in measurement.”</p>
DE 007	1	1.1		Ed	We agree with comment 0004 on 2CD to include digitalisation in the list of multiple developments metrology faces. However, it should not read “digitalisation <i>of</i> geopolitical changes” but only “digitalisation” in general.	Replace “...trade, digitalisation of geopolitical changes,...” by “...trade, digitalisation, geopolitical changes,...”	Agreed Updated accordingly
JP1 008	1	1.1	2 <sup>nd</sup> sentence	Ed	France proposed an addition of “digitalisation”. However, the revised expression “digitalisation of geopolitical change” does not have a practical meaning.	Propose changing this expression to “... trade, <u>digitalisation, geopolitical change</u> , ...” by splitting the items by a comma.	Accepted. Updated accordingly
AU 009	1	1.1	Intro	ed	‘digitalisation of geopolitical changes’ – The addition of ‘of’ seems to be a typo.	Suggest rewording, ‘...digitalisation, geopolitical changes, elimination of...’	Accepted. Updated accordingly

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AU 010	1	1.1	Intro	ed	‘and redefinition of the role of metrology’. What does this mean? Has the role of metrology been redefined? Or is it meant to specify that due to all the global challenges, role of metrology has been become more encompassing than just measurement?	Wording to be amended based on the intended meaning to be conveyed.	Accepted as follows: The text ‘and redefinition of the role of metrology’ was removed and replaced by the text “and manufacturing”. The reference to “redefinition of the role of metrology” is redundant in the sentence. The sentence describes the fields having effect on the metrology nowadays.
AU 011	1	1.1.	2	ed	Previous points in the paragraph refer to multiples	“based on the production quality system” to “based on <del>the</del> production quality systems”	Accepted.
AU 012	1	1.2	1	ed	The presentation of the first sentence is complicated – consider replacing	<b>In legal metrology, measurements are important for conformity assessment in the legal control of measuring instruments</b>	Accepted. The text was updated accordingly.
AU 013	1	1.2	2	ge	There is inconsistent use in the spelling of realisation (realization) throughout the document. For example, Clause 1.2 uses “z”, Clause 3.8 uses “s”	Provide consistency throughout the document e.g. organisation use of “z” be replaced by “s”	Accepted. “z” was replaced by “s” (realisation, organisation)
JP4 014	1	1.2	3 <sup>rd</sup> para.	Ed	The 3 <sup>rd</sup> paragraph is not clear.	Recommend rephrasing as shown below.  <i>In line with another standard, ISO 9001:2015 [8], when <u>traceability of measurement result</u> <del>traceability</del> is a requirement, or <u>the traceability</u> is considered by the organisation to be an essential part of providing confidence in the validity of measurement results, measuring <del>equipment</del> <u>instrument</u> shall be calibrated or verified at specified intervals or prior to use, against measurement standards having <del>the</del> values that are traceable to <del>values for</del> <u>the</u> international or national measurement standards.</i>	Accepted. The text was updated accordingly.

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JP3 015	1	1.2 and 5.6.1	2 <sup>nd</sup> and 3 <sup>rd</sup> para. of 1.2 Fig. 2 of 5.6.1	Te/ed	In this draft, the term “measuring <u>equipment</u> ” is used three times. On the other hand, “measuring <u>instrument</u> ” is used many times. It seems that “equipment” is used ISO/IEC 17025 and “instrument” is preferred in many OIML publications. In order to avoid confusion, either one of the two should be used.	Recommend replacing “measuring <u>equipment</u> ” with “measuring <u>instrument</u> ” if there is no specific reason for using “equipment”.	Accepted.  The text was updated accordingly (2nd and 3rd para. of 1.2, 2.2, 4.1.1, 4.4.1 e), 5.5.1, Fig. 2 of 5.6.1,
JP2 016	1	1.2, 1.4, 1.6, 4.7.1 and 5.4.1		Te/Ed	<p>The word “value(s)” was added in several clauses in response to the comment from ISO/REMCO. Although we understood the policy “only values are traceable”, some of the additions had created unclear expressions. They might be withdrawn or modified.</p> <p>For example, a simple expression “this weight is traceable to the primary standard” may sound more natural than “<u>the value for</u> this weight is traceable to <u>the value for</u> the primary standard” for many people in metrology. When we say “standard”, it implies “the value realized by the standard”.</p>	Our recommendations are given in respective clauses.	Accepted as is listed in the relevant clauses.
RU 017	1	1.2; 1.4; 1.6; 3.24; 4.5.1		ge	The term “ <b>verification</b> ” used in the following paragraphs has different meanings: <b>verification</b> are traceable to the SI (1.4); <b>verification</b> is sometimes conducted without the corresponding measurement uncertainty estimation (1.6); procedure (other than type evaluation) which results in the affixing of a <b>verification</b> mark and/or issuing of a <b>verification</b> certificate (3.24) <b>verifications</b> in legal metrology (4.5.10), etc. e.g.: in 1.4, what is denoted as “ <b>verification</b> ” is not a <b>verification</b> , because it goes about a	Add the term “verification” in Chapter 3 corresponding to the definition given in ISO 9000 (3.8.12) and VIM (2.44).	Partially accepted.. The definition of verification from VIM (2.44) was added in Chapter 3.  Clause 1.4 is not intended to relate with ISO 9001. Adding the other definition for the term “verification” according to ISO 9000 (3.8.12) could be confusing.

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					procedure of confirming the conformity tot he requirements of ISO 9000 (3.8.12).		The beginning of the first sentence in clause 1.4 was rewording as “ <u>The</u> traceability of measurement results...” See also JP6 019.
JP5 018	1	1.3	1 <sup>st</sup> line	Te/Ed	The term “in part” may not be necessary. The demonstrated equivalence is a basic and important requirement for the international traceability.	Delete “in part” if it is not necessary.	Accepted. The text was updated accordingly.
JP6 019	1	1.4	1 <sup>st</sup> sentence	Te/Ed	This sentence is not clear.	Propose a rephrasing as shown below.  <i>This traceability of measurement results is essential in order that if the results of the measurement and the claimed <del>on the applicable</del> measurement uncertainty are <del>to be</del> comparable and meaningful. National measurement systems provide the framework within which all <u>associated</u> values necessary for the proper performance of a calibration, testing or verification are traceable to the SI or, if this is not possible, to <u>the values of for</u> nationally or internationally agreed reference materials.</i>	Accepted. The text was updated accordingly.
AU 020	1	1.5	1	ed	Suggest reflecting the level of acceptance of the classical scheme in the wording of the clause	“the classical scheme based on a direct calibration chain is widely used <b>and accepted</b> ”	Accepted. The text was updated accordingly.

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JP7 021	1	1.6	1 <sup>st</sup> sentence	Ed	The term “measurement values” is not used in other clauses, while “measurement results” is used frequently.	Replace “measurement values” with “measurement results”.	Accepted. The text was updated accordingly. See also DE 005.
REMC O / PT		1.6		te	<p>The sentence</p> <p>“Verification is sometimes conducted without the corresponding measurement uncertainty estimation.”</p> <p>could be erroneously interpreted and the following sentence</p> <p>“Where verification is performed without consideration of the measurement uncertainty, then it may not be considered to preserve or assure traceability”</p> <p>may suggest that in legal metrology when there is not an explicit estimate of measurement uncertainty, the measurement traceability is not assured, what is not correct. As well stated in OIML G19 (3.4):</p> <p>“The practice of specifying a fraction, such as 1/3 or 1/5, for the maximum allowed ratio of the error (actually, uncertainty) of the standard (reference) measuring instrument to the MPE is another example of at least implicitly accounting for measurement uncertainty.</p> <p>Both sentences, 2nd and 3rd should be reformulated.</p>	<p>2nd sentence:</p> <p>Verification is sometimes conducted without the explicitly corresponding measurement uncertainty estimation. In that cases, the usual practice is to implicitly establish a limit value to the measurement uncertainty by limiting the ratio of the error of the standard (reference) measuring instrument to the MPE of the instrument being verified.</p> <p>3rd sentence:</p> <p>Where verification is performed without any (explicit or implicit) consideration of the measurement uncertainty, then it may not be considered to preserve or assure traceability.</p>	<p>Accepted as follows:</p> <p>2nd sentence:</p> <p>Verification is sometimes conducted without the explicitly corresponding measurement uncertainty estimation. In that cases, the MPE of the measuring instrument is specified taking into account the measurement uncertainty.</p> <p>3rd sentence:</p> <p>Where verification is performed without any explicit or implicit consideration of the measurement uncertainty, then it may not be considered to preserve or assure traceability.</p>
US-2 022	1	2	Scope	ed	Suggested editorial improvements to the scope of D5.	<b>2 Scope</b>	Accepted.

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						<p>2.1 This Document <b>provides some key</b> principles and methods of metrological traceability. It proposes general rules for the establishment of hierarchy schemes for measuring instruments including the specification of calibration chains and methods for the dissemination of units. <b>These</b> schemes then serve as evidence of metrological traceability.</p> <p>2.2 This Document provides guidance and assistance to organisations on how to comply with the metrological traceability requirements for relevant standards. It is <b>primarily</b> intended to <b>be used by</b> legal metrology laboratories where the supervision of measuring and test equipment is an important <b>element</b> of quality assurance. <b>This Document may also</b> be used by organisations involved in industrial production processes (development, manufacture, installation, final inspection) and by calibration and testing laboratories.</p> <p>2.3 Depending on the circumstances, <b>methods</b> of achieving metrological traceability <b>other</b> than those described herein may be applicable. <b>While these other methods</b> are not discussed in this Document, <b>they</b> may be described in other International Documents</p>	The text was updated accordingly.
RU 023	1	2.3; 4.4; 4.6.1	fig.1 (note d)	ed	It is not clear from these paragraphs what procedures are meant by “other ways of achieving metrological traceability” (2.3) and how the measurement traceability is realized, if no references are implied, such as measurement standards or RMs, e.g., “traceability of reference procedures”?	To give examples in 2.3 of “other ways” and to clarify the issue of traceability of reference procedure with regard to this document.	Not accepted. As is written in 2.1, this document provides some key deals with the principles and methods of metrological traceability. It proposes general rules for the establishment of hierarchy schemes for measuring instruments

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including specification of calibration chains and methods for the dissemination of units. These schemes then serve as evidence of the metrological traceability.

In a matter of fact, other methods of achieving metrological traceability than those described in this document may exist. But this document does not deal with it, but this other methods may be described in other International Documents (also in the future). The meaning of the clause 2.3 is that the principles and methods of metrological traceability mentioned in this document are one way how to achieve the metrological traceability. This principle was mentioned also in existing version of OIML D 5. We suggest do not prescribe these other methods as they are not described in this document and to avoid their propagation. Traceability of reference procedures is not intended to be used as a method of metrological traceability in

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							this document and is not relating to “other ways” of achieving metrological traceability. The metrological traceability documentation, such as calibration or verification methods and procedures, are supporting documents to the hierarchy schemes for measuring instruments including specification of calibration chains and methods for the dissemination of units. This documentation shall clearly describe how the metrological traceability of the measurement results was achieved.
REMC O/ LU		3.4		te	definition of calibration – I think the sentence is not finished “... <i>obtaining a measurement result from an indication</i> “.... of what?”.	Please complete sentence	Not accepted  Definition of the calibration is exactly according to (VIM, 2.39).
REMC O/ US		3.6		te	Section 1.6 above specifies that, "special precaution must be taken for a complete estimation of the measurement uncertainty to ensure the traceability of the measurement values", yet a complete estimation of MU is not specified as a requirement in definition 3.6 for “metrological traceability”. Reconcile the statement in section 1.6 with the definition proposed in 3.6. Suggest adding a note specifying that metrological traceability requires	Add the following Note:  Note 3: Metrological traceability requires a complete estimation of the measurement uncertainty	Not accepted  The definition of metrological traceability stated in 3.6 is fully in line with VIM, 2.41 and adding the new note (not mentioned in VIM) may lead to misinterpretation. In the clause 1.6, the requirement for complete

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					a complete estimation of the measurement uncertainty.		estimation of the measurement uncertainty to ensure the traceability of the measurement results specifies that it relates directly to legal metrology.  Therefore the suggestion is to keep the text as it is.  Note: The word in the clause 1.6 “ <u>complete</u> estimation of the measurement uncertainty” was added on the basis of the comment 0016 ISO/REMCO – collected comments for the revision of D5 – 2CD.
AT 024	1	3.8		e	The definition and the note are separated due to the next page. We recommend putting them together on the same page for a better reading. (the same situation occurs at 3.15, 3.21)	Start with the definition 3.8 on the next page.	Accepted
REMC O / US		3.8	Note	te	The note to 3.8 metrological traceability to a measurement unit specifies that the expression “traceability to the SI” means ‘metrological traceability to a measurement unit of the International System of Units’. “to a measurement unit of the International System of Units” needs further qualification. Suggest: “to a base or derived unit of the International System of Units”	Note should read: The expression “traceability to the SI” means ‘metrological traceability to a base or derived measurement unit of the International System of Units’.	Not accepted  The International System of Units covers also derived units.  For a full description and explanation of the International System of Units, see the current edition of the SI brochure published by the Bureau International des Poids et Mesures (BIPM) and available on the BIPM

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REMC O/ LU		3.9 and 3.10		te	Definitions of measuring instrument and system. For example “ <i>A measuring instrument that can be used alone is a measuring system</i> ”. Please clarify the difference between these two categories. Please also give some examples.	Clarify and give examples.	website. Not accepted.  No text was proposed to add in the document.  The definition of the measuring instrument and the measuring system is exactly according to VIM. According to the definition, measuring instrument that can be used alone <u>we may call also the “measuring system”</u> . The same meaning is mentioned also in the definition of the measuring system. A measuring system may consist of only “one measuring instrument”.
JP8 025	1	3.26 and 7.3.6 c)		Te/Ed	Although the term “metrological characteristics” is used frequently in this draft, its meaning is ambiguous. Only 7.3.6 c) provides a brief explanation in the parenthesis.	Move the explanation “(accuracy class, the maximum permissible error, etc.)” from 7.3.6 to 3.26 just after “metrological characteristics” that appears for the first time in this draft.	Accepted. The text was updated accordingly.
AU 026	1	4		te	This is specific to legal metrology. However, the scope of the document considers both scientific and legal metrology.	Suggest adding the requirements for scientific traceability.	Not accepted.  According to scope, the document is primarily intended for legal metrology and for legal metrology laboratories, calibration and testing laboratories.

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							No specific text containing the requirements for scientific traceability that could be added in the document was presented by the member.
AU 027	1	4.1 and 4.1.1		ed	There is no need to have a separate clause for headings and a sub-clause for the text when there is only one sub-clause (e.g. 4.1 and 4.1.1)	Remove unnecessary clause numbering throughout document (e.g. remove 4.1.1)	Accepted
AU 028	1	4.1.1		ge	It is arguable that the overarching objective of metrological traceability is to allow measurement results to be comparable. The list provided is the resulting benefits of and drivers for the need for this comparability	Change to “Metrological traceability of the results obtained through the use of measuring and test equipment by means of traceable calibration or verification is necessary <b>to provide comparability of measurement results the benefits of which include:</b> a)...	Accepted.
AU 029	1	4.1.1	a)	ge	Metrological traceability of results does not meet requirements of growing national and international trade, it supports meeting the requirements of growing national and international trade”	Remove “ <b>meet</b> ” and change to “ <b>support</b> ”	Accepted.
AU 030	1	4.2, 4.2.1, 4.3, 4.3.1			It is suggested that Clauses 4.2 and 4.3 are combined since any legal application of measurement is by definition a legal metrology application.	We propose the following wording  4.2 Application in legal metrology For the application of any laws and regulations prescribing requirements on measurements, on prepackages and on measuring instruments, metrological traceability to SI units is required and may be obtained through the system of national measurement standards and certified reference materials provided either by local sources or by any other internationally recognised sources	Accepted as follows:  4.2 Application in legal metrology  4.2.1 For the application of any laws and regulations prescribing requirements on measurements, on prepackages and on measuring instruments, metrological traceability to

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						<p>To provide the metrological traceability for the application of legal metrology control, the evaluation of the measurement uncertainty may be unnecessary</p> <p>Clause 4.3 should be deleted.</p>	<p>SI units is required. The traceability may be obtained through the system of national measurement standards and certified reference materials provided either by local sources or by any other internationally recognised sources.</p> <p>4.2.2 The evaluation of the measurement uncertainty may be necessary to provide the metrological traceability for the application of legal metrology control.</p>
JP9 031	1	4.3.1	1 <sup>st</sup> sentence	Ed	The long sentence may be separated.	<p>Recommend a separation as shown below.</p> <p><i>For the application ... SI units is required. <del>and</del> The traceability may be obtained ....</i></p>	Accepted.
AU 032	1	4.4		te	The scope of the document covers metrological traceability as a whole, while the clause 4.4 provides elements of metrological traceability relevant to legal metrology.	Suggest providing the hierarchy of calibrations and metrological traceability applicable to both scientific and legal metrology.	<p>Not accepted. See also AU 026.</p> <p>According to scope, the document is primarily intended for legal metrology and for legal metrology laboratories, calibration and testing laboratories.</p> <p>No specific text containing the requirements for scientific traceability that</p>

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							could be added in the document was presented by the member.
AU 033	1	4.4.1	1	ed	Include the word “the”	with the realisation of the SI	Accepted
AU 034	1	4.4.1	1	ge	It is unnecessary to redefine metrological traceability as it has already been defined previously. Rather than rephrase the definition, state the general requirements for achieving it.  In addition there appears to be an inconsistency between the redefinition provided in paragraph 1 and the discussion of the realisation of traceability in d) which aligns with the formal definition.	We propose the following wording  Metrological traceability generally requires that measurement results are compared, in one or more stages, with the realisation of the SI for the measurand in question.	Accepted
JP10 035	1	4.4.1	a) and b)	Te/ed	Conventionally, the word “evaluate” is used with “uncertainty”.	Replace “calculate” with “evaluate”.	Accepted in the case a)  The word “evaluate” does not occur in the case b).
AT 036	1	4.4.1	c)	te	In this clause the competence is related to “shall accredited”. NMIs within the CIPM MRA are not accredited. The wording in the document might exclude such option.	Please change “shall accredited” to “shall accredited or peer accessed)	Accepted
DE 037	1	4.4.1	c)	Te	We do not agree with the new wording resulting from comment 0033 on 2CD as it conflicts with the CIPM MRA an ILAC P10. The CIPM MRA does not require an accreditation an also ILAC P10 shows alternative ways to give evidence of competence.	Delete “and shall be accredited”	Accepted as follows:  That's right that NMIs within the CIPM MRA are not accredited. The proposed words were not deleted but they were modified.

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							The wording was changed as “ shall be accredited or peer assessed and/or their services are covered by the International Committee for Weight and Measures Mutual Recognition Arrangement (CIPM MRA) [18].”
AU 038	1	4.4.1	Fig 1	ge	An accredited calibration laboratory can source traceability from a legal metrology laboratory	Make the arrow between legal metrology laboratories and accredited calibration laboratories bidirectional	Accepted
JP12 039	1	4.4.1	g)	Te/ed	According to 2.13 of OIML V 1 (2013), the term “subsequent verification” also includes non-periodical verifications (verification after repair and voluntary verification).	Change the expression as shown below.  <i>g) Subsequent verification: verification of a measuring instrument after a previous verification <del>carried out periodically at specified intervals</del> according to the procedure laid down by the regulations.</i>	Accepted
JP11 040	1	4.4.1	The last line of c)	Te	Accredited laboratories already demonstrated the necessary competence. They do not need to provide an additional evidence.	Replace “... <u>and</u> shall be accredited” with “... <u>or</u> shall be accredited”.	Accepted partially.  The items concerning <u>technical competence</u> are mentioned in the bracket.  On the other hand, the accreditation covers overall competence of the subject. Accreditation is an impartial and independent formal recognition and attestation of an organization by an accreditation authority confirming its competence

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							to carry out the activities declared in the accreditation certificate and permanently meet the requirements specified by the relevant normative document.  From this reason it is separately mentioned in the sentence.  The sentence was rewording in line with DE 037.
<b>US-3 041</b>	1	4.4.1 g)		ed	Suggested edit.	... according to the procedures specified by the regulations.	Accepted.
<b>REMC O / US</b>		4.4.1	Figure 1	te	In Figure 1 and throughout this document the term "reference standard" is used, yet the defined term is reference measurement standard (3.16). If "reference standard" is the deprecated term, "reference measurement standard" should be used. The same applies to "working standard".	Use the defined terms, "reference measurement standard" and "working measurement standard" throughout the document.	Accepted
<b>REMC O / US</b>		4.4.1 a-g			Section 4.4.1 a – g lists the "essential elements" that are important to metrological traceability within the context of legal metrology. Specification of the measurand of interest should be included in the list of essential elements.	Add: "Specification of the measurand" to the list of essential elements.	Accepted  New point was added:  d) Specification of the measurand: the measurand that is subject of the hierarchy of calibrations.
<b>FR 042</b>	1	4.5.1		te	The last sentence "However, compliance with the prescribed maximum permissible error alone should not necessarily be considered to ensure traceability" is confusing	An example would help	Accepted. For better understanding, the text was rewording as ".... The compliance with the prescribed maximum permissible error alone

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							should not necessarily be considered to ensure traceability. With respect to the metrological traceability, the MPE of the measuring instrument shall be accompanied with information on the measurement uncertainty that relates to that MPE.”
US-4 043	1	4.5.1		gen	Improved text	... a maximum permissible error (MPE) of the measurement standard (or measuring instrument) <del>indications</del> is specified ...	Accepted
AU 044	1	4.5.1	1	ed	Consider replacing “ensure” with “demonstrate”	“be considered to <del>ensure</del> <b>demonstrate</b> traceability”	Accepted
JP13 045	1	4.5.1	1 <sup>st</sup> sentence	Ed	The term “indication” is not used for “measurement standard”.	Change the expression as shown below.  ... a maximum permissible error (MPE) of the <u>values of measurement standard (or indications of measuring instrument)</u> <del>indications</del> is specified ...	Partially accepted  The expression was rewording according to comments US-4 043.  ... <u>values of</u> ... was not added to avoid the misunderstanding. The definition of MPE is given in 3.21.
REMC O / PT		4.5.1		te	The last sentence should identify and appoint the additional elements that should be considered together to the MPE to ensure the traceability	Join an additional sentence: The use of measurement methods according to normative documents or specifications is a relevant element to demonstrate the metrological traceability of measurement results in such cases.	Not accepted.  The clause 4.5.1 was already updated different way - see FR 042.
AU 046	1	4.6 and 4.6.1		ed	The information contained in the sub clause 4.6 relates to documentation required.  Documentation cannot provide reference and working standards nor can it provide means of	Suggest renaming of the sub clause to Documentation. Also suggest removing the unnecessary sub clause level 4.6.1.	Accepted. See also AU 001.

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					dissemination of units. Reference and working standards and means of dissemination of units can be provided with documentation		
JP14 047	1	4.6.1	1 <sup>st</sup> sentence	Ed	The “documentation” does not provide the “standards and means”. The former is provided as the information for the latter.	Replace “by” with “with” as shown below. <i>Reference and working standards and means of dissemination of units have to be provided <u>with</u> <del>by</del> documentation ...</i>	Accepted. See also AU 046.
REMC O / PT		4.6.1		te	The second sentence allows certificates of non-accredited entities to demonstrate traceability which is not according part 5 of the document.	2nd sentence: The basic document for these measurement standards and means of dissemination of units is the valid calibration certificate issued either by an accredited calibration laboratory or by a NMI (see chapter 5).	Not accepted.  Chapter 5 includes, in addition to accredited calibration laboratories or NMI, the legal metrology laboratories and in-house calibration that needn't be accredited (e.g. for calibration of working standards). See also 5.6 Hierarchy of measurement standards for more detail information.
REMC O / PT		4.6.1		te	The last sentence use terminology not according to definitions: the uncertainty is always related the measurement done and not to the instrument.	Last sentence: These procedures must also state the detailed procedure for evaluating measurement uncertainties in calibration or verification of measuring instruments.	Accepted.
AU 048	1	4.7.1	1	ed	Consider replacing the word “play” with “perform”	“reference materials <del>play</del> <b>perform</b> the role”	Accepted.

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JP15 049	1	4.7.1	2 <sup>nd</sup> sentence	Ed	Because the word “values” means the specific values assigned to the reference materials, it should be accompanied with an article “the”.	Add “the” as shown below. <i>It is equally important that <u>the</u> values assigned for such reference materials are traceable to ...</i>	Partially accepted.  The sentence was reworded as follows:  “It is equally important that the <u>measurement results obtained by using</u> such reference materials ... “  See also DE 005.
DE 050	1	4.7.1	Note 2	Te	We do not agree with the new wording resulting from comment 0037 on 2CD as it conflicts with the CIPM MRA and ILAC P10. Values assigned to certified reference materials included in the BIPM KCDB or the JCTLM database may be accepted as well. We propose to replace Note 2 by a general statement and a reference to the respective section of ILAC P10.	Replace  “Reference materials produced by accredited RMPs (Reference materials producers) as per ISO 17034:2016 [16] are also considered as traceable to national or international standards.” by  “Reference materials produced by RMPs (Reference materials producers) as per ISO 17034:2016 [16] may be considered as traceable to national or international standards if the ILAC policy for traceability provided through reference materials and certified reference materials is followed. Further information is provided by ILAC P10 [18] section 4, especially items 7), 8) and 9).”	Accepted  with small correction as follows:  “ <i>Reference materials produced by RMPs (Reference materials producers) as per ISO 17034:2016 [16] may be considered as traceable to national or international standards if the ILAC policy for traceability provided through reference materials and certified reference materials is followed. <u>Further information may be found in ILAC P10 [18].</u></i> ”
REMC O / US		4.7.1		te	Reads: “In many fields, reference materials play the role of reference and working standards.” Certified reference materials should be specified here.	Change text to read: In many fields, certified reference materials play the role of reference and working standards.	Accepted

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JP16 051	1	5.1.1 and 5.2.2		Ed	Full names of CGPM, BIPM and CIPM should be given in English because this is an English version of D 5. The names in French will be provided in the French version of D 5 later.	Recommend providing the names in English.	Accepted
FR 052	1	5.2.2		te	The Mutual Recognition Arrangement (CIPM MRA) is linked to physical quantities. The requirement “ <i>signatory to the Mutual Recognition Arrangement of the Comité International des Poids et Mesures</i> ” is not precise enough, it should refer to the relevant quantity.	“NMI which is a signatory to the Mutual Recognition Arrangement of the Comité International des Poids et Mesures <b><u>for the relevant quantity</u></b> ”	Accepted  Also, the last sentence of 5.2.2 was numbered as 5.2.3 for the better reading.
JP17 053	1	5.2.2, 5.3.2, 5.4.1 and Annex A		Ed	Because “Calibration and Measurement Capability” is an important proper term for CIPM MRA, capital letters or an abbreviation should be used.	In 5.2.2, replace “calibration and measurement capabilities” with “Calibration and Measurement Capabilities (CMC)”. Use capital letters or “CMC” in other clauses.	Accepted  5.2.2 and Annex A were updated accordingly.  5.3.2 and 5.4.1 were rewording as folloes:  5.3.2 “...which are calibrated by an NMI with suitable Calibration and Measurement Capability or an accredited laboratory.”  5.4.1 “...by an NMI with suitable Calibration and Measurement Capabilities or an accredited laboratory.”
AU 054	1	5.3.1	1	ed	Consider rewording this sentence. At present the sentence does not appear to link the measurement results with the measuring instruments. The sentence infers that there is a calibration of measurement results.	“ <b>shall be able to demonstrate that the measurement results associated with the calibration of measuring instruments are traceable to SI units</b> ”	Accepted

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JP18 055	1	5.3.1	Note	Ed	In the 2 <sup>nd</sup> line of the note, the term “ILAC Laboratory Combined MRA mark” may be simplified.  In the 5 <sup>th</sup> line of the note, the abbreviation “MLA” may be a typo. MLA is used by IAF to mean “Multilateral Recognition Arrangement”.	The 2 <sup>nd</sup> line should read “... ILAC Laboratory Combined MRA mark on ...”.  If it is a typo, replace “MLA” with “MRA”.	Partially accepted  Following ILAC-P10, the 2nd line was rewording as follows:  “ ... combined ILAC MRA mark ...”  The second sentence of the note was rewording according to ILAC-P10 as follows:  <i>“Alternatively, the accreditation mark of the accreditation body that is a signatory to the ILAC MRA or the reference to its accreditation status may be included on the calibration certificate.”</i>
REMC O/ CH		5.3.1		te	"... by national accreditation bodies..." Accreditation bodies need not necessarily be "national"	Delete "national"	Accepted
REMC O/ CH		5.3.2		te	Whole paragraph is superfluous and does not add any substantial value to the whole document	Delete whole paragraph	Not accepted.  Clause 5.3.2 describes the position and the purpose of the accredited calibration laboratory in the manufacturer's calibration hierarchy.
REMC O/ US		5.3.2		ed	Remove words “which are”	Text should read: Their task is to compare, at appropriate intervals, the firm's own working standards with reference standards calibrated by an NMI or an accredited	Accepted

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						laboratory with suitable calibration and measurement capability.	
REMC O/ CH		5.3.3		Te	<p>"In this case the customer has to be assured that the measurement uncertainty achieved in a laboratory is suitable and sufficient for the intended use of the measuring instrument to be calibrated."</p> <p>This phrase is unclear and probably wrong: Unclear: "...has to be assured...": it is unclear who has the obligation of activity here.</p> <p>Probably wrong: The phrase implies that the calibration laboratory has the obligation to assure that the measurement uncertainty is suitable for the intended use. This is completely wrong since the calibration lab cannot know the intended use and this obligation therefore is on the side of the user of the measuring instrument</p>	<p>Either re-phrase or delete the sentence, or. Better: Delete whole paragraph 5.3.3 as it adds no value to the document</p>	<p>Not accepted.</p> <p>The phrase <i>"In this case the customer has to be assured that the measurement uncertainty achieved in a laboratory is suitable and sufficient for the intended use of the measuring instrument to be calibrated."</i> means that the customer is responsible to choose suitable accredited laboratory in relation to the measurement uncertainty.</p>
AU 056	1	5.3.4	1	ed	If certificates is to become plural then the "a" before "calibration" should be removed	The calibration results are documented in <del>a</del> calibration certificates	Accepted
REMC O/ CH		5.3.4		te	<p>"The calibration results are documented in a calibration certificates"</p> <p>D5 It is the wrong document to set requirements for accredited laboratories (5.3). Since the headline of 5.3 clearly mentions accredited laboratories, it is clear that all requirements that are listed in ISO IEC 17025 are to be applied</p>	Delete whole paragraph 5.3.4 as it adds no value to the document and risks contradictions to what is required elsewhere regarding "accredited laboratories.	<p>Not accepted.</p> <p>Clause 5.3.4 was reworded as follows: <i>"Accredited calibration laboratories generally documents the calibration results in calibration certificates."</i></p> <p>The calibration certificates and calibration results relates with the hierarchy schemes (see for example fig. 2). The clause 5.3.4</p>

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							describes how the accredited laboratory usually documents the calibration results. It does not result from the clause 5.3.4 that no others requirements have to be fulfilled.
DE 057	1	5.4.1		Te	After several changes resulting from the comments on the 2CD the 1 <sup>st</sup> sentence is now confusing. We do not agree with changing “shall” to “should” as this conflicts with EN ISO/IEC 17025 and ILAC P10. We propose to reword the sentence according to EN ISO/IEC 17025 No. 6.5.2. We recommend adding an additional note giving the link to the respective section of EN ISO/IEC 17025.	Replace “Legal metrology laboratories should be able to demonstrate that the measurement standards values and measuring instruments values used for verification are traceable to the SI units within their scope of authorisation according to the national legislation.” by  “Legal metrology laboratories shall ensure that measurement results used for verification within their scope of authorisation according to national legislation are traceable to the SI. <i>Note:</i> Further guidance is provided by EN ISO/IEC 17025 [1] section 6.5.2”	Accepted  The note was rewording with small change as follows: <i>“Note: Further guidance may be found in EN ISO/IEC 17025 [1] section 6.5.2.”</i>
JP19 058	1	5.4.1	1 <sup>st</sup> and 2 <sup>nd</sup> sentences	Te/Ed	In the 1 <sup>st</sup> sentence, as we pointed out in our comment (JP2), the word “values” may not be necessary.  In the 2 <sup>nd</sup> sentence, change the expression of “calibration and measurement capabilities” according to our comment (JP17).	Recommend deletions of “values” as shown below.  <i>Legal metrology laboratories should be able to demonstrate that the measurement standards values and measuring instruments, values used for verification are traceable to ....</i>  Use capital letters or “CMC” for “calibration and measurement capabilities”.	Accepted  See DE 057 for rewording the 1st sentence.
REMC O / US		5.4.1		te	Reads: “Legal metrology laboratories should be able to...” In previous sections of the document the normative “shall” was used.	Reviewed document for consistency of intent with respect to normative vs informative language.	Accepted  See DE 057.

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							In this document, verbal forms used in International Standard was applied: - “shall” indicates a requirement; - “should” indicates a recommendation; - “may” indicates a permission; - “can” indicates a possibility or a capability.
RU 059	1	5.5.1		ge	In this paragraph, NMIs are listed as the performers of so called in-house calibrations along with calibration and metrology laboratories of companies, which does not seem to be entirely appropriate since NMIs are national bodies responsible for national systems for assuring the traceability (see 5.2; 5.6.1, fig.2). Metrological work carried out by NMIs is unlikely to be classified as 'in-house' because of their status.	To remove NMI from paragraph 5.5.1. Their internal calibration documents (if any) shall be described in a separate sub-paragraph.	Accepted For better understanding, the paragraph 5.5.1 was rewording as follows:  <i>“In-house calibration means regular calibration of own working standards or measuring instruments which is performed by the metrology laboratory, the accredited calibration laboratory or the company itself against its own reference standard with metrological traceability.”</i>
REMC O / PT		5.5.1	Parag 1	te	By definition and according Fig.1, a legal metrology laboratory does not perform the calibration of reference standards to be used in in-house calibrations of working standards.	Change the sentence to “... that are traceably calibrated at an accredited calibration laboratory or an NMI.”	The clause 5.5.1 was already updated. See RU 059.
REMC O / US		5.5.1		te	The phrase “traceably calibrated” is awkward. Suggest rephrasing.	Replace “traceably calibrated” with: calibrated in a way that establishes metrological traceability	The clause 5.5.1 was already updated. See RU 059.
AU 060	1	5.6		te	The hierarchy relates specifically to legal metrology.	Suggest including scientific metrology to align with the scope of the document.	Not accepted. See also AU 026.

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							<p>According to scope, the document is primarily intended for legal metrology and for legal metrology laboratories, calibration and testing laboratories.</p> <p>No specific text containing the requirements for scientific traceability that could be added in the document was presented by the member.</p>
US-5 061	1	5.6		ed	<p>First, since there is no 5.6.2 ... 5.6.1 is not needed (the sentence can just be Clause 5.6).</p> <p>Second, the sentence is a little complicated as written ... suggested improvement provided.</p>	5.6 The hierarchies of measurement standards and the responsible metrological organisations in each country are shown in Fig. 2.	Accepted
JP20 062	1	5.6.1	Fig. 2	Te/Ed	See our comment (JP3).	In the column titles, replace “measuring <u>equipment</u> ” with “measuring <u>instrument</u> ”.	Accepted
AU 063	1	5.6.1	Figure 2	te	Consider including certified reference materials be included in the Tasks, Basis and Output columns. Or are certified reference materials by definition “measurement standards”?	Amend table accordingly to include reference to certified reference materials	<p>Accepted.</p> <p>The table was amended as appropriate. See also REMCO / BR 5.6.1</p>
REMC O / BR		5.6.1	Fig. 2	te	Considering that certified reference materials can be reference standards the correspondence of Responsibility, Tasks, Basis for the legal control, calibration or measurements and Outputs from the legal control, calibration and measurements in the table must include these	<p>In the “Responsibility” column include: “reference material producers”, changing the text to:</p> <p>Legal metrology laboratories, accredited calibration laboratories and reference material producers</p>	<p>Accepted as follows:</p> <p><i>“Legal metrology laboratories, accredited calibration laboratories and reference material producers”</i></p>

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					materials and not only calibration accredited laboratories and calibration certificate.	<p>In the “Task” column include “and/or production of certified reference materials”, changing the text to:</p> <p>Calibration of working standards and/or production of certified reference materials to safeguard the metrology infrastructure of country</p> <p>In the “Basis for the legal control” column include “and/or certified reference material certificate”, changing the text to:</p> <p>Calibration certificate and/or certified reference material certificate from NMI or other accredited laboratory</p> <p>In the “Outputs from the legal control, calibration and measurements” column include “and/or certified reference material certificate”, changing the text to:</p> <p>Calibration certificate and/or certified reference material certificate for working standard.</p>	<p><i>“Calibration of working measurement standards or production of certified reference materials to safeguard the metrology infrastructure of country”</i></p> <p><i>“Calibration certificate or reference material certificate from NMI or other accredited laboratory”</i></p> <p><i>“Calibration certificate or reference material certificate for working measurement standard”</i></p>
AU 064	1	6	1	te	Is clause 6 only intended to cover hierarchy schemes for measuring instruments or hierarchy schemes more generally? If the former the title should be changed to reflect contents of the clause. If the latter, as quality measurements are playing a greater role in hierarchy schemes there should be a reference in this clause to “certified reference materials”	Either change the title of the clause or include reference to both certified reference materials and reference methods.	<p>Accepted.</p> <p>The title was changed to reflect contents of the clause (follows the title of D5 document “<i>Principles for the establishment of hierarchy schemes for measuring instruments</i>”).</p>
REMC O/ CH		6.1.4	c)		"When the hierarchy scheme is established, it is necessary to specify especially ... c) the methods and means of dissemination of units"	Delete the requirement of "methods and means of dissemination" throughout the document	<p>Not accepted</p> <p>The definitions of hierarchy schemes (3.28 and 3.29), the contents of a</p>

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					We doubt that "the methods and means of dissemination" are a required element in a hierarchy scheme. On the contrary, we believe a scheme has to be valid INDEPENDENT of methods and means of dissemination.		national and local hierarchy scheme (7.1 and 7.1.2) and 7.4.3 include means of dissemination of units. The methods and means of dissemination are required element in hierarchy schemes (see also Annex C).
AU 065	1	6.1.6	c)	ed	Remove the word “the” before equipment	the costs of <del>the</del> equipment	Accepted
AU 066	1	6.1.7	a) b) c)	te	There are no definitions in the document for a “standard measure” or “standard measuring instrument”	The wording should refer to a measurement standard being a “indicating measuring instrument”, “material measure”, etc.	Accepted  The text was modified as follows:  a) direct measurements: — ..... <del>standard</del> <u>material</u> measure; or — ..... of a <u>material</u> measure ..... b) direct comparison <del>or</del> <u>comparison using a measure</u> (standard comparison): — ..... an <u>indicating</u> measuring instrument against an <del>standard</del> <u>indicating</u> measuring instrument; c) comparison with the help of a comparator: — .... a <u>material</u> measure against a <u>material</u> <del>standard</del> measure; d) indirect measurements: — ..... a <del>material measure or</del> measuring instrument using other .....
REMC O/ LU		6.1.7		te	Please clarify the description of the various measuring methods and give some examples.	Clarify and give examples.	Partially accepted.

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							See comment AU 066. The methods were described more understandable.
REMC O/CH		6.1.9			<p>"... uncertainty of the measurements..."</p> <p>An important (yet undefined) term is introduced here and used for the first time and then explained in a "Note".</p> <p>It is not appropriate to define a term in a note.</p> <p>It is not clear if "uncertainty of THE measurement" that is amended with a note) is the same as "uncertainty of measurement" as defined in 3.3</p>	<p>Use consistent wording.</p> <p>If uncertainty of THE measurement should be not the same as 3.3, then add a proper definition in section 3.</p>	<p>Accepted.</p> <p>The term “the total uncertainty of the measurements” was replaced by “expanded measurement uncertainty” as the “overall uncertainty” according to Note 3 of VIM 2.35.</p> <p>The definition “expanded measurement uncertainty” according to VIM 2.35 was added in section 3.</p> <p>The Note in the clause 6.1.9 was removed as no longer needed.</p> <p>According to Note 3 to the definition, expanded measurement uncertainty is termed “<u>overall uncertainty</u>” in paragraph 5 of Recommendation INC-1 (1980) (see the GUM) and simply “uncertainty” in IEC documents.</p>
US-6 067	1	7		ed	Throughout Clause 7 (multiple places), replace the word “kind” with the word “type.”	<p>Example:</p> <p>“... certain <b>type</b> <del>kind</del> of measuring instrument ...”</p>	<p>Accepted</p> <p>The word “kind” was replaced with the word “type” in entire text of D5, as appropriate.</p>

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JP21 068	1	7.3.5		Ed	We appreciate the explanation by the convener to our comment to 2CD. On understanding what is intended in this clause, we propose a rephrase and addition of an example for better understanding.	Propose rephrasing shown below.  <i>The form of <del>expressing</del> <u>numerical expression (using an absolute or relative value)</u> for the metrological characteristics <del>(absolute or relative)</del> of the measurement standards and/or measuring instruments in a single hierarchy scheme should be as similar as possible. <u>For example, expressions with gram and percent should not be mixed.</u></i>	Accepted
REMC O / US		8	[9]		Reference [9] OIML D 2:2007 states that the kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram (3rd CGPM, 1901). This statement is no longer true.	Update OIML 2 2:2007 per the resolutions adopted at the 2018 26th CGPM.	Accepted  Reference [9] OIML D 2:2007 was updated as follows: OIML D 2:2007 Legal units of measurement under the terms of Resolution 1 of the 26th CGPM in 2018.
AU 069	1	All		ge	Quality measurements which often rely on reference materials should also be included in metrological hierarchy schemes as they are becoming increasingly subject to metrological control, e.g. 4.4.1, 5.6.1, 6.1.1	Where appropriate, this document should be amended to reflect this change.	Accepted  Amended in 4.1.1 ... through the use of measuring instruments <u>or reference materials</u> and test equipment .....  Amended in 4.4.1 ... or for the case of repeated standard, routine calibrations <u>or quality measurements</u> , a maximum ... a maximum permissible error (MPE) of the measurement standard, <u>reference material</u> or

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							measuring instrument is specified .....
							Amended in 5.6.1 – see AU 063
							Amended in 6.1.1 <i>a) purpose (e.g. scientific metrology, verification in legal metrology, calibration, quality measurement etc.):</i>
AT 070	1	Annex A	1 <sup>st</sup> item	te	BEV as NMI is charged with realisation of the unit length. Therefore the content of the item might be necessarily amended/changed by/to “Realisation”	Please change “Definition of unit” to “Realisation of unit” in the first item.	Accepted
RU 071	1	Annex B	fig.	te	In the calibration hierarchy scheme for measuring instruments it is proposed to indicate the accuracy of standards as a total standard uncertainty, while in the Mutual Recognition Arrangement (MRA) it is recommended to specify the extended uncertainty at P=0.95.	Perhaps it makes sense to stick to the MRA recommendations.	Accepted
RU 072	1	p.1		ge	Document number: N017	Document number: N018	Accepted
AU 073	1	various		ed	The formatting seems to be having a lot of hanging paragraphs or clause/sub clause numbers. For instance, under sub clause 4.1, Objectives of metrological traceability, the text is under a further sub clause 4.1.1, which is not required.	Suggest formatting and streamlining the document and removing unnecessary levels in the document, to improve readability.	Accepted  Updated accordingly.

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