|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | blue%20tiff | TC9 Comments on: | First Committee Draft R 60: Metrological Regulation for Load Cells Parts 1&2 | | TC9 Secretariat: | USA, John Barton ([john.barton@nist.gov](mailto:john.barton@nist.gov)) | | | | | |
| The following comments are those received from TC9 member states based on their review of proposed amendments derived from the presentation of “RECOMMENDATION FOR THE REVISION OF TEST PROCEDURES FOR LOAD CELLS IN LEGAL METROLOGY” given at the IMEKO World Congress Fundamental and Applied Metrology Conference on September 6-11, 2009 in Lisbon, Portugal and the 1st Working Draft of OIML R60 Parts 1&2 which was circulated in December 2010.  The Secretariat requested Input on the 1WD from Mr. Gep Englar due to his work and experience in the development of the 2009 OIML template that was used in the formatting of the 1WD as well as 1CD.  Many of the responses to the comments are based on the discussions and conclusions of the Technical Committee made during the TC9/R60 meeting held in Braunschweig, Germany September 19-20, 2011. | | | | |
| **Member State/ Liaison** | **Page number** | **Document clause** | **Member Comments** | **Secretariat’s Response** |
| Gep Englar | General |  | 1)      I am missing an Annex “Bibliography”. This was also missing in the present version of R 60. See OIML Directives for the technical Work, Part 2, 6.4.4, 6.4.5 and 7.6, and also Annex X in the Template. In this 1WD, Several references to other (OIML and other) publications do not state which version is meant. In my opinion, this must be completed. | As noted in comments from TC9 members, Bibliography Annex is not included in 1WD. This Annex has been included in 1CD. |
| Gep Englar | General |  | 2)      In this 1WD (6.3.1.1 and others), the expressions “type” and “pattern” are used. I assume they have an identical meaning in this draft. Please note that in the VIML (2.5 & 2.6), “type” is the preferred expression. | Amended. "Type" will be used and will replace "pattern" in future draft |
| Gep Englar | General |  | 3)      One of the basic background of the draft OIML template is a very strict differentiation between the requirements in Part 1, and Part 2 describing metrological control and the tests to verify compliance with the requirements. You will remember the OIML seminar: “No requirements in the form of tests”! And requirements shall (as far as possible) be independent of the physical principle of the instrument. And mostly, this is possible (although somewhat unfamiliar for some test engineers)! For instance the requirement with respect to electromagnetic susceptibility is also applicable to purely mechanical instruments, but that test is only necessary for electronic ones. See also the draft Template. This aspect has only applied to a very limited degree in this 1WD R 60. | Amendments to Recommendation have been made to separate requirements from tests. |
| Gep Englar | General |  | 4)      In the Draft OIML Template it is foreseen that there is a link from the tests in Part 2 to the requirements in Part 1: each test is preceded by a statement like: “This test is applied to verify compliance with the provisions in [refer to relevant clause in Part 1] for ….”I am missing such references in the 1WD R 60.(The other way is covered in 1WD R 60 by 6.10). | Additional statements to indicate link of tests in Part 2 to requirements in Part 1 are included in 1CD. |
| Gep Englar | General | 1 | General: In this introduction, there is too much emphasis on the “prescribed” Template for OIML Recommendations. It must be noted that it is still a draft Template. So the status is still rather informal. But in spite of this, the application of the Template was strongly encouraged during both the OIML seminars in Douai. As the Templates are primarily drafted for complete instruments, the application for “modules” is not easy and the some creativity by (the secretary of) the responsible TC or SC is necessary. This is in particular the case if it is the intention to transform an existing Recommendation to the structure of the templates. In this respect, the secretary of OIML TC9 made a start in this transition. But in my opinion, this transition is far from complete | This issue was discussed at the TC9/R60 meeting held September 19-20, 2011. The conclusion at the meeting was to adhere to the structure of the template as closely as possible, however every effort should be made to maintain the continuity and usefulness of the existing document. The 1 WD is the initial move toward this goal and subsequent drafts will reflect additional effort. |
| Gep Englar | 3 | 1 | Editorial: “…. a load cells ……” | Amended |
| Gep Englar | 2 | 4 | Although not changed, I suggest to limit the scope (contents) of this Recommendation more clearly to the “pure” load cell. In that case, a load cell has per definition “only” an output quantity (for instance mV/V or frequency) and no indication. See also the definition in 3.1.1 | Scope of this Recommendation will follow the resolutions of the 2011 TC9-R60 meeting in Braunschweig. Summary of this meeting may be found at: http://workgroups.oiml.org/tcsc/tc-09/tc-09/meetings/Meeting%20Summary-final.pdf/view |
| Gep Englar | 5 | 3.1.1 | Force transducer is not defined (but see VIM 3.7)The note is new. It states: “Load cells equipped with electronics ………………….. are called digital load cells.”Suggestion to replace the note by “Load cells with a digital output (either by their physical principle or by for instance including analog-to-digital convertor (ADC) and/or data processing device) are called digital load cells.”Remark: As the expression “digital load cell” is not used in the Recommendation, it is right not to add a definition.But see also my remark 9.12.7.1 | Note in 3.1.1 deleted as recommended.  Note in 3.1.2 added as recommended by Germany, NL, and Australia. |
| Gep Englar | 5 | 3.1.2.1 | This definition comes from OIML D 11, so I suggest moving this to Annex A.3 | Definition relocated to Annex |
| Gep Englar | 6 | 3.3.1 | (Reference to Template 3.x): I suggest to combine this with 3.3.1 I understand that R60 is mainly inspired by load cells with strain gauges, but other principles should also be kept in mind. In my ancient experience from the 70‘s and 80’s, other physical principles are (or were….) among others: \* Electromagnetic force compensation (Mettler); \* Vibrating string (Van Berkel); \* Magnetic “Pressductor” (ASEA/ABB); \* A few more “exotic” systems, but I do not remember those manufacturers. | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X (To be determined by TC9 as needed) |
| Gep Englar | 6 | 3.3.1 | As a “digital load cell” can very well be based on strain gauges, there is no contradiction between “strain gauge load cell” and “digital load cell”. | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| Gep Englar | 6 | 3.4.1 | Reference to version of “VIM” is missing.  Although “adapted from VIM”, move to A.1 ????? | Definition moved to Annex |
| Gep Englar | 8 | 3.5.8 | Although not changed:  I am in doubt: Is this right? This text suggests that this mass shall not exceed MPE.Suggestion: “Smallest load that shall be constantly applied to the load cell so the MPE will not be exceeded in the measuring range“ | Clause wording amended |
| Gep Englar | 8 | 3.5.9 | Although not changed, I suggest changing the text:  “Difference in load cell output at minimum dead load, measured before after application of a load of Emax.“ Furthermore, I suggest to move this item to 3.7 as there is a relation to creep (3.7.1) | Wording amended as recommended |
| Gep Englar | 8 | 3.5.11 | Although not changed, I suggest deleting “test or”. Test shall be in compliance with the intended use. But that matter shall be dealt with in Part 2. | The wording as is does not appear to detract from the intent of the clause |
| Gep Englar | 9 | 3.5.16 | Although not changed, I suggest replacing “requirements” by “specifications”. | Existing language does not appear to detract from the intent of the clause |
| Gep Englar | 10 | Figure 1 | In my opinion, the “old” layout of Figure 1 is far clearer than the new one. But if the secretary prefers to keep this as a sub-table instead of a picture, the layout can be simply improved by deleting the borders of that sub-table. | Figure replaced |
| Gep Englar | 10 | 3.7.4 | This definition is clearly adapted from D11, 3.9. So refer and move to A.1 (?) | Definition relocated to Annex |
| Gep Englar | 11 | 3.7.7 | Although not changed, I see a problem with this definition: The true value of the measurand is a mass, expressed in kg.  But, for the load cell itself, the “load cell measurement result” is (for stain gauges) a voltage ratio without dimension.  Reference to VIM: no edition is given. Move to Annex A.1. But, on the other hand, please not that “error” is not defined in the present VIM. So may be it is better removing this reference. | Wording amended to reflect the resolution of the TC9 and avoid the use of specific units for the output of a load cell.  Reference to current VIM added. |
| Gep Englar | 11 | 3.7.8 | See my remark 3.7.7 | Wording amended to reflect the resolution of the TC9 and avoid the use of specific units for the output of a load cell.  Reference to current VIM added. |
| Gep Englar | 11 | 3.7.11 | Although not changed, Please note that there is a different definition in the VIM (2.21) | Amended |
| Gep Englar | 12 | 3.7.13 | Although not changed, Please note that there is a different definition in the VIM (4.12) | Amended |
| Gep Englar | 12 | 3.7.14 | Although not changed, This definition is adapted from D 11, 3.10. Suggestion: refer to D 11 and move to A.3 | Definition amended to reflect reference of OIML D11 |
| Gep Englar | 12 | 3.8.1 | Although not changed. This definition differs from the one in the VIM to which the reference is made. But this definition does comply with the present edition of OIML D 11, 3.13. But, on the other hand, D 11 is currently being revised and I expect that at this occasion, it will be aligned with the present VIM. | Terminology amended to reconcile with V 2-200: 2010 |
| Gep Englar | 12 | 3.8.1.1 | See D11, 3.13.2. So I suggest adding the reference and moving to A.3 | Paragraph relocated to Annex |
| Gep Englar | 12 | 3.8.1.2 | See D11, 3.13.1. So I suggest adding the reference and moving to A.3 | Paragraph relocated to Annex |
| Gep Englar | 14 | 4 | To prevent confusion by those who are not familiar with the OIML Template, I suggest adding a temporary statement (until the text is drafted by TC9): “The following text is an explanatory text copied from the draft OIML Template”. | Suggested text added as "Description of Load Cells". Additional or alternative text to be decided by TC9 |
| Gep Englar | 16 | 6.3 | In my opinion, a load cell (without indication) has no “real” error, nor MPE. But instead, in my view, the MPE is a theoretical value specific for the type evaluation. May be, in future, the Draft OIML Template can be improved at this point (!) Furthermore, please note that the “approval” is a legal action (issuing the approval document) that follows after successful type evaluation. | Improvements to the OIML Template will be taken into consideration during subsequent revisions. |
| Gep Englar | 17 | 6.3.1.1 | Lay-out: On screen there is no problem (neither in normal view, nor in print lay-out). But when printed (2 different printers, 2 different operating systems), Table 1 and the rest of the text in this cell does not appear on paper.  Note (1) at bottom of page: add editions / add them to “Bibliography”. | Problems with word processing to printing could not be reproduced. Efforts to avoid these problems are taken. It is believed that this specific problem has been corrected  Amended |
| Gep Englar | 18 | 6.5 | Although not changed, I suggest to add: “…. by the manufacturer”. | Amended |
| Gep Englar | 18 | 6.7 | Suggestion: in d), replace “necessary” by “applicable”.  Remove “g)” (not the text, only letter and column). | Amended as proposed |
| Gep Englar | 19 | Figure 2 | Right side of picture: I suggest to replace “needed” by “prescribed”. | Amended |
| Gep Englar | 19 | 6.8.1.1 | I suggest adding a note: “Depending on local climatic conditions (extreme cold or hot countries) and the expected conditions of outdoor application (weigh bridges, hopper scales, belt weighers, etc.) national legislation can prescribe other limits with a range of 50 °C.” See also note (1) in Draft Template, 6.10. | Amended as proposed |
| Gep Englar | 20 | 6.8.1.3 | Compared to the previous edition, 5 °C is changed to 15 °C. On purpose, or typing error ????? The last sentence is not a requirement but part of the test procedure. So move this to Part 2. | Amended |
| Gep Englar | 20 | 6.8.3 | See General remark 3) | Amended |
| Gep Englar | 20 | 6.8.3.1 | According to the way the present text is written, these are not a requirement but part of the test procedure. So move to Part 2.For 6.8.3, I suggest to change the text to a requirement; for instance:With respect to humidity conditions, there are 4 humidity classes: Standard, CH, NH, and SH. In case of class CH, NH, or SH, the class designation shall be marked on the load cell.(For 6.8.3.1, I did not yet try to draft you a suggested text; later… may be) | Paragraph amended. Language regarding testing procedures relocated to 9.10.5 |
| Gep Englar | 21 | 6.8.3.2 | See General remark 3) I suggest changing the text (See also the draft OIML Template, § 6.10) to: “A load cell shall meet the applicable MPE in condition of relative humidity up to 85 %.” | Language amended |
| Gep Englar | 21 | 6.9.1.1 | There is no 6.10.2.1 | Amended |
| Gep Englar | 21 | 6.9.1.2 | See General remark 3) Why only for load cells equipped with electronics? In my opinion, this durability requirement (and even the test) is also applicable to “simple” strain gauge cells. And strictly spoken, a strain gauge is not an electronic component (see OIML D 11, 3.4). Wrong reference: 9.11.7.8 shall be replaced by 9.12.7.8 | Statement added to requirement that clarifies strain gauge technology is subject to this requirement. Portion of paragraph to Part 2, 9.10.7.10 |
| Gep Englar | 22 | Table 3 | See General remark 3) Replace reference to test by reference to requirement. Warm-up time also for stain gauge load cells (see previous remark). Why double: Table 3 and 6.11.3.x ? Wrong references: 9.11.7.x shall be replaced by 9.12.7.x | See above comment - statement added.  Table relocated to Part 2, 9.10.7.1. References amended. |
| Gep Englar | 22 | 6.9.2 | No tests here! See General remark 3) | Amended |
| Gep Englar | 22 | 6.9.2.1 | See General remark 3)Wrong reference: 9.11.7 shall be replaced by 9.12.7 | Amended |
| Gep Englar | 22 | 6.10 | Wrong reference 6.10.2 | Paragraph deleted |
| Gep Englar | 22-24 | 6.11 | In my opinion, many of the requirements described here go beyond the properties of the load cell itself, as they seem to be more applicable to the weighing instrument (R 76)! So, I suggest removing such aspects from R 60. | See comments regarding scope of R60 based on conclusions of TC9 meeting. |
| Gep Englar | 23 | 6.11.1 | 2nd paragraph: Only for electronics?: see also my earlier remark for strain gauge cells.  In my opinion, the typical aspect of a load cell (unlike a weighing instrument) is, that it has no indication of its own. So the “load cells” mentioned in this paragraph are outside the scope of this Recommendation and should be left to R 76. | Statement added to requirement that clarifies strain gauge technology is subject to this requirement.  See also above response. |
| Gep Englar | 23 | 6.11.1.3 | No durability test for strain gauge load cells? (no electronics!) Reference to 6.11.3: This contains requirements; no examinations. Reference to 6.9.2: should be to Part 2 | References amended. See response for 6.11.1 |
| Gep Englar | 24 | 6.11.3.1 | In my opinion, this is outside the scope of this Recommendation and belongs to R 76. Besides that: do you expect any load cell including an indicator, but without electronics?  I suggest removing this requirement. | See comments regarding scope of R60 based on conclusions of TC9 meeting. |
| Gep Englar | 24 | 6.11.3.2 | Is this a requirement for the load cell or for the indicator? I suggest removing this requirement. | Requirements 6.11.3.1 - 6.11.3.4 deleted as per conclusion of TC 9 meeting |
| Gep Englar | 24 | 6.11.3.3 | In my (old!) personal experience, load cells were always powered by the load cell indicator. If this is still the case, these sub clauses are not relevant. | See above |
| Gep Englar | 24 | 6.11.3.4 | The title reads “…. (AC)” but b) applies “… if AC is used” This seems somewhat strange to me. (In addition, please keep in mind that a DC mains network (in 9.12.7.3 there is reference to DC mains network) is a very rare situation. As far as I know, only on petrochemical plants and may be in a few remote villages or private generators in remote areas.)If there are loads cells specified to be directly powered (not via the indicator) by a battery, please note that OIML D 11 and the Draft Template gives far more detailed requirements. But I am in doubt whether this is relevant for load cells! | See above |
| Gep Englar | 25 | 7.2 | I must confess, I am not fully up to date with the state of the art of load cells. But If there are load cells with built-in electronics that contain digital circuits and may be even software, but without a display, only than 7.2 might be relevant. Anyhow, I do not agree with the statement in the last sentence and I suggest to change as follows: “The load cell shall be provided with a facility to transmit the actual version of the identification code to the indicator.” | Software requirement amended as proposed by TC9 work group. New requirement needs review. |
| Gep Englar | 25 | 7.3.1 | This information is not required in 6.7 | Marking requirements section realigned. Please see layout in 1CD. |
| Gep Englar | 25 | 7.3.2 | I suggest adding: “In case of “Standard” class, no such character is required.”  (see also my remark 6.8.3). | Unless load cell is designated as one of the accuracy classes listed it is implicit that no marking of this type is required |
| Gep Englar | 26 | 7.3.5 | 9.9 to 9.10.2 does not give limits of error, but tests | Paragraph references amended |
| Gep Englar | 26 | 7.3.6 | Redraft as requirements instead of reference to tests (see draft OIML Template). | Requirement redrafted to separate requirements from tests. |
| Gep Englar | 27 | 7.3.8 | The present text seems to suggest that other information (not mentioned in 7.3.7.1 or 7.3.8) would be forbidden. Therefore, I suggest adding:  “c. other information considered necessary or useful by the manufacturer.” | Statement added as proposed |
| Gep Englar | 28 | 7.3.11 | Although not changed, I suggest replacing the beginning of the 1st sentence by: “If it is impossible to attach the markings prescribed in 6.7, than the load cell shall be accompanied by the manufacturer providing this information.” | It would not seem reasonable to require the manufacturer to personally accompany the specimen. It should be sufficient that the requirement states that a document is provided in lieu of complete markings. |
| Gep Englar | 28 | Part 2 | Editorial: I suggest starting Part 2 on a new page. | Amended |
| Gep Englar | 29 | 8.1.1 | Although not changed, I suggest replacing the 1st sentence by: “This Recommendation prescribes performance require­ments for load cells used in weighing instruments subjected to legal metrological control.“ | Statement amended as proposed |
| Gep Englar | 29 | 8.2 | The text is a direct copy from the draft OIML Template. 1st paragraph: I suggest adapting the text: “… the load cell complies …” Same in 2nd paragraph. | Amended |
| Gep Englar | 29 | 8.3.1 | Although not changed, I suggest adding: “… (used during the tests to observe …)” This in order to clarify that the indicator of the weighing instrument is not meant. | Amended as proposed |
| Gep Englar |  | 9 | All tests: I suggest adding to all tests: “This test is applied to verify compliance with the provisions in …….. “ (See Draft OIML Template). | Amended as proposed |
| Gep Englar | 30 | 9.4 | In contrast with the title, 9.4 does not contain any test conditions. | Deleted clauses 9.4 and 9.4.1 per comment from France. Eliminated redundancy with clauses 9.9.3 and 9.9.3.1 |
| Gep Englar | 30 | 9.5 | 1st sentence: And the rest of clause 9 ??? I suggest adding in the 2nd sentence: “… sample(s) of each family of the load cell for type testing.” | 2nd sentence deleted per France's comment. |
| Gep Englar | 31 | Table 7 | Probably typing error (?): Replace top of right column by (see Template) by:  “Tests that may be divided amongst no more than 2 additional specimen.” | Amended |
| Gep Englar | 31 | 9.6.1 | I suggest moving this to 9.5 | Moved - subparagraph of 9.3 |
| Gep Englar | 31 | 9.6.3 | Please note that the “approval” is an (“administrative”) procedure following positive results of evaluation and tests. So I suggest changing the text: “…. Are deemed to fulfil the requirements of this Recommendation”. | Amended |
| Gep Englar | 32 | 9.6.4 | There are no sub clauses 9.5.2 and 9.5.3 | Amended |
| Gep Englar | 32 | 9.6.6 | I suggest moving this to 9.12.5 | This clause relates to the selection for test criteria of load cells within a family and appears to be located within the proper context. |
| Gep Englar | 32 | 9.7 | As 7.2 and 9.8.1.f suggests that load cells might contain software (but I have my doubts!), it is necessary to provide documentation about the software. | Added documentation relative to software |
| Gep Englar | 33 | 9.9.1 | Although not changed, I suggest replacing the end by: “…… used in weighing instruments subjected to legal metrological control.“ | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| Gep Englar | 33 | 9.9.1.2 | Although not changed, I suggest replacing the 2nd sentence by: “Testing of complete systems that include load cells is not covered by the scope of this Recommendation.“ But such a statement is superfluous if the scope of this Recommendation is very clear! | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| Gep Englar | 34 | 9.9.4 | I suggest adding a table with the reference conditions for the tests (see draft OIML Template 13.4.1). | Table added as proposed |
| Gep Englar | 34 | 9.9.4.1 | Although not changed, I suggest replacing the end: “… traceable to (inter)national standards”. Clarification: nowadays it is widely accepted that traceability can also be acceptable to the national standard of another country. And in rare cases may be even directly to BIPM. | Paragraph amended |
| Gep Englar | 34 | 9.9.4.2 | See draft Template 13.4.1 | Paragraph relocated to 9.7.4.1. Table for reference conditions added. |
| Gep Englar | 34 | 9.9.4.5 | Although not changed, please note that in the VIML, the word “verification” has a very specific meaning!Therefore, I suggest replacing the text by:“All standards and measuring instruments used for the tests shall be traceable to (inter)national standards.” | Amended as proposed |
| Gep Englar | 35 | 9.9.4.7 | I suggest adding: “If the load cell has a fixed connection cable, this cable is considered as an integral part of the load cell. So it shall be at the same temperature as the body of the load cell.” | The connection cable is addressed already in the current text. "The load cell and its connecting means (cables, tubes, etc.) which are integral or contiguous shall be at the same test temperature." |
| Gep Englar | 35 | 9.9.4.10 | Please note that in the VIML, the word “verification” has a very specific meaning! In my opinion this belongs to the normal operation of the test lab, so superfluous here. | Paragraph amended according to proposal from Netherlands |
| Gep Englar | 35 | 9.9.4.11 | I suggest adding to the examples: “input impedance of the indicator” | Amended as proposed |
| Gep Englar | 35 | 9.9.4.12 | Please note that this is also covered by Part 3 of the Draft OIML Template. In my opinion, there is no objection to have the date noted in full text. | This language is unchanged from the 2000 edition of R60. No formal proposal has been brought forward to change this format |
| Gep Englar | 36 | 9.10.2 | Please note that Part 3 of the Draft Templates is called: “Report format for type evaluation”. Type evaluation is more than only the laboratory tests! | Reference to Part 3 amended |
| Gep Englar | 37 | 9.10.3.1 | I suggest adding: “… specified in Table 8. | Paragraph amended as proposed per Netherlands comments |
| Gep Englar | 37 | 9.10.3.2 | As the influence of (un)loading times can be significant, it is my opinion that these shall always be noted in the report. But this is already prescribed in general by 9.9.4.12. | No action required |
| Gep Englar | 37 | 9.11.1 | This is a requirement. So it belongs in Part 1. | paragraph relocated |
| Gep Englar | 38 | 9.11.2 | This is a requirement that belongs in Part 1 | Paragraph reworded, relocated |
| Gep Englar | 50 | 9.11.7.3 | Replace 6.12.3.4 and 6.12.3.4 by 6.11.3.4 and 6.11.3.4 See my remarks 6.11.3.3 and 6.11.3.4; in particular with respect to “DC mains network”. And in Part 1, there are no requirements related to DC mains networks, so a test is not applicable. No uncertainty of the temperature is given. I suggest referring to “reference temperature” (Draft template 13.4.1). | Paragraph reference numbers amended  uncertainty of reference temperature inserted as proposed |
| Gep Englar | 51 | 9.11.7.3 | List all standards referred to, and their version in a future Annex Bibliography (See Template, Annex X). | Standards referred to listed in bibliography |
| Gep Englar | 38 | 9.12.1.2 | No uncertainty of the temperature is given. I suggest referring to the “reference temperature” (Draft template 13.4.1). | inserted uncertainty (+/- 2 °C) |
| Gep Englar | 39 | 9.12.1.4 | Where can I find 9.8.1.10 ? | amended |
| Gep Englar | 39 | 9.12.1.7 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 39 | 9.12.1.9 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 39 | 9.12.1.10 | Replace 9.11.1.8 by 9.12.1.8 | amended |
| Gep Englar | 39 | 9.12.1.11 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 40 | 9.12.1.12 9.12.1.13 | Replace “...11...” by “….12….”. | amended |
| Gep Englar | 40 | 9.12.2.1 | I do not see any real “test conditions” in 9.3 (nor in 9.4) | amended |
| Gep Englar | 40 | 9.12.2.2 | No uncertainty of the temperature is given. I suggest referring to “reference temperature” (Draft template 13.4.1). | inserted uncertainty (+/- 2 °C) |
| Gep Englar | 41 | 9.12.2.4 | There is no 9.8.1.10 | amended |
| Gep Englar | 41 | 9.12.2.8 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 41 | 9.12.2.9 | Replace “...11...” by “….12….”. | amended |
| Gep Englar | 41 | 9.12.2.10 | There is no 9.8.1.8 Replace 9.10.1 by 9.11.1. | amended |
| Gep Englar | 42 | 9.12.3.1 | 9.3 Does not give any test procedures | amended |
| Gep Englar | 42 | 9.12.3.2 | No uncertainty of the temperature is given. I suggest referring to “reference temperature” (Draft template 13.4.1). | inserted uncertainty (+/- 2 °C) |
| Gep Englar | 42 | 9.12.3.4 | Where can I find 9.8.1.10 ? | amended |
| Gep Englar | 42 43 | 9.12.3.8 9.12.3.10 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 43 | 9.12.3.11 | Replace “...11...” by “….12….”. | amended |
| Gep Englar | 43 | 9.12.3.12 | Where can I find 6.12.3.2 ? | amended |
| Gep Englar | 43 | 9.12.4 | I suggest adding here (or in the future Part 3): “So there is no need to conduct this test in case of bending beam or shear beam type of load cells. The justification for not conducting this test shall be noted in the test report”. | TC9 resolutions during September 2011 meeting indicated that R60 scope will not be overly prescriptive. "The justification for not conducting this test shall be noted in the test report" statement added. |
| Gep Englar | 43 | 9.12.4.1 | Wrong reference to A.3 | amended |
| Gep Englar | 43 | 9.12.4.3 | Where can I find 9.8.1.10? | amended |
| Gep Englar | 44 | 9.12.5.1 | Probably wrong reference: 9.8 does not specify test conditions | amended |
| Gep Englar | 44 | 9.12.5.2 | No uncertainty of the temperature is given. I suggest referring to “reference temperature” (Draft template 13.4.1). | inserted uncertainty (+/- 2 °C) |
| Gep Englar | 44 | 9.12.5.4 | Where can I find 9.8.1.10? | amended |
| Gep Englar | 45 | 9.12.5.8 9.12.5.10 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 45 | 9.12.5.11 | Replace “...11...” by “….12….”. | amended |
| Gep Englar | 45  46 | 9.12.5.12 | List the standards referred to, and their version in a future Annex Bibliography (See Template, Annex X).  Last sentence page 45 and last sentence of clause: Replace “...11...” by “….12….”. | standards referred to in bibliography  paragraph references amended |
| Gep Englar | 46 | 9.12.5.13 | Replace “...11...” by “….12….”. | amended |
| Gep Englar | 46 | 9.12.6.1 | Probably wrong reference: 9.8 does not specify test conditions | amended |
| Gep Englar | 47 | 9.12.6.4 | Where to find 9.11.2.10 ? | amended |
| Gep Englar | 47 | 9.12.6.7 9.12.6.9 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 48 | 9.12.6.10 | Replace …11… by …12… | amended |
| Gep Englar | 48 | 9.12.6.11 | Lay-out: On screen there is no problem (neither in normal view, nor in print lay-out). But when printed (2 different printers, 2 different operating systems), all text in this cell below the heading does not appear on paper. List all standards referred to, and their version in a future Annex Bibliography (See Template, Annex X). Replace 9.11.6.1 to 9.11.6.10 by 9.12.6.1 to 9.12.6.10 | Could not duplicate printing problem. Paragraph references amended. Bibliography created for standards reference |
| Gep Englar | 48 | 9.12.6.12 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 49 | 9.12.7.1 | Title: The Expression “load cell with digital output interval” is not defined. Is this identical with a “digital load cell”? But see also my remark 3.1.1 | Expression has been interpreted as being equivalent to “digital load cell”. TC9 to review and verify. |
| Gep Englar | 49 | 9.12.7.2 | Replace 6.12.3.2 by 6.11.3.2No uncertainty of the temperature is given.I suggest referring to “reference temperature” (Draft template 13.4.1). | Reference to temperature uncertainty inserted as proposed. |
| Gep Englar | 50 | 9.12.7.2 | Replace 9.9.3 by 9.10.3 | amended |
| Gep Englar | 51 | 9.12.7.4 | Replace 6.10.1.1 by Table 7 (???) | reference amended to 6.9.1.1 |
|  |  | 9.12.7.5 | Prescribing these tests is only relevant for load cells directly powered from the Mains network; do they exist indeed? List all standards referred to, and their version in a future Annex Bibliography (See Template, Annex X). | TC9 to determine if these test are relevant. Standards referenced to Annex F – Bibliography |
| Gep Englar | 52-54 | 9.12.7.6 | Replace 6.10.1.1 by Table 7 (???) | amended |
|  |  | 9.12.7.7 | I am in doubt whether these tests are relevant for “pure” load cells! List all standards referred to, and their version in a future Annex Bibliography (See Template, Annex X). | Standards listed in bibliography.  These test are designed to determine the effects of exposure to electromagnetic fields. Language in 9.12.7.7 does not indicate that components other than the load cell under test be exposed to such influence. |
| Gep Englar | 54-56 | 9.12.7.8 | Replace in title 6.10.1.2 by 6.11.1.2 | Amended |
| Gep Englar | 56 | 9.13 | Replace in the text Figure 9.1 by Figure 3In my opinion, 9.13 and Figure3 should be part of the procedure for the temperature test. So it should be moved there. | Text in figure amended as needed. |
| Gep Englar | 56 | Figure 3 | Wrong references in Figure 3 | amended |
| Gep Englar | 56-57 | 9.13.1 | Replace in the text Figure 9.2 by Figure 4 | amended |
| Gep Englar | 57 | Figure 4 | Wrong references in Figure 4 | amended |
| Gep Englar | 59 | Annex A | Versions of the referred publications are missing. See also my remark “Bibliography”. | Bibliography added |
| Gep Englar | 60 | all | Lay-out: On screen there is no problem in normal view. But in print lay out and when printed (2 different printers, 2 different operating systems), all text after page 59 is invisible on screen and not printed. In normal view, this entire part seems to be page 60. Therefore, I can make no reference to page numbers. | Cannot reproduce printing difficulties. Hopefully 1CD will print as desired. |
| Gep Englar | ? | Annex B | Annex B seems to be a copy from the present R 60. And in my opinion it makes no sense assessing this Annex until the revision of the main Recommendation is in a more advanced stage. So I did not assess this Annex. Nevertheless, I identified 2 wrong references: There is no 9.5.4, nor 9.5.5 (2x) | Annexes amended-revised |
| Gep Englar | - | Annex … | Bibliography to be added (See draft OIML Template, Annex X) | Bibliography added |
| METAS | 10 | 2.6 | Fig. 1 is not as clear as in the current edition. It is not clear for somebody not used to the field if the minimum and maximum designate a value or a range of values. | Amended |
| METAS | all |  | The document has been reorganized to comply with the 2009 edition template for OIML recommendations. This implied a renumbering of most of the paragraphs but not all. Would it not be wise to comply strictly to the prescribed numbering system? | A number of the elements within the OIML template are not applicable to this Recommendation and would not be used. It was not practical to adhere strictly to the template numbering system when it would result in many gaps due to missing elements. |
| Germany | general |  | 1)      The following comments simply concern structural and formatting matters as requested. Technical comments will be given at a later stage. Technical aspects of the revision and new metrological requirements e.g. given in the document “Proposal for revision 1.doc” are not considered yet in these remarks. This may lead to small changes in the structure and additional subsections. | As was requested when the Working Draft was circulated that technical issues be reserved for future drafts. |
| Germany | general |  | 2)      Up to now the OIML Recommendation Template OIML Gxx, Draft Version 1.3, dated 2009-03-26 is only a working draft (???). Is this draft already obligatory? The structure seems to be unfavourable for load cells partially. | The conclusion at the TC9/R60 meeting held September 19-20, 2011 was to adhere to the structure of the template as closely as possible, however every effort should be made to maintain the continuity and usefullness of the existing document. The 1 WD is the initial move toward this goal and subsequent drafts will reflect additional effort. |
| Germany | general | Annex C & D | 3)      Annexes C and D of OIML R60: 2000(E) are not included in the working draft 1. Both annexes are from highest importance. | The following Annexes are included in the 1CD:  Annex A – Selection of load cells for testing  Annex B – Load transmission  Annex C – OIML Certificate of Conformity  Annex D – OIML Certificate of Conformity (alternate proposal)  Annex E – Definitions from other publications  Bibliography |
| Germany | general |  | 4)      The cross references has to be checked in the whole document (e.g. 6.8.3, 6.9). | Amended |
| Germany | general |  | 5)      A section dealing with index of terms at the end of the recommendation is missing. | Annex for both Definitions from other international publications and a Bibliography of cited references included in 1CD. |
| Germany | 5 | 3.1.1 | 6)      Unique use of the term “digital load cells” or “Load cell equipped with electronics”. The use of both terms could lead to misleading, see terminology of R60 (3.1.2) “Load cell equipped with electronics”.  Proposal: The note should be cancelled here. In 3.1.2 a note could be given that these load cells are named colloquial as digital load cells. | Note in 3.1.1 deleted as recommended.  Note in 3.1.2 added as recommended. |
| Germany | 12 | 3.7.15.1 | 7)      Does not belong to subsection 3.7.15Proposal: New section: 3.7.15.1 -> 3.7.16 | Amended |
| Germany | 12 | 3.7.15.2 | 8)      Does not belong to subsection 3.7.15 Proposal: New section: 3.7.15.1 -> 3.7.17 | Amended |
| Germany | 13 | 3.9 | 9)      – Some abbreviations do not concern to load cells (ASD, GSM, ...) and should be cancelled.  – This section should be at the beginning or at the end of the recommendation (e.g. before the index of terms). | Abbreviations not used in R60 removed. Abbreviations are appropriately located with "Terminology" section |
| Germany | 14 | 5 | 10)  The text from the template should be cancelled, because the SI-Units should be obligatory. | Per discussion and resolutions of the September 2011 TC9/R60 meeting: the scope of R60 will be limited to the load cell itself. Regulation of the output from the load cell when acted upon by a weighing instrument will be performed under the requirements of that weighing instrument's respective Recommendation. |
| Germany | 15 | 6.2 | 11)  The sections 6.4, 6.5 and 6.7 should be removed to section 6.2 “Accuracy Classes”.  Remark: A load cell is not only classified by class A to D. Further characteristics are necessary for classification, e.g. class C3 for a load cell for class C with 3000 verification intervals. | Clauses relocated so as to show the relation to load cell classification |
| Germany | 16 | 6.3 | 12)  This point needs clarification. Proposal: Text from Template should be cancelled. | Bulleted statements within clause have been deleted, language amended to clarify |
| Germany | 17 | 6.3.1 | 13)  Section 6.3.1 and section 6.3.1.1 should be concentrated in one section. | Paragraphs located consecutively in6.2.1 and 6.2.1.1 in 1CD |
| Germany | 17 | 6.4 | 14)  This section should be moved as subsection to section 6.2. | This paragraph relocated as subparagraph 6.1.2 under Principles of load cell classification |
| Germany | 18 | 6.5 | 15)  This section should be moved as subsection to section 6.2. | This paragraph relocated as subparagraph 6.1.3 under Principles of load cell classification |
| Germany | 18 | 6.7 | 16)  This section should be moved as subsection to section 6.2. | This paragraph relocated as subparagraph 6.1.5 under Principles of load cell classification |
| Germany | 18 | 6.7 | 17)  Under f) a list (see 4.6.6 in OIML R60: 2000(E)) is referenced which is not given in this section. Proposal: Complete section 4.6 of OIML R60: 2000(E) should be included in this section. | Amended |
| Germany | 21 | 6.9 | 18)  This Text from the Template is not applicable and should be deleted. No initial verification of load cells as a module of weighing instruments. | Clause relocated to 3.7.13. Terminology in clause restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| Germany | 21 | 6.9 | 19)  This section should become a “preliminary note” in section 6.8.Proposal: new section 6.8.1 | See above |
| Germany | 21 | 6.9.1.1 | 20)  Disturbances in subsection of Chapter 6.9 “Significant Fault” are unclear. Proposal: Implementation of a separate Chapter 6.X “Disturbances”, see Tab. 7 of OIML R60 (2000). Alternative disturbances should be part of Chapter 6.11 (Requirements for load cells equipped with electronics). | 6.9 Significant Fault relocated to 3.7.13 in 1CD. 6.9.1.1 relocated to 6.6.2.1 (under 6.8."Load Cells Equipped With Electronics") |
| Germany | 21 | 6.9.1.2 | 21)  Span stability in subsection of Chapter 6.9 “Significant Fault” is unclear. This section should be moved to section 6.8, see Tab. 7 of OIML R60 (2000). The structure should make clear, that this is a requirement for load cell equipped with electronics. | Clause relocated under 6.6 in 1 CD "Load Cells Equipped With Electronics" |
| Germany | 22 | 6.10 | 22)  Unclear. Proposal: Text should be deleted. | Paragraph deleted as proposed |
| Germany | 24 | 6.11.2 | 23)  This section should be moved behind section 6.11.1.1 as new section 6.11.1.2. Attention: Is it intended that a load cell has special hardware to be made inoperative automatically or to realize a fault detection output automatically? How can it be tested? Test preocedures? | Paragraph relocated to 6.6.1.1 as subparagraph to 6.6.1 (Faults). TC9 to draft test procedures if necessary. |
| Germany | 25 | 7.3 | 24)  Proposal: New structure for section 7.3 (more clear): 1)      Mandatory information (from sections 7.3.7.1 and 6.7) o   Sections 7.3.2 to 7.3.6 as subsections 2)      Additional information (from section 7.3.8) 3)      Minimum LC markings (from section 7.3.1) 4)      Required information not marked on LC (from section 7.3.11) Remark: Additionally information e.g. mounting torque, force introduction, cable type and length should be added here (previously unconsidered!). | New structure for 7.3 incorporated. Additional load cell markings of accuracy class designation, temperature limits, and vmin added to required LC markings per member comments and conclusion of TC9/R60 meeting. |
| Germany | 29 | 8.3 | 25)  What are the consequences of Chapter 8.3? In our opinion these are general requirements which are fulfilled by Chapter 8.3.1. The test laboratory has to document that the uncertainty has to be taken into account adequately. Proposal: Text from Template should be deleted. | Template clause 8.3 deleted |
| Germany | 30 | 9.1, 9.2 | 26)  These sections should be concentrated in one section to make the document shorter. | Paragraph 9.2 deleted to eliminate redundancy with 9.9.2. "Scope" and "Purpose" should be considered independently as they are different concepts. |
| Germany | 32 | 9.6.6 | 27)  The section “Humidity test” should deal with analogue load cells and load cells equipped with electronics separately. Proposal: New section 9.6.7 “load cells equipped with electronics” with similar content, but additionally a selection criterion µV/vmin as input of the analogue digital converter. | New paragraph added for load cells equipped with electronics as proposed. Needs review by TC9. |
| Germany | 33 | 9.9.1, 9.9.2 | 28)  These sections are a repetition of the sections 9.1 and 9.2.  Proposal: concentration of contents in section 9.1. Subsection 9.9.1 and 9.9.2 can be deleted | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| Germany | 33 | 9.9.3.1 | 29)  This section is a repetition of section 9.4. Proposal: Cancellation of section 9.9.3.1 | "Test Equipment" concentrated in 9.7.2 in 1 CD. Redundant paragraphs deleted. |
| Germany | 58 | Annex A | 30)  Is this an OIML requirement? Most of the definitions are general expressions and do not concern explicitly to load cells. All essential definitions required for load cells should be given in chapter 3 (Terminology). If this annex is required it should be the final annex after all load cell specific annexes. | Annex “Definitions from other applicable international publications” is a mandatory component per OIML template. Definitions specific to R60 have been retained in terminology section. |
| Germany | 73 | Annex B | 31)  Table B.2.9 of OIML R60: 2000(E) is missing. | Amended |
| France | General |  | At several places, it is written that decisions about tests and examinations are made by the “testing laboratory” (e.g 9.6). This should either be replaced by the fact that decisions are made by the issuing authority or to keep general principle that decisions shall be made without designation of who is responsible to make this decision (variable from one country to the other). | "testing laboratory" replaced with "issuing authority" where appropriate |
| France | General |  | Coherent statements or requirements should be made about functional aspects of a load-cell.  -         3.1.3 (Performance test) says : “Test to verify whether the load cell under test is capable of performing its intended functions”  -         The paragraph under table 3 says “Generally, the tests are carried out on fully operational equipment in its normal state or in a status as similar as possible thereto. If the load cell is equipped with an interface that permits it to be coupled to external equipment, all functions that are performed or initi­ated via an interface shall operate correctly”  -         The second paragraph of 6.11.1 (General requirements for electronic load-cells) says : “If a load cell is configured with substantially all the electronic functions of an electronic weighing instru­ment then it may be required to undergo additional evaluation against other requirements contained in the OIML Recommendation for the weighing instrument. Such evaluation is outside the scope of this Recom­mendation.”  -         Paragraph 7.2 asks if it is relevant to deal with software which, in case of relevance, will have as a consequence an examination of functions.  A first question to be answered is therefore : Does R60 include requirements on functions and associated examinations or is this let to other recommendations ? | TC9 members present at the meeting expressed concerns that requirements should not be restrictive with regard to the design of any load cell/transducer. No concensus could be reached for a universal load cell definition. Conclusions of the TC9/R60 meeting are:  - Include references to other Recommendations when an overlap of requirements occurs.  - Include under the subtitle “Load Cells Equipped With Electronics” clarification that additional testing based on the Recommendation relevant to the load cell's use may be necessary.  - If associated software functions to produce more than a raw count, and particularly if the software produces an indication of mass, that function should be evaluated under other appropriate Recommendations. |
| France | 12 | 3.7.14 | Significant fault. This paragraph gives the value of the significant fault (v) which is then supposed to apply to all cases. In 6.9 it is written “A fault greater than the magnitude of the MPE on initial verification is a significant fault” These paragraphs are not in line. | Terminology restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| France | 12 | 3.7.15.1 & 3.7.15.2 | These paragraphs, dealing with “Temperature effect on minimum dead load output” and with “Temperature effect on sensitivity”, should be numbered respectively 3.7.16 and 3.7.17. | Amended |
| France | 14 | 5 | Units of measurement. This paragraph should be kept as it was in R60/2000; so additions should be deleted. | Per discussion and resolutions of the September 2011 TC9/R60 meeting: the scope of R60 will be limited to the load cell itself. Regulation of the output from the load cell when acted upon by a weighing instrument will be performed under the requirements of that weighing instrument's respective Recommendation. |
| France | 15 | 6.3 | Maximum permissible load cell errors  The hyphens” -         MPE according to accuracy classes or  -         MPE at type approval ” should be deleted. MPEs are clearly described in the following paragraphs. | Bulleted statements within clause have been deleted |
| France | 18 | 6.7 | a) read 7.3.2 instead of 7.3.1 b) read 7.3.3 instead of 7.3.2 | Amended |
| France | 18 | 6.8 | Influence quantities (Rated operating conditions). According to 3.8.1 and 3.8.1.2, the title should be “Influence factors” | Amended |
| France | 20 | 6.8.1.3 | Temperature effect on minimum dead load output, read 5°C instead of 15°C | Amended |
| France | 20 | 6.8.3 | Read 9.12.5 and 9.12.6 instead of 9.11.5 and 9.11.6 (2 times) | Amended |
| France | 20 | 6.8.3.1 | Read 9.12.5 instead of 9.11.5 | Amended |
| France | 21 | 6.8.3.2 | Read 9.12.6 instead of 9.11.6 | Amended |
| France | 21 | 6.9 | It’s more appropriated to move it to § 3.7.14, because the place is not coherent.  Concerning the new first line of the §, we consider a significant fault to be a fault greater than the LC verification interval v and not the MPE on initial verification which is a stronger criteria. | Clause relocated to 3.7.1.4. Terminology in clause 3.7.14 restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| France | 21 | 6.9.1.1 | As 6.9.1 doesn’t exist, the sub-clause number is not correct. Read 6.9.2.1 or new § 6.12 instead of 6.10.2.1 | Amended |
| France | 21 | 6.9.1.2 | As 6.9.1 doesn’t exist, the sub-clause number is not correct. Read 9.12.7.8 instead of 9.11.7.8 | Clause relocated under 6.8 "Load Cells Equipped With Electronics"  Paragraph numbering amended |
| France | 22 | 6.9.1.2 | Table 3 to move to 6.9.2.1 and read 9.12.7 instead of 9.11 in the 2nd column legend. All the references should be 9.12.7.x instead of 9.11.7.x. The table shows that EMC tests have not been updated to be in line with additions in this area. Applying these tests only will not enable a certifying body to issue a certificate for a complete weighing instrument without having other tests performed (e.g surges, immunity to conducted radio-frequency fields…). It should be updated in line with D11 and other recommendations related to weighing instruments (R76/2006, R51/2006, …) | Clauses relocated under 6.8 "Load Cells Equipped With Electronics"  Paragraph renumbering amended  Paragraph updated to current D11 |
| France | 22 | 6.9.2.1 | Read 9.12.7 instead of 9.11.7 | Amended |
| France | 25 | 7.2 | Software: a routine generating itself an identification code has not to be required for embedded software.  It seems make mandatory a technical solution. Is it necessary?  The requirement should be that if the software is embedded in a fixed hardware it cannot be modified or uploaded via any interface or by other means after securing or sealing.  Software identification is mandatory and has to be provided.  For free programmable or downloadable software, a software analysis approach like prescribed in Welmec guide 7.2 might be an acceptable solution.  See also D31 | According to the resolutions of TC9 at the Sept. 2011 Braunschweig meeting, any firmware that affects the raw count of the load cell must be covered in R60. In addition, if the software associated with a load cells influences no more analog to digital conversion and the linearization of the load cell output, then the software should be evaluated using R60 and in accordance with D31. If the function of the software results in an indication of mass, then that function should be evaluated under other Recommendations. Work group (PTB) proposed requirement(s) and procedures related to software added. |
| France | 25 | 7.3.3 | Read 7.3.9 instead of 7.3.8 | Reference amended |
| France | 26 | 7.3.5 | Read 9.11 instead of 9.10.2 | Reference amended |
| France | 26 | 7.3.6.1 | Read 9.12.5 and 9.12.6 instead of 9.11.5 and 9.11.6 | Requirement redrafted to separate requirements from tests  Paragraph references amended |
| France | 26 | 7.3.6.2 | Read 9.12.5 instead of 9.11.5 | Requirement redrafted to separate requirements from tests |
| France | 26 | 7.3.6.3 | Read 9.12.6 instead of 9.11.6 | Requirement redrafted to separate requirements from tests |
| France | 28 | 7.3.11 | Move just after 7.3.1 | Paragraph relocated to 7.2.1 in 1CD |
| France | 30 | 9.4 & 9.4.1 | Redundant with 9.9.3 and 9.9.9.1 and only a part of the requirement.  Suppress or make reference to 9.9.3 and 9.9.4 | Deleted clauses 9.4 and 9.4.1 per comment from France. Redundant with clauses 9.9.3 and 9.9.3.1 |
| France | 30 | 9.5 | Units submitted to type test.  The second paragraph “The applicant for the type test shall supply at least …” should be deleted because there are a lot of criteria which are defined in the next paragraphs.  If more than one load-cell is considered to be submitted for some testing parts, then it should appear at the appropriate place as for example in 9.6 in case of change of a load-cell which failed a test. | Deleted per France’s comment. General statement regarding the limitation on the number of load cells supplied should not be made. The submission of more than one load cell when needed should appear in the appropriate location (associated with that specific clause). |
| France | 31 | 9.6 | In Table 7, same legend for both columns.  We suggest to specify that humidity test and accuracy tests for the lowest capacity in the highest precision and also durability test have to be carried out on the same specimen.  The paragraph after Table 7 should be moved to 9.5. (because at this stage the load cells have already been selected)  It also should be split up in 2 cases, one for reparation, one for modification. Reparation applies to 1 load-cell, modification applies more to design and might then have impact on all load-cells being tested. | Legends amended. Humidity and Accuracy testing added per recommendation in Table.  Paragraph moved and dissected as recommended. |
| France | 32 | 9.6.4 | Read 9.6.2 and 9.6.3 instead of 9.5.2 and 9.5.3 | Amended |
| France | 32 | 9.7 | d) and e) add if appropriate or applicable  manufacturer specifications datasheet is missing | Amended |
| France | 33 | 9.8.1 | c) §9.8.1.4 doesn’t exist.  Tighten torque value, plate dimensions for off-center type load cells. | Added "h" - installation instructions/recommendations |
| France | 33 | 9.9.3 & 9.9.3.1 | Redundant with 9.4 and 9.4.1 | "Test Equipment" concentrated in 9.7.2 in 1 CD. Redundant paragraphs deleted. |
| France | 34 | 9.9.4.4 | Measuring range limits: add "the minimum value Dmin shall not be higher than the value of Emin increased by 10% of Emax" | Statement added as proposed |
| France | 36 | 9.9.5 | Redundant with 6.10 so this paragraph should be deleted. | Paragraph 6.10 deleted |
| France | 37 | 9.11.1 | Read two times 9.11.1.1 instead of 9.10.1.1 | Amended |
| France | 38 | 9.12 | Read 9.13 instead of 9.12 | Amended |
| France | 38 | 9.11.1 | Read 9.4 instead of 9.3 insufficient, preferred 9.9.3 and 9.9.4 | Amended to read 9.4 rather than 9.3 |
| France | 39 | 9.12.1.4 | Read 9.9.4.10 instead of 9.8.1.10 | Amended |
| France | 39 | 9.12.1.7 and 9.12.1.11 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 40 | 9.12.2.1 | Read 9.4 instead of 9.3 insufficient, preferred 9.9.3 and 9.9.4 | Amended - changed to 9.8.3 & 9.8.4 amended/relocated |
| France | 41 | 9.12.2.8 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 41 | 9.12.2.9 | Read 9.12.2.3 to 9.12.2.8 instead of 9.11.2.3 to 9.11.2.8 | Amended |
| France | 41 | 9.12.2.10 | Read 9.9.4.8 instead of 9.8.1.8 | Amended |
| France | 42 | 9.12.3.1 | Read 9.4 instead of 9.3 insufficient, preferred 9.9.3 and 9.9.4 | Amended |
| France | 42 | 9.12.3.4 | Read 9.9.4.10 instead of 9.8.1.10 | Amended |
| France | 42 | 9.12.3.8 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 43 | 9.12.3.10 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 43 | 9.12.3.11 | Read 9.12.3.3 to 9.12.3.10 instead of 9.11.3.3 to 9.11.3.10 | Amended |
| France | 43 | 9.12.3.12 | Read 9.11.2 instead of 6.12.3.2 | Amended |
| France | 43 | 9.12.4.1 | Read 9.9.3 and 9.9.4 instead of A.3  The NEW 2nd hyphen is not necessary. It applies to all "Check test conditions".  If required, it would be better adding a new sub-paragraph in 9.9.4. | Wording from OIML template deleted |
| France | 43 | 9.12.4.3 | Read 9.9.4.10 instead of 9.8.1.10 | Amended |
| France | 44 | 9.12.4.7 | last two new lines to be reconsidered | New language from OIML template deleted. |
| France | 44 | 9.12.5.1 | Read 9.9.3 and 9.9.4 instead of 9.8 | Amended |
| France | 44 | 9.12.5.4 | Read 9.9.4.10 instead of 9.8.1.10 | Amended |
| France | 45 | 9.12.5.8 and 9.12.5.10 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 45 | 9.12.5.11 | Read 9.12.5.7 to 9.12.5.10 instead of 9.11.5.7 to 9.11.5.10 | Amended |
| France | 45 | 9.12.5.12 | Read 9.12.5.1 to 9.12.5.11 instead of 9.11.5.1 to 9.11.5.11 | Amended |
| France | 46 | 9.12.5.12 | Read 9.12.5.13 instead of 9.11.5.13 | Amended |
| France | 46 | 9.12.5.13 | Read 9.12.5.1 to 9.12.5.11 instead of 9.11.5.1 to 9.11.5.11 | Amended |
| France | 46 | 9.12.6.1 | Read 9.9.3 and 9.9.4 instead of 9.8 | Amended |
| France | 47 | 9.12.6.4 | Read 9.9.4.10 instead of 9.11.2.10 | Amended |
| France | 47 | 9.12.6.7 and 9.12.6.9 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 48 | 9.12.6.11 | Read 9.12.6.1 to 9.12.6.10 instead of 9.11.6.1 to 9.11.6.10 | Amended |
| France | 48 | 9.12.6.12 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 49 | 9.12.7.2 | Read 6.11.3.2 instead of 6.12.3.2 | Amended |
| France | 50 | 9.12.7.2 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 50 | 9.12.7.3 | Read 6.11.3.3 and 6.11.3.4 instead of 6.12.3.3 and 6.12.3.4 | Amended |
|  |  |  | Read 9.12.1.1 to 9.12.1.12 instead of 9.11.1.1 to 9.11.1.12 |  |
| France | 51 | 9.12.7.4 and 9.12.7.5 | Read 6.9.1.1 instead of 6.10.1.1 | Amended |
| France | 52 | 9.12.7.6 | Read 6.9.1.1 instead of 6.10.1.1 | Amended |
| France | 53 | 9.12.7.7 | Read 6.9.1.1 instead of 6.10.1.1 | Amended |
| France | 54 | 9.12.7.8 | Read 6.9.1.2 instead of 6.10.1.2  We think there is necessity to harmonise with R 76 on the span stability test procedures for digital load-cells.  In R 60 the procedure of the span stability test is to conduct the test before, at various intervals during, and after the load cell is subjected to any of the applicable tests, this includes also perturbance tests.  R76 states that this test is to conduct at various intervals before, during and after the EUT has been subjected only to performance tests (minimum tests meant are the temperature test and, if applicable, the damp heat test - a lot of other tests may also be included but this is not mandatory). | Amended as proposed |
| France | 55 | 9.12.7.8 | Read 9.10.3 instead of 9.9.3 | Amended |
| France | 56 | 9.13 | Read Figure 3 instead of Figure 9.1 | Amended |
| France | 56 | 9.13.1 | Read Figure 4 instead of Figure 9.2 | Amended |
| France |  | Annex B | This annex should be moved to paragraph 9.6.  Then you get the example together with the requirements for which it gives clarification if needed. | Following the formatting of the OIML template, example of selecting a load cell for type evaluation will remain as Annex (A) |
| Japan |  | General | We afraid that the requirement of conformity to the uniform OIML template may cause an inconvenience to the users of recommendation due to a difference in structure from that of R60 (2000). We would like to know the importance or priority of the template in the process revising OIML recommendations. If it causes a significant confusion even partly, it might be better to keep the original structure. | The conclusion at the TC9/R60 meeting held September 19-20, 2011 was to adhere to the structure of the template as closely as possible, however every effort should be made to maintain the continuity and usefulness of the existing document. The 1 WD is the initial move toward this goal and subsequent drafts will reflect additional effort. |
| Japan | 12 | 3.7.15.1 | This clause shall be at the same level with the other terms in "3.7 Measurement and error terms". Therefore, the clause number shall be changed to 3.7.16. | Amended |
| Japan | 12 | 3.7.15.2 | This clause shall be at the same level with the other terms in "3.7 Measurement and error terms". Therefore, the clause number shall be changed to 3.7.17. | Amended |
| Japan | 16 | 6.3 | We consider the order between 6.3 (Maximum permissible load cell errors) and 6.4 (Maximum number of load cell verification intervals) shall be reversed. It is because we consider the classes A-D (Table 2 in 6.4) shall be defined prior to the explanation of MPE (Table 1 in 6.3). | See response to Germany's comment on 6.2. - Additional clauses relocated so as to show the relation to load cell classification |
| Japan | 17 | 6.4 | Same with above. | Clause relocated (6.1.2) |
| Japan | 21-22 | 6.9.1.1-6.9.2.1 | These clauses (Disturbances, Span stability requirements, Performance and stability tests) are additional requirements for the load cells equipped with electronics. Therefore, we consider these clauses shall be placed under the clause "6.11 Requirements for load cells equipped with electronics ". | Clauses relocated under 6.8 "Load Cells Equipped With Electronics" |
| Japan | 33 | 9.9.1 | This clause is not necessary because the definition of "Scope" is already mentioned in 9.1. | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| Japan | 33 | 9.9.2 | This clause is not necessary because the definition of "Purpose" is already mentioned in 9.2. | Paragraph 9.2 deleted to eliminate redundancy with 9.9.2. |
| Japan | 37 | 9.11 | "Permissible variation of results" defines a general metrological requirement and is not used only for type evaluation. Therefore, we recommend moving this clause after "6.6 Repeatability Error" and renumber the clauses 6.7 and so forth. | Paragraph relocated (6.4) |
| Australia | General |  | We are generally supportive of the work done to put this recommendation into the format of the OIML Template, although clearly there are some special aspects of load cells that cause difficulties (thank you to the Secretariat for their work in regard to this).  We have made some specific comments below. | The conclusion at the TC9/R60 meeting held September 19-20, 2011 was to adhere to the structure of the template as closely as possible, however every effort should be made to maintain the continuity and usefulness of the existing document. The 1 WD is the initial move toward this goal and subsequent drafts will reflect additional effort. |
| Australia |  | Annex A | Note that we have not given detailed consideration to the applicability (or need for inclusion in R60) of all the definitions taken from the VIM and VIML (Annex A.1, A.2 and A.3). | Definitions from other publications included as per OIML template |
| Australia | 5 | 3.1.1 | We would suggest that a separate terminology for “digital load cell” would be preferable, e.g. add 3.1.2a (renumber later)  3.1.2a Digital load cell  A load cell equipped with electronics which produces its output in a digital form. | Note in 3.1.1 deleted as recommended.  Note in 3.1.2 added as recommended. |
| Australia | 6 | 3.2.x | Definitions of Categories of Instruments  We do not see a need for a categorisation of single/multiple application load cells. The number of load cells used is a characteristic of the instrument rather than of the load cell.  Perhaps this was referring to whether a load cell is intended to be used in an instrument with a single range or with multiple ranges or intervals. Again, we believe that such modes of use are a characteristic of the instrument rather than the load cell. There is no characteristic of a load cell which should preclude it being used in either mode of operation (clearly if a manufacture is intending the load cell to be used for applications requiring low vmin or DR values, they will design and specify accordingly – but that does not require a separate load cell categorisation).  Suggest:  This recommendation is intended to apply to all load cells, irrespective of technology used. Nevertheless load cells may be categorised according to aspects of their design.  Form of output  - Analog or Digital  Technology used  - Strain Gauge, Electromagnetic Force Balance, Magnetostrictive, Piezoelectric, Pneumatic, Vibrating Wire or other types  Specific design aspects of application of that technology (these examples typically applying to strain gauge load cells).  - Shear Beam or Bending Beam, Single Point, S-type, Canister, Load pin  Characteristics of intended load (force) application  - Tension, Compression, Universal (tension or compression)  As the recommendation is intended to be applicable to all load cells, irrespective of such categorisation, detailed definitions regarding the above categorisations are not considered necessary. | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| Australia | 6 | 3.3.1 | Definitions concerning construction of load cells.  Moment in-sensitive (Moment resistant) load cells [Platform load cells / Single point load cells]  Some load cells are designed such that they can maintain relatively high accuracy of measurement despite the load being applied at a distance from the normal loading axis of the load cell.  Such load cells are commonly used to directly support a weighing platform at a single point (generally near its centre), and hence are sometimes known as ‘single point’ or ‘platform’ load cells. However such load cells may be used for other purposes.  Humidity classification  Load cells may be designed or constructed so as not to be susceptible to the influence of humidity (for example hermetic sealing, or ‘potting’ of strain gauges may be able to achieve this).  NH Where load cells are not expected to satisfy the humidity testing requirements of this document, the manufacturer may mark them as “NH”. An instrument incorporating such load cells will be expected to satisfy humidity testing requirements for the complete instrument (the instrument may need to incorporate additional humidity protection measures to achieve this).  CH Where load cells are expected to satisfy the cyclic humidity testing requirements of this document, the manufacturer may mark them as “CH”. Load cells which are not otherwise marked as “NH” or “SH” shall be taken to be of the “CH” humidity classification.  SH Where load cells are expected to satisfy the static humidity testing requirements of this document, the manufacturer may mark them as “SH”. | See above response |
| Australia | 14 | 4 | Add Description of Load Cells  Suggest (seeking to avoid repeating the general definition of 3.1.1):  A load cell provides an output related to the force (load) applied to it. Load cells are used as modules of measuring instruments (typically weighing instruments). The output of a single load cell or multiple load cells is provided to other modules of the measuring instrument for further processing and/or display. | Suggested text added as "Description of Load Cells". Additional or alternative text to be decided by TC9. |
| Australia | 14 | 5 | The added wording “The results of measurement shall be displayed and/or printed …” is not really applicable to load cells.  Suggest:  Where a digital output is provided which is intended to be directly displayed without further processing, the digital value shall be in the following units according to the International System of Units (SI): gram (g), kilogram (kg) or tonne (t).  In other cases the load cell output may be provided in other quantities related to the measured quantity (mass).  Examples: Voltage, voltage relative to input voltage (mV/V), digital counts. | Per discussion and resolutions of the September 2011 TC9/R60 meeting: the scope of R60 will be limited to the load cell itself. Regulation of the output from the load cell when acted upon by a weighing instrument will be performed under the requirements of that weighing instrument's respective Recommendation. |
| Australia | 15 | 6.2 | We feel that other parts of load cell specification/performance are aspects of load cell classification, and should be mentioned in 6.2.  Suggest:  Add the following to 6.2.  “In addition load cells are classified according to the Maximum number of load cell verification intervals (6.4), Minimum load cell verification interval vmin (6.5), maximum value of minimum dead load output return (DR). | Additional clauses relocated so as to show the relation to load cell classification per Germany's comment |
| Australia | 16 | 6.3 | The wording here suggests that there is some difference between ‘MPE according to accuracy class’ and ‘MPE at type approval’.  Suggest:  “Under the rated operating conditions in 6.8, the maximum permissible error (MPE) shall not exceed the limits indicated below.  These MPEs are applicable after increasing as well as decreasing the measurand (i.e. they include hysteresis). “ | Paragraph amended. Bulleted statements within clause have been deleted |
| Australia | 18 | 6.7 | Complete load cell classification  This has always been an unusual part of R60, and could well do with tidying up in the revised document to separate out.  a) Information to be supplied for type approval evaluation  b) Requirements for marking  - of the load cell  - to be supplied with the load cell if not marked on it  The ‘standard classification’ is really just a way of summarising some of the required information. | Section regarding load cell classification amended. To be reviewed by TC9 as part of 1CD |
| Australia | 21 | 6.9 | Significant fault.  We think this should just say “… MPE …” rather than “MPE on initial verification”. Initial verification is always carried out on a complete instrument rather than just a load cell. | Clause relocated to 3.7.1.4. Terminology in clause 3.7.14 restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| Australia | 25 | 7.2 | We agree that further discussion regarding software is necessary.  We expect that there is likely to be a need to distinguish between:  (a)    Software which defines the load cell operation; and  (b)   Parameters used by that software which may vary from load cell to load cell (e.g. temperature correction parameters, calibration factor).  Where software version numbers or calibration counters are important, we believe that it is necessary the simple means are provided for personnel conducting metrological surveillance to access such numbers and counters (without requiring confidential passwords, special equipment, or complex sequences of operations) – e.g. displayed during the instrument switch on procedure or via an “info” button.  This is actually more a requirement of the indicator used, but R60 should say something like “the load cell shall be designed such that an indicator used with it is capable of …”. | According to the resolutions of TC9 at the Sept. 2011 Braunschweig meeting, any firmware that affects the raw count of the load cell must be covered in R60. In addition, if the software associated with a load cells influences no more analog to digital conversion and the linearization of the load cell output, then the software should be evaluated using R60 and in accordance with D31. If the function of the software results in an indication of mass, then that function should be evaluated under other Recommendations. Work group (PTB) proposed requirement(s) and procedures related to software added. |
| Australia | 29 | 8.2 | Responsibility for compliance  There is a need to be clear about whether “the instruments” refers to “the load cells” or “the instruments incorporating these load cells”.  The issue of responsibility “after assignment” is problematic for load cells, which are always used in a complete instrument, and which cannot readily be tested as a separate module (according to R60) except in specialised load cell testing facilities. | wording amended |
| Australia | 30 | 9.6 | Where a load cell has to be modified or repaired after initial testing, it is critical that full and detailed information be provided regarding any modifications made. We would prefer the second last paragraph to provide a stronger presumption of the need to re-test – e.g we suggest “If the testing laboratory has reason to fear that the modification may have a negative influence …”. | Amended as proposed |
| Australia | 32 | 9.7 | We suggest:  “(f) documents or other evidence to support and demonstrate the manufacturer’s belief that the load cell design and characteristics comply with the requirements of this Recommendation. (We dislike the word “assumption” in this context).  If the testing laboratory deems this necessary, it can require additional or more detailed documentation or evidence; either to be able to assess the design or quality of the instrument, or to be able to fully define the approved type, or both. “ | Language amended as proposed |
| Australia | 50 | 9.12.7.3 | We believe there is a need to clarify whether the testing is to be carried out with variation of the voltage applied to the load cell itself, or with variation of the voltage applied to the indicator used to test the (digital) load cell. The added first paragraph implies the latter. | Technical Committee input needed. To be determined: is there any justification to include testing of load cells powered directly by DC mains network? |
| Canada | General comment |  | Canada accepts the new structure and format and thanks the Secretariat for its work. |  |
| Canada | 5 | 3.1.2 (old 2.1.3) | Since 3.1.1 mentions that load cells equipped with electronics are also called digital load cells, the definition title for 3.1.2 should perhaps read  3.2.1 Load cell equipped with electronics (i.e., digital load cells) | Note added to 3.1.2 that addresses the use of "digital load cells" |
| Canada | 6 | 3.2.x | –To be discussed with TC9: Perhaps the type of load transfer (direct or indirect) should also be mentioned as the mounting adapters may have an effect on the performance of the load cell (e.g., load buttons, threaded rods/hooks/eye bolts, self-aligning rocker-pin assemblies, universal, chain links, etc.) | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| Canada | 7 | 3.4.3 (old 2.2.3) | It might be beneficial to further describe what is meant by “same design” | Example already provided - "strain gauges bonded to metal" |
| Canada | 15 | 6.2 (old 4.2, 6.1) | –To be discussed with TC9: Since the OIML MAA CPR for the R60 DoMC agreed at its first general meeting in Lyon (15-16 June 2005) to recommend the addition of a supplemental Accuracy Class to R60 to account for heavy-duty devices, the addition of a Class C’ or Class CL should be discussed by TC9. | Proposal was withdrawn at September 2011 TC9/R60 meeting |
| Canada | 17 | 6.3.1.1 (old 5.1.1 Table 5) | See comment for 6.2 | Proposal withdrawn as per Canada's request |
| Canada | 17-18 | 6.4 (old 4.3, 6.4) | See comment for 6.2 | See above comment |
| Canada | 18 | 6.7 (old 4.6) | –To be discussed with TC9: Load cells equipped with electronics (digital load cells) should be identified and marked differently from analogue load cells since the required tests are different. | If load cells equipped with electronics are to be identified as such, R60 should include technical requirements for necessary markings (inscriptions). Any draft proposals for such markings will be circulated to TC9 members for review. |
| Canada | 19 | 6.8.1.2 (old 5.5.1.2) | –To be discussed with TC9: The minimum range of temperature for the proposed intermediate class “CL” should be 30◦C. However, since large capacity devices are mostly used outdoors, the temperature limits could be as great as -40◦C to 40◦C and such load cells could be tested and marked accordingly. | Proposal for class CL withdrawn as per Canada's request |
| Canada | 20 | 6.8.1.3 (old 5.5.1.3) | –To be discussed with TC9: Temperature effect on minimum dead load output for the proposed class “CL” could be 3 x plc x vmin for any change in ambient temperature of 5◦C | Proposal for class CL withdrawn as per Canada's request |
| Canada | 21 | 6.8.x | –To be discussed with TC9: To be consistent with OIML R76, a durability requirement should be introduced for analogue load cells as well as for digital load cells (6.1.2). Text from OIML R76 could be used for both sections: The durability error due to wear and tear shall not be greater than the absolute value of the maximum permissible error. Adherence to this requirement is assumed if the instrument has passed the endurance test specified in A.X. It is recommended that this test be performed on load cells of all capacities. The test could consist of the application of a load equivalent to ½ to ¼ of Maximum capacity where the load is applied for a total of 300 applications; an increasing/decreasing test would be performed before and after application of the load cycle. | Per conclusions of the September 2011 TC9 meeting -span stability is not equivalent to durability. Durability is a characteristic that is best equated with a complete weighing instrument, and It is not reasonable to institute a requirement for durability on load cells as they are simply a module |
| Canada | 25 | 7.3.1 (old 4.7.1) | Minimum load cell markings should include the Class and the temperature limits and the OIML conformity mark. Also see comment for 6.7. | New structure for 7.3 incorporated. Additional load cell markings of accuracy class designation, temperature limits, and vmin added to required LC markings per member comments and conclusion of TC9/R60 meeting. Additional marking for OIML certificate number added to 1CD |
| Canada | 25 | 7.3.2 (old 4.6.1) | See comment for 6.2 | Proposal withdrawn |
| Canada | 26 | 7.3.4 (old 4.6.3 Table 2) | See comment for 3.2.x | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| Canada | 28 | 7.3.10 (old 4.6.8 Table 4) | See comment for 3.2.x | See above comment regarding 3.2.x |
| Canada | 29 | 8.2 (old 12.2) | Please use gender-neutral wording by replacing “his” by “theirs” or by changing the structure of the sentence. | Amended |
| Canada | AnnexA.5 | A.5 | –To be discussed with TC9: Definitions from OIML R76 to be added for such terms as Analogue data processing device, Digital data processing device, Electronic device, Electronic sub-assembly, Electronic component, Warm-up time – as these are relevant for load cells equipped with electronics. Other definitions of R76 such as Metrologically relevant, Type, Durability (see comment below for 5.5.4), Durability error, Significant durability error, Performance test, etc | Some of these terms are included in Annex E, 1CD. Additional terms used in R60 but not yet defined may be added as necessary. |
| Austria | 6 | A.5 | Proposals for definitions that should be included:  A strain gauge is a device used to measure deformation of an object on the basis of changes in the electrical resistance.  Load transmission device is a device which transforms the influence of the load into an electrical signal. | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| Austria | 17 | 6.3.1 | Insert nmax into the paragraph:  The maximum permissible load cell errors for each accuracy class (the indicated load cell output having been adjusted to zero at minimum dead load, Emin) are related to the maximum number of load cell verification intervals nmax specified for the load cell (see 6.4) and to the actual value of the load cell verification interval, v. | Amended as proposed |
| Austria | 21 | 6.9.1.2 | “The aim of this test is not to measure the influence on the metrological performances of mounting or dismounting the load cell on or from the force-generating system, so the installation of the load cell in the force-generating system shall be carried out with particular care. “  “With particular care” gives space for interpretation and should be more specified.  The installation of the load cell in the force-generating system shall be carried out correctly according to the technical specification of the manufacturer. Positions of frictions should be avoided. After installation the whole system should rest a minimal time period, which depends on the temperature’s difference, before testing to attain temperature stability. | Clause relocated under 6.8 "Load Cells Equipped With Electronics"  Portion of clause relocated to Part 2 (9.10.7.11) and proposed language inserted. |
| Austria | 25 | 7.2 | We think the requirements for software as mentioned are relevant. The changes suggested are supported. | According to the resolutions of TC9 at the Sept. 2011 Braunschweig meeting, any firmware that affects the raw count of the load cell must be covered in R60. In addition, if the software associated with a load cells influences no more analog to digital conversion and the linearization of the load cell output, then the software should be evaluated using R60 and in accordance with D31. If the function of the software results in an indication of mass, then that function should be evaluated under other Recommendations. Work group (PTB) proposed requirement(s) and procedures related to software added. |
| Austria | 25 | 7.3.1 | In addition to the minimum load cell markings all essential information (accuracy class, Y, Z, temperature range) should be required to be permanently fixed on the load cell.  According to our experience there still exist LCs without markings. It would support the identification more if there were more markings mandatory to be fixed on the load cell. | New structure for 7.3 incorporated. Additional load cell markings of accuracy class designation, temperature limits, and vmin added to required LC markings per member comments and conclusion of TC9/R60 meeting. |
| Austria | 39 | 9.12.1.8 | We are not sure, if a minimum of at least 5 increasing load points are enough. Would it not be better to have 10 load points (like in R-76)? | Refer to R76 - harmonize R60 with R76. TC9 to decide. |
| Austria | 40 | 9.12.1.13 | According to the test report, the measurement at reference temperature is missing in this sentence.  replace  “Repeat the operation described in …, first at the higher temperature, then at the lower temperature, including the approximate temperature range limits for the accuracy class; then perform the operations at 20°C.”  by  “Repeat the operation described in .., first at 20°C, then at the higher temperature, the lower temperature, including the approximate temperature range limits for the accuracy class; then perform the operations at 20°C.” | Missing step from test report to perform operation at reference temperature first inserted as proposed |
| Austria | 41 | 9.12.3 | The execution of the determination of minimum dead load output return is just the same as in 9.12.2.  We suggest to insert  “Determination of minimum dead load output return (DR)  Repeat the operations described in 9.12.2.1 – 9.12.2.7.”  and to remove 9.12.3.1 - 9.12.3.7. | Because there are cross references to subparagraphs under 9.12.3 (i.e., figure A.1 & A.2) full compliment of procedural steps retained under 9.12.3 |
| Austria | 42 | 9.12.3.2 | Maybe we should define a time period during the system stabilizes at 20°C. (e.g. 30 min) Advisably, this should be done in general for defining the stabilization time, where it is necessary. | Any time period established would need to have approval of TC9. Subsequent drafts of this Recommendation may include such a resolution |
| Austria | 43 | 9.12.3.11 | same comment as for 9.12.1.13 | first step of procedure inserted "at 20 °C, then at"... |
| Austria | 43 | 9.12.4.3 | Wrong reference. The correct reference is 9.9.4.10. | Amended |
| Austria | 44 | 9.12.4.6 | The recommended test points (+- 1kPa) do not cover the whole possible range.  Wouldn’t it be better to create new tests points in order to correspond with the requirements of 5.5.2.?  We suggest a range up to 5 kPa lower and higher than atmospheric pressure with steps of 1 kPa. | Technical Committee review needed of paragraph amendments. |
| Austria | 44 | 9.12.5.3 | Insert  “Wait 5 minutes.”  for compliance with 9.12.1.3. | inserted language as proposed |
| Austria | 45 | 9.12.5.11 | The description of the test procedure is unclear. Which parameters must have each individual circle?  A more detailed explanation would be useful. | This language is unchanged from the 2000 edition of R60. If TC9 wishes to change wording, suggested alternatives will be accepted for consideration. |
| Austria | 49 | 9.12.7.2 | Before switching on the load cell, it has to be exercised by applying a maximum test load three times. This has to happen after each load application? According to the loading and unloading this would not make any sense.  If it is meant to exercise the load cell by applying a maximum test load three times once before starting the tests,  “after each load application” should be deleted. | Language amended |
| Austria | 54 | 9.12.7.8 | “The span stability test should be performed in max. 28 days in which all other tests should be carried out. “  We think that time is too short. EMC tests should not be included because it takes more time if different laboratories are assigned with those tests.  It may be better to specify tests e.g. temperature and humidity tests like in OIML R 76, which have to be carried out within 28 days, whereas at least the EMC tests are excluded in this 28 days’ time limit.  Furthermore we should specify a time period to ensure the full recovery of the load cell (e.g. 3 hours). (page 56) | Changes made as proposed |
| Austria | 56 | 9.13 | Change “Test sequence” to “Recommended test sequence” | Amended as proposed |
| CECIP |  | 1, Introduction | Third part, add to: “The data that can be extracted from a load cell is simply a measurement of change in the output of the load cell in relation to the input.” into “The data that can be extracted from a load cell or a combination of load cells is simply a measurement of change in the output of the load cell or load cells in relation to the input.” | Text in this section deleted |
| CECIP |  | 3.2 | Categories of Load Cells: Only interesting to deal in R60 with categories according to application of load because, actually, there are many other existing design type technologies and market denominations as Single point, O-ring, Tork-ring, membrane, column, multi-column, pancake, etc and in the future could appear others. | Per resolutions from TC9/R60 meeting: Categories of Load Cells will consist of generic criteria that will not exclude alternate technologies. |
| CECIP |  | 3.3 | Construction of load cells: Strain gauge analog load cell; Digital load cells (strain gauge based; vibrating cords, load cells of electromagnetic equilibrium compensation, etc.) | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| CECIP |  | 3.5.6 | There is no 9.8.1.4. Should be 9.9.4.4 | Amended |
| CECIP |  | 3.5.11 | There is no 9.8.1.4. Should be 9.9.4.4 | Amended |
| CECIP |  | 6.2.1 | Supplementary classifications should be consistent or redundant with the new text pending for 3.2, 3.2x and 3.3 | See comments for 3.2, 3.2X, and 3.3 |
| CECIP |  | 6.8.1.3 | Correct is 5C° for load cells of class B,C and D. | Amended |
| CECIP |  | 6.8.3 | 9.11.5 should be 9.12.5; 9.11.6 should be 9.12.6 | Amended |
| CECIP |  | 6.8.3.1 | 9.11.5 should be 9.12.5 | Paragraph split into requirements and tests. References amended |
| CECIP |  | 6.8.3.2 | 9.11.6 should be 9.12.6 | Amended |
| CECIP |  | 6.9.1.1 | There is no 6.10.2.1. Should be 6.9.2.1 | Amended |
| CECIP |  | 6.9.1.2 | 9.11.7.8 should be 9.12.7.8 | Amended |
| CECIP |  | Table 3 | “Section 9.11 test procedures 9.11.7.2 up to 9.11.7.8” should be “Section 9.12 test procedures 9.12.7.2 up to 9.12.7.8” | Amended |
| CECIP |  | 6.9.2.1 | 9.11.7 should be 9.12.7 | Amended |
| CECIP |  | 6.1 | There is no 6.10.2; should be 6.9? | Paragraph (from template) deleted |
| CECIP |  | 7.3.3 | 7.3.8 should be 7.3.9 | Amended |
| CECIP |  | 7.3.6.1 | 9.11.5 should be 9.12.5; 9.11.6 should be 9.12.6 | Requirement redrafted to separate requirements from tests |
| CECIP |  | 7.3.6.2 | 9.11.5 should be 9.12.5 | Amended |
| CECIP |  | 7.3.6.2 | 9.11.6 should be 9.12.6 | Amended |
| CECIP |  | Table 6 | Last line, - 5/ 0 should be – 5/30 | Amended - table relocated to 6.1.7 |
| CECIP |  | 9.6, table 7 | As the table compares the same items, is looks superfluous | Amended |
| CECIP |  | 9.6.4 | There are no 9.5.2 and 9.5.3, should be 9.6.2 and 9.6.3 respect. | Amended |
| CECIP |  | 9.8.1 | c) There is no 9.8.1.4  f) See the remark on 7.2 (if remark needed) | Amended |
| CECIP |  | 9.9.1 | It is repeated in “9.1 Scope” | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| CECIP |  | 9.11.1 | There is no 9.10.1.1 should be 9.11.1.1 | Amended |
| CECIP |  | 9.12 | Inside the paragraph “...see 9.12...” should be “see 9.13” | Amended |
| CECIP |  | 9.12.1.4 | There is no 9.8.1.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.1.7 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.1.9 | 9.9.3 should 9.10.3 | Amended |
| CECIP |  | 9.12.1.10 | 9.11.1.8 should be 9.12.1.8 | Amended |
| CECIP |  | 9.12.1.11 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.1.12 | 9.11.1.7 to 9.11.1.11 should be 9.12.1.7 to 9.12.1.11 | Amended |
| CECIP |  | 9.12.1.13 | 9.11.1.3 to 9.11.1.12 should be 9.12.1.3 to 9.12.1.12 | Amended |
| CECIP |  | 9.13.2.1 | 9.3 should be 9.4 | Amended |
| CECIP |  | 9.12.2.4 | There is no 9.8.1.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.2.8 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.2.9 | 9.11.2.3 to 9.11.2.8 should be 9.12.2.3 to 9.12.2.8 | Amended |
| CECIP |  | 9.12.2.10 | There is no 9.8.1.8 should be 9.9.4.8, 9.10.1should be 9.11.1 | Amended |
| CECIP |  | 9.12.3.1 | 9.3 is not applicable, the test sequence can be found in 9.4 | Amended |
| CECIP |  | 9.12.3.4 | There is no 9.8.1.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.3.8 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.3.11 | 9.11.3.3 to 9.11.3.10 should be 9.12.3.3 to 9.12.3.10 | Amended |
| CECIP |  | 9.12.3.12 | There is no 6.12.3.2 should be 9.11.2 | Amended |
| CECIP |  | 9.12.4.1 | A.3 is not applicable, the test conditions are 9.4 (and sequence can be found in 9.13) | Amended |
| CECIP |  | 9.12.4.3 | There is no 9.8.1.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.5.1 | 9.8 does not mention test conditions should be 9.4 | Amended |
| CECIP |  | 9.12.5.4 | There is no 9.8.1.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.5.8 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.5.10 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.5.11 | 9.11.5.7 to 9.11.5.10 should be 9.12.5.7 to 9.12.5.10 | Amended |
| CECIP |  | 9.12.5.12 | 9.11.5.1 to 9.11.5.11 should be 9.12.5.1 to 9.12.5.11, 9.11.5.13 should be 9.12.5.13 | Amended |
| CECIP |  | 9.12.5.13 | 9.11.5.1 to 9.11.5.11 should be 9.12.5.1 to 9.12.5.11 | Amended |
| CECIP |  | 9.12.6.1 | 9.8 does not mention test conditions should be 9.4 | Amended |
| CECIP |  | 9.12.6.4 | There is no 9.11.2.10 should be 9.9.4.10 | Amended |
| CECIP |  | 9.12.6.7 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.6.9 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.6.10 | 9.11.6.8 should be 9.12.6.8 | Amended |
| CECIP |  | 9.12.6.11 | 9.11.6.1 to 9.11.6.10 should be 9.12.6.1 to 9.12.6.10 | Amended |
| CECIP |  | 9.12.6.12 | 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.7.2 | 6.12.3.2 should be 6.11.3.2, 9.9.3 should be 9.10.3 | Amended |
| CECIP |  | 9.12.7.3 | 6.12.3.2 and 6.12.3.4 should be 6.11.3.2 and 6.11.3.4 | Amended |
| CECIP |  | 9.12.7.4 | 6.10.1.1 should be 6.11.1.1 | Amended |
| CECIP |  | 9.12.7.5 | 6.10.1.1 should be 6.11.1.1 | Amended |
| CECIP |  | 9.12.7.6 | 6.10.1.1 should be 6.11.1.1 | Amended |
| CECIP |  | 9.12.7.7 | 6.10.1.1 should be 6.11.1.1 | Amended |
| CECIP |  | 9.12.7.8 | 6.10.1.2 should be 6.11.1.2 | Amended |
| CECIP |  | 9.13 | Figure 9.1 must be figure 3, in figure 3:  A.4.1.3 should be 9.12.1.3,  A.4.1.5 – A4.1.12 should be 9.12.1.5 – 9.12.1.12,  A.4.2.5 – A4.2.8 should be 9.12.2.5 – 9.12.2.8 and  A.4.3.5 – A4.3.10 should be 9.12.3.5 – 9.12.3.10 | Amended |
| CECIP |  | 9.13.1 | Figure 9.2 must be figure 4, in figure 3:  A.4.1.3 should be 9.12.1.3,  A.4.2.5 – A4.2.8 should be 9.12.2.5 – 9.12.2.8 and  A.4.3.5 – A4.3.10 should be 9.12.3.5 – 9.12.3.10 | Amended |
| CECIP |  | Annex B | It should be inetersting to keep different B.x names for the different steps like in the R60 2000 edition, following references inside the Annex B will be refered as pages of the Draft. | Amended |
| CECIP |  | Annex B, page 68 | 9.5.4 should be 9.6.4 | Amended |
| CECIP |  | Annex B, page 69, 70 and 71 | There is no 9.5.5 should be 9.6.5 | Amended |
| CECIP |  | Annex B, page 72 | Steps B.2.2 TO B.2.5 do not exist are in pages 68 to 71. | Amended |
| CECIP |  | Annex B, page 73 | At the end there is no summary of the load cells selected for tests as in R60 (2000) point B.2.9 | Amended |
| CECIP |  | Part 3 Test Report Format | Part 3 Test Report Format (Annex C in 2000 edition): It will be apreciated to know when is expected to have a new draft for Part 3. | Draft of Part 3 of OIML R60 will be circulated once technical issues are addressed in Parts 1&2. It can be predicted more accurately when the level of technical amendments to Part 1&2 1CD are determined. |
| CECIP |  | Other: | As this working draft is basically a reformated of the R60 2000 edition, It is interesting to know if it is expected to put on the table the technical inputs proposed by PTB and commented by CECIP LMG before the end of 2010. | Many of the proposals brought forward by PTB were suggestions that impact the scope of R60. The Secretariat felt that prior to addressing comments/proposals that impacted the technical aspects of the Recommendation, the broader issue of what the scope of R60 should be would be discussed and settled by TC9 members. This issue was handled at the September 19-20, 2011 TC9 meeting. TC9 members were asked to comment on these non-technical aspects during the first call for comments. |
| United Kingdom | General |  | A bibliography (at the back of the Recommendation) listing the references to publications used in R60 would be a useful reference for testing purposes. | Bibliography added in 1CD |
| United Kingdom |  | 2 | VIM Terminology needs to be aligned with the wording and clauses of the VIM 2-200 Edition 2007, and the text ‘Adapted from VIM…’ removed. For example, ‘Accuracy Class’ in 2.2.1 is now worded differently under a new clause of 4.25 in the VIM 2-200 Edition 2007. | Amended |
| United Kingdom | 4 | 2.2 | The word “characteristics” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  [This is only visible with the “Show/Hide ¶” feature in operation]  The word “permissible” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 6 | 3.3.1 | Expand the “examples to include other “technologies” e.g.  Vibrating wire  •Piezoelectric crystal  •Hydraulic load cells  •Pneumatic load cells | Per resolutions from TC9/R60 meeting: Definitions included that describe construction of load cells will be limited to terminology currently used in R60. The following definitions will be added:  3.3.1 Strain gauge;  3.3.X To be determined by TC9 |
| United Kingdom | 7 | 3.5 | For ease of understanding, propose inserting column header title to distinguish between numbering for tests (Annex A) and requirements (clauses). | OIML template design will be used to separate and distinguish between tests and metrological/technical requirements |
| United Kingdom | 10 | 3.7.1 | The word “conditions” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 11 | 3.7.5 | The word “indicating” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 11 | 3.7.8 | The word “conditions” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 11 | 3.7.9 | The word “Recommendation” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 10 | 3.7.1 | The word “environmental” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 12 | 3.8.1 | The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 12 | 3.8.1.1 | The word “specified” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 13 | 3.8.3 | The word “performance” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “reference” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 14 | 5 | 5 Units of measurement  3rd sentence: the word “were” to be replaced by “where”, i.e.  In countries where other units mass are legal, the relevant requirements specified in this Recommendation may be converted to these legal units of mass, using simple interpolation.  In 3.1 General Definitions, 3.1.1 Load cell  a load cell is defined as a: “Force transducer which, after taking into account the effects of the acceleration of gravity and air buoyancy at the location of its use, measures mass by converting the measured quantity (mass) into another measured quantity (output).”  The output is not necessarily according to the International System of Units (SI): gram (g), kilogram (kg) or tonne (t), but in another SI unit: μV. This output may then “converted” by a further device {Indicator with A/D convertor} to produce the result according to the International System of Units (SI): gram (g), kilogram (kg) or tonne (t).  During Type evaluation/testing, the “output” may be determined using another device, e.g. voltmeter, therefore the 2nd sentence [displayed and/or printed in the following units] is misleading. | Per discussion and resolutions of the September 2011 TC9/R60 meeting: the scope of R60 will be limited to the load cell itself. Regulation of the output from the load cell when acted upon by a weighing instrument will be performed under the requirements of that weighing instrument's respective Recommendation. |
| United Kingdom | 14 | 6.1 | The word “system” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 16 | 6.2.1 | The word “classifications” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 17 | 6.3.1.1 | In section A.2.3, the Note specifies that: “Pattern” is used in legal metrology with the same meaning as “type”; in the entries in this Recommendation, only “type” is used.  However “Pattern” appears in several instances e.g. 6.3.1.1, 8.1, 9.3, 9.4.1, 9.1, 9.2, 9.7, 9.11.1, 9.11.2, 9.11.3.1, 9.11.4.  The word “positive” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “sensitivity” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | References in document to "pattern" changed to "type" where appropriate. Typographical errors corrected. |
| United Kingdom | 17 | 6.4 | The word “intervals” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 18 | 6.7 | Delete “g)”,but retain the text, as this is information and not one of the 6 classification parts. | Amended |
| United Kingdom | 20 | 6.8.1.3 | The word “apportionment” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 20 | 6.8.2 | The word “interval” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 20 | 6.8.3 | The references to 9.11.5 and 9.11.6 are incorrect, they should be 9.12.5 & 9.12.6 | Amended |
| United Kingdom | 20 | 6.8.3.1 | The reference(s) to 9.11.5 is incorrect, it should be 9.12.5  The word “output” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 21 | 6.8.3.2 | The reference(s) to 9.11.6 is incorrect, it should be 9.12.6 | Amended |
| United Kingdom | 21 | 6.9 | Amend the wording: “A fault greater than the magnitude of the MPE on for initial verification is a significant fault.”  The word “interval” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “independent” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “measurement” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “memorized” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Clause relocated to 3.7.1.4. Terminology in clause 3.7.14 restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| United Kingdom | 21 | 6.9.1.1 | The reference(s) to 6.10.2.1 is incorrect, | Amended |
| United Kingdom | 22 | 6.9.1.2 | The reference 9.11.7.8 is incorrect, it should be 9.12.7.8  The word “verification” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “performances” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 22 | 6.9.1.2 Table 3 | The references to: 9.11; 9.11.7.2; 9.11.7.3; 9.11.7.4; 9.11.7.5; 9.11.7.6; 9.11.7.7 & 9.11.7.8 are incorrect, they should be 9.12; 9.12.7.2; 9.12.7.3; 9.12.7.4; 9.12.7.5; 9.12.7.6; 9.12.7.7 & 9.12.7.8 | Amended |
| United Kingdom | 22 | 6.9.2.1 | The reference to: 9.11.7 is incorrect, it should be 9.12.7. | Amended |
| United Kingdom | 22 | 6.10 | The reference to: 6.10.2 is incorrect, it should be 6.9.2.7 | Paragraph (from template) deleted |
| United Kingdom | 23 | 6.11.1  6.11.1.1 | The word “Recommendation” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “instrument” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “electrical” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 23 | 6.11.1.3 | The word “requirements” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 24 | 6.11.3.4 | Amend wording: “…..whenever the voltage is below the minimum value specified by the manufacturer. | Per resolution of TC9/R60 meeting - paragraphs 6.11.3.1 - 6.11.3.4 which pertain to load cells with indicator have been deleted |
| United Kingdom | 25 | 7.3.1 | The word “required” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 25 | 7.3.3 | The word “intervals” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 26 | 7.3.6.1 | The reference(s) to: 9.11.5 & 9.11.6 are incorrect, they should be 9.12.5 & 9.12.6. | Paragraph references amended |
| United Kingdom | 26 | 7.3.6.2 | The reference(s) to: 9.11.5 is incorrect, it should be 9.12.5. | Requirement redrafted to separate requirements from tests |
| United Kingdom | 26 | 7.3.6.3 | The reference(s) to: 9.11.6 is incorrect, it should be 9.12.6. | Requirement redrafted to separate requirements from tests |
| United Kingdom | 27 | 7.3.7 (g) | The word “electrical” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000 | Amended |
| United Kingdom | 28 | 7.3.10 | The word “different” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 29 | 8.1.1 | The word “requirements” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000  The word “evaluation” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. This also occurs at: 9.9.1. | Amended |
| United Kingdom | 30 | 9.1 | The word “evaluation” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 30 | 9.2 | The word “determination” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Paragraph deleted |
| United Kingdom | 30 | 9.4.1 | The word “consists” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 30 | 9.5 | The reference(s) to: 9.7 & 9.8 are incorrect, they should be 9.8 & 9.9. | Amended |
| United Kingdom | 31 | 9.6 | Amend wording “If the testing laboratory has sound reasons to fear consider that the modification has negative influence on tests that already had a positive result, these tests shall be repeated. {the word “fear” may not translate correctly}  The word “provisions” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended. "Fear" changed to "reason to suspect". |
| United Kingdom | 31 | 9.6.2 | The word “different” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 32 | 9.6.4 | The reference(s) to: 9.5.2 & 9.5.3 are incorrect, they should be 9.6.2 & 9.6.3. | Amended |
| United Kingdom | 33 | 9.8.1 | The reference(s) to: 9.8.1.4 is incorrect, there is no section 9.8.1.4. | Amended |
| United Kingdom | 33 | 9.9.1 | The word “evaluation” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| United Kingdom | 33 | 9.9.2 | The word “determination” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 34 | 9.9.3.1 | The word “consists” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 34 | 9.9.4 | The word “program” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 34 | 9.9.4.2 | The word “without” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 34 | 9.9.4.3 | The word “introducing” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 34 | 9.9.4.4 | The word “maximum” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 35 | 9.9.4.6 | The word “recommended” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 35 | 9.9.4.8 | The word “significantly” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 35 | 9.9.4.10 | The word “convenient” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “instrument” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 36 | 9.9.5 | The reference to 9.10 is incorrect, it should be 9.11.  The reference to 9.8.1 is incorrect, it should be 9.11. | Amended |
| United Kingdom | 37 | 9.10.3.2 | The word “proportionally” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “minimum” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 37 | 9.11.1 | The references to 9.10.1.1 are incorrect, they should be 9.11.1.1. | References corrected |
| United Kingdom | 38 | 9.11.1.1 | The word “apportionment” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 38 | 9.12 | The word “following” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 39 | 9.12.1.4 | The reference to 9.8.1.10 is incorrect, it should be 9.9.4.10 | Amended |
| United Kingdom | 39 | 9.12.1.7 | The word “sequence” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The reference to 9.9.3 is incorrect, it should be 9.10.3 | Amended |
| United Kingdom | 39 | 9.12.1.9 | The reference to 9.9.3 is incorrect, it should be 9.10.3  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 39 | 9.12.1.10 | The reference to 9.11.1.8 is incorrect, it should be 9.12.1.8 | Amended |
| United Kingdom | 39 | 9.12.1.11 | The reference to 9.9.3 is incorrect, it should be 9.10.3 | Amended |
| United Kingdom | 40 | 9.12.1.12 | The reference 9.11.1.7 to 9.11.1.11, is incorrect, it should be 9.12.1.7 to 9.12.1.11 | Amended |
| United Kingdom | 40 | 9.12.1.13 | The references 9.11.1.3 to 9.11.1.12, are incorrect, they should be 9.12.1.3 to 9.12.1.12 | Amended |
| United Kingdom | 40 | 9.12.1.14 | The word “determined” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 40 | 9.12.1.16 | The word “minimum” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 41 | 9.12.2.1 | The reference to 9.3 is incorrect, it should be 9.4 | Amended |
| United Kingdom | 41 | 9.12.2.4 | The reference to 9.8.1.10 is incorrect, it should be 9.9.4.10 | Amended |
| United Kingdom | 41 | 9.12.2.8 | The reference to 9.9.3 is incorrect, it should be 9.10.3  The word “intervals” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 41 | 9.12.2.9 | The reference 9.11.2.3 to 9.11.2.8, are incorrect, they should be 9.12.2.3 to 9.12.2.8. | Amended |
| United Kingdom | 41 | 9.12.2.10 | The references 9.8.1.8 & 9.10.1, are incorrect, they should be 9.9.4.8 & 9.11.1.  The word “determined” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 42 | 9.12.3.1 | The reference to 9.3 is incorrect, it should be 9.4. | Amended |
| United Kingdom | 42 | 9.12.3.4 | The reference to 9.8.1.10 is incorrect, it should be 9.9.4.10 | Amended |
| United Kingdom | 43 | 9.12.3.8 | The reference to 9.9.3 is incorrect, it should be 9.10.3. | Amended |
| United Kingdom | 43 | 9.12.3.10 | The reference to 9.9.3 is incorrect, it should be 9.9.3.  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 43 | 9.12.3.11 | The reference 9.11.3.3 to 9.11.3.10, are incorrect, they should be 9.12.3.3 to 9.12.3.10. | Amended |
| United Kingdom | 43 | 9.12.3.12 | The reference to 6.12.3.2 is incorrect, it should be 9.11.2. | Amended |
| United Kingdom | 43 | 9.12.4.3 | The reference to 9.8.1.10 is incorrect, it should be 9.9.4.10. | Amended |
| United Kingdom | 44 | 9.12.4.6 | The word “approximately” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “pressure” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 44 | 9.12.4.7 | The word “barometric” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “compared” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 44 | 9.12.5.1 | The reference to 9.8. is incorrect, it should be 9.9. | Amended |
| United Kingdom | 44 | 9.12.5.4 | The reference to 9.8.1.10 is incorrect, it should be 9.9.4.10. | Amended |
| United Kingdom | 45 | 9.12.5.8 | The reference to 9.9.3 is incorrect, it should be 9.10.3.  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 45 | 9.12.5.10 | The reference to 9.9.3 is incorrect, it should be 9.9.3.  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 45 | 9.12.5.11 | The reference to 9.11.5.7 to 9.11.5.10, are incorrect, they should be 9.12.3.3 to 9.12.3.10. | Amended |
| United Kingdom | 45 | 9.12.5.12 | The reference to 9.11.5.1 to 9.11.5.11, are incorrect, they should be 9.12.5.1 to 9.12.5.11.  The word “Guidance” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 46 | 9.12.5.12 | The reference to 9.11.5.13 is incorrect, it should be 9.12.5.13 | Amended |
| United Kingdom | 46 | 9.12.5.13 | The reference 9.11.5.1 to 9.11.5.11, is incorrect, it should be 9.12.5.1 to 9.12.5.11.  The word “carefully” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “applied” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Paragraph split. References amended |
| United Kingdom | 46 | 9.12.6.1 | The reference to 9.8. is incorrect, it should be 9.9. | Amended |
| United Kingdom | 47 | 9.12.6.4 | The reference to 9.11.2.10 is incorrect, it should be 9.9.4.10. | Amended |
| United Kingdom | 47 | 9.12.6.7 | The reference to 9.9.3 is incorrect, it should be 9.10.3. | Amended |
| United Kingdom | 47 | 9.12.6.9 | The reference to 9.9.3 is incorrect, it should be 9.10.3.  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 48 | 9.12.6.10 | The reference to 9.11.6.8 is incorrect, it should be 9.12.6.8 | Amended |
| United Kingdom | 48 | 9.12.6.11 | The reference 9.11.6.1 to 9.11.6.10, is incorrect, it should be 9.12.6.1 to 9.12.6.10.  The word “Environmental” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 48 | 9.12.6.11 (a) | The word “following” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 48 | 9.12.6.12 | The reference to 9.9.3 is incorrect, it should be 9.10.3.  The word “recorded” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 49 | 9.12.7 | The word (Disturbances) is incorrectly followed by the character “\_” | Amended |
| United Kingdom | 49 | 9.12.7.1 | The equation Ec = Eo – E ≤ mpe has been changed from the one stated in OIML R60 2000 Ec = E – Eo ≤ mpe | Amended |
| United Kingdom | 49 | 9.12.7.2 | The word “maximum” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 50 | 9.12.7.2 | The reference (see 6.12.3.2) is incorrect, it should be (see 6.11.3.2).  The reference to 9.9.3 is incorrect, it should be 9.10.3.  The word “measurements” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “indication” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Reference to “Warm-Up Time” paragraph deleted due to deletion of 6.11.3.2.  Reference to 9.9.3 amended  Typos amended |
| United Kingdom | 50 | 9.12.7.3 | The reference (see 6.12.3.3 and 6.12.3.4), is incorrect, it should be (see 6.11.3.3 and 6.11.3.4).  The word “variations” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “reference” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “performed” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | References deleted as were paragraphs 6.11.3.3 and 6.11.3.4  Typos amended. |
| United Kingdom | 51 | 9.12.7.3 | The word “simultaneously” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “Electromagnetic” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 51 | 9.12.7.4 | The reference (see 6.10.1.1) is incorrect, it should be (see 6.9.1.1).  The word “intervals” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “accomplish” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 51 | 9.12.7.5 | The reference (see 6.10.1.1) is incorrect, it should be (see 6.9.1.1). | Amended |
| United Kingdom | 52 | 9.12.7.5 | The word “suppressed” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “accomplish” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 52 | 9.12.7.6 | The reference (see 6.10.1.1) is incorrect, it should be (see 6.9.1.1). | Amended |
| United Kingdom | 53 | 9.12.7.7 | The reference (see 6.10.1.1) is incorrect, it should be (see 6.9.1.1).  The word “applied” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “suppressed” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “accomplish” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 54 | 9.12.7.8 | The reference (see 6.10.1.2) is incorrect, it should be (see 6.9.1.2).  The word “suppressed” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “accomplish” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “contained” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “number” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The word “manufacturer” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 55 | 9.12.7.8 | The word “operating” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  Addition of the word “the” into Test duration:  The time necessary to carry out all the required tests in this Section but not to exceed 28 days, whichever is the shorter. | Typos amended. Language amended per Austria’s comments. |
| United Kingdom | 55 | 9.12.7.8 | The word “following” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The reference to 9.9.3 is incorrect, it should be 9.10.3.  The word “maximum” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 56 | 9.12.7.8 | The word “measurements” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000. | Amended |
| United Kingdom | 56 | 9.13 | The word “temperature” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The reference to Figure 9.1 is incorrect, there is no Figure 9.1. There is a Figure 3 in clause 9.1 | Amended |
| United Kingdom | 56 | 9.13.1 | The word “temperature” incorrectly contains a “­”, which is a hyphenation copied from OIML R60 Edition 2000.  The reference to Figure 9.2 is incorrect, there is no Figure 9.2. There is a Figure 2 in clause 9.2 | Amended |
| United Kingdom |  | Annex A | Performance tests reference need to be updated to the latest and relevant IEC standards.  The definitions in Annex A should appear in the terminology section somewhere at the beginning of the document. | Amended |
| United Kingdom | 68 | ANNEX B | The reference to 9.5.4 is incorrect, it should be 9.6.4. | Amended |
| United Kingdom | 69 | ANNEX B | The reference to 9.5.5 is incorrect, it should be 9.6.5. | Amended |
| United Kingdom | 70 | ANNEX B | The reference to 9.5.5 is incorrect, it should be 9.6.5.  The reference to 9.5.1 is incorrect, it should be 9.6.1. | Amended |
| United Kingdom | 71 | ANNEX B | The reference to 9.5.5 is incorrect, it should be 9.6.5.  The reference to 7.3.3 is incorrect, it should be 9.6.3. | Amended |
| United Kingdom | 72 | ANNEX B | The reference B.2.2 to B.2.5 is incorrect, Annex B does not have any section numbering. | Amended |
| United Kingdom | 73 | ANNEX B | The reference to 7.3.6 is incorrect, it should be 9.6.6. | Amended |
| Netherlands |  | all | VIML (2.5 & 2.6) indicate “type” as preferred Use “type” instead of “pattern” | References to “pattern” changed to “type” |
| Netherlands |  | all | Indicate versions of referred publications | Amended |
| Netherlands |  | Annex ? | Implement Annex “Bibliography” | Bibliography included in 1CD |
| Netherlands |  | Chapter 3 and Annex A | Doubling of definitions should be eliminated. There is surely no need for mentioning the same terms in the terminology as well as in Annex A. Moreover the vocabularies are available for free. For that reason one could even question why definitions are copied in the terminology part. See e.g. the present committee draft R46. | Definitions from other publications included in 1CD - Annex D (mandatory)  Redundant definitions eliminated. |
| Netherlands |  | all | The recommendation R60 is not a recommendation for a complete measuring instrument. It could be considered a more or less horizontal recommendation. For that reason several clauses and terms do not fit to the template, while it was not foreseen that this template would cover such a horizontal recommendation. However the principle of dividing in the parts requirements, tests and report still could be applied as well as some further detailing. | As per conclusions of TC9 meeting, revision of R60 will follow OIML template as closely as practical. |
| Netherlands |  | all | Many internal references need to be updated; please review. | Amended |
| Netherlands | 3 | 1 | 3th par. 5th line singular/plural conflict (.. a load cells..) | Amended |
| Netherlands | 5 | 2.3 | “...associated with...” ? Wouldn´t it be better to use “..comprising..” ? | Amended |
| Netherlands | 5 | 3.1.1 | It is advised to first separate between straight forward load cells, load cells equipped with electronics and load cells including electronics and digital output, the first mentioned rather being a component the next being rather a device or module and the last being an almost complete weighing instrument, which is more within the scope of R76. Taking this into account deletion of the note is suggested and focussing only on the first 2 is suggested.  In the further approach the difference between the first and second (with or without electronics) should not be of influence to the tests on electronic required for the following reason:  Each straight forward load cell can be considered as a component of an electronic circuit, most of the time equipped with relative long cabling and often comprising non-linear elements. This configuration typically resembles an antenna & detection circuit for radio frequency signals, thus being of influence to the susceptibility for EMC tests.  When combining this aspect with the proven susceptibility of type approved weighing bridges to RF signals there are sufficient arguments to not exclude these straight forward load cells from the environmental tests as described for those equipped with electronics.  So summarizing one could divide between:  1)      load cell as a component (LC)  2)      load cell as a device or module (LCM)  3)      load cell as an instrument (LCI)  It is advised is to leave out the LCI type from R60 and to deal with the LC and LCM in the same or similar manner. | Note deleted as recommended  Note added to 3.1.2 to recognize the use of terminology "digital load cells" |
| Netherlands | 5 | 3.1.2 | To be discussed. Suggest to delete at least the examples since “electronics” is a generic term used of which the definition can be found anywhere.  Suggest to replace by a note indicating that: “strain gauge bridge circuits are not considered electronic components for the purpose of this recommendation” | Examples have been deleted.  Note has been added. |
| Netherlands | 5 | 3.1.2.1 | Incorrect definition (although copied from D11 (2004)) Please try to amend in a later stage. D11 is in revision and it is the intention to amend several definitions. | Definitions from current D11 used. |
| Netherlands | 7 | 3.4.3 | Delete “pattern” | Amended |
| Netherlands | 10 | 3.6 | The figure is distorted. Copy the R60 2000 figure in a correct way. | Previous "Figure 1" inserted as suggested |
| Netherlands | 11 | 3.7.8 | Ref. incorrect should be 5.24, but “Intrinsic Error” which is no longer defined in the new VIM will be defined in the VIML (in revision) | Reference amended |
| Netherlands | 12-Nov | 3.7.11; 3.7.13 | Definitions to be adjusted to VIM V2-200 | Amended |
| Netherlands | 12 | 3.7.14 | Definition to be adjusted to VIML (after publication of new VIML) | Terminology restored to 2000 edition of R60. Language from OIML template deleted. Reference to D11 added |
| Netherlands | 12 | 3.8.1 | To be adjusted to V2-200 | Updated to V2-200: 2012 |
| Netherlands | 12 | 3.8.1.1; 3.8.1.2 | Definitions to be adjusted to VIML (after publication of new VIML) | New VIML unpublished. Definitions have been removed - located now in Annex D, D3 will be amended when new edition is published. |
| Netherlands | 13 | 3.9 | Delete abbreviations not used in this recommendation | Abbreviations not used in R60 removed. |
| Netherlands | 14 | 5 | Delete the original R60 text ( first line) | First sentence deleted. Regulation of the output from the load cell when acted upon by a weighing instrument will be performed under the requirements of that weighing instrument's respective Recommendation. |
| Netherlands | 16 | 6.3 | Due to its horizontal applicability this recommendation should focus on type evaluation. There is no need for implementing requirements and tests with regard to initial as well as subsequent verification and in-service inspection. Since all tests concern type evaluation there is no need to explicitly mention type evaluation. Therefore delete “MPE at type approval” as there is no difference in MPE during type-approval or verification Moreover the term “approval” should be replaced by “evaluation” : (“evaluation” is the action and “approval” is the outcome or result in case of passing all the tests and examinations) | Paragraph amended. Bulleted statements within clause have been deleted |
| Netherlands | 21 | 6.9 | Copy the original 2.4.14 into this clause. Furthermore see comment on 6.3.: Initial verification is not applicable | Clause relocated to 3.7.1.4. Terminology in clause 3.7.14 restored to 2000 edition of R60. Clause 6.9 derived from OIML Recommendation template has been deleted |
| Netherlands | 21 | 6.9.1.1 | This definition needs adjusting to the VIM and VIML terminology. “, the difference between the load cell output (due to a disturbance) and the load cell output (without disturbance) is defined as “fault” in 3.7.4  Moreover it should be decided whether to use the VIM 4.20 term “ instrumental bias” instead of “intrinsic error”  Furthermore: Should it be vmin or v ? | "load cell intrinsic error" changed to "fault". Changed v to vmin. |
| Netherlands | 23 | 6.11.1 | PLC for electronic load cell should be < 1, only for a load cell including the platform and digital weight output the PLC could be 1. | "equal to or" deleted per comment. |
| Netherlands | 23 | 6.11.1.3 | This requirement might be superfluous or might be in the wrong place.  Moreover 6.9 also concerns electronics. Further see the comment on 3.1.1 | Paragraph relocated to Terminology section 3.7.14 |
| Netherlands | 24 | 6.11.3.3 | Take into account future addition of AC adapter requirements | Per resolution of TC9/R60 meeting - paragraphs 6.11.3.1 - 6.11.3.4 which pertain to load cells with indicator have been deleted |
| Netherlands | 25 | 7.2 | If LCI will be part of this recommendation software should also tackled but in line with OIML D31.(Again a reason to eliminate LCI from this recommendation) | New language developed by TC9 work group inserted. Wording based on conclusions of TC9 meeting, to be reviewed by technical committee. |
| Netherlands | 26 | 7.3.6.2 / 7.3.6.3 | Redraft such that these clauses concern requirements | Requirement redrafted to separate requirements from tests |
| Netherlands | 29 | 8.2 | Replace “instruments” by “load cells” | Amended |
| Netherlands | 30 | 9.1 | The difference in the description of the scope in 9.1 and that of 9.9 should be made more explicitly. One should distinguish between 9.1 which concerns the “evaluation” and 9.9 which concerns performing of tests, which is part of the evaluation. So leave out “test” and “testing” in 9.1 and replace by “evaluation” where applicable. | Deleted paragraphs 9.9.1, 9.9.1.1, and 9.9.1.2. Deleted "testing" and replaced with "evaluation" where appropriate |
| Netherlands | 30 | 9.5 | “Units” to be replaced by “specimens” (Draft template is not adequate concerning this term) Suggest to change the title to “Submission of specimens for evaluation” Consequently replace “unit” by “specimen” where applicable | "units" changed to "specimens."  Title of clause changed as proposed |
| Netherlands | 31 | 9.6 | Change “If a specimen does not pass a specific test and as a result and it has to be modified...” to “If a specimen does not pass a specific test and as a result it has to be modified...” | Paragraph amended according to comments from France, Australia. |
| Netherlands | 32 | 9.6.5 | Text is not clear although identical to R60 Ed 2000 | Language changed but must be reviewed to verify that intent has not changed. |
| Netherlands | 32 | 9.7 | Replace “measuring instrument” and “instrument” by “load cell” | Amended |
| Netherlands | 33 | 9.8 | Replace “instruments” with “load cells” | Amended |
| Netherlands | 33 | 9.9.1 | See comment on 9.1 | Sections 9.9.1, 9.9.1.1, and 9.9.1.2 deleted to eliminate redundancy |
| Netherlands | 35 | 9.9.4.10 | The term “periodic verification of the indicating instrument calibration” is confusing, please replace with “periodic check on calibration status of the indicating instrument shall be performed” (assume that this is meant) | Amended as proposed |
| Netherlands | 35 | 9.9.4.12 | In title replace “data” by “string” or “format” | Replaced "data" with format as proposed. |
| Netherlands | 36 | 9.10.2 | Replace “Test Format” by “Type evaluation report format” | Amended |
| Netherlands | 37 | 9.10.3 | Propose to extend the table making a separation between the time for loading and the stabilization time. | Table amended as proposed |
| Netherlands | 37 | 9.10.3.1 | As a consequence of extending the table this text may partly be deleted | Amended as proposed |
| Netherlands | 37 | 9.10.3.2 a) | Include examples: 1. Change in load 10 kg, loading time 7.5 s (150% of 5 s), stabilization time 5 s, MPE is reduced to 50%  2. Change in load 1500 kg, loading time 25 s (125% of 20 s), stabilization time 20 s, MPE is reduced to 75% | Examples included as proposed |
| Netherlands | 37 | 9.11 | The 9.11 sub clauses contain requirements. These shall be described in general terms in part 1 and the verification of compliance shall be described in part 2 | The metrological requirement portions of the following paragraphs have been relocated to Part 1 (6.4)  New language developed for test portions of clauses must be reviewed by TC9. |
| Netherlands | 38 | 9.11.2 | Re-edit. The grammar is incorrect. Advice to split up the sub clause in requirement and test.  Requirement:  “The difference between the initial reading of the minimum load output (Dmin) and the reading of Dmin after being exposed to a maximum load Dmax for 30 minutes, shall not exceed half the value of the load cell verification interval (0.5 v).”  Test:  Include in the clause for the test: “Dmax may range between 90 % and 100 % of Emax”  Further include a time period for observing the indication after unloading | Paragraphs edited to separate tests and requirements. Requirements located in Part 1, test located in Part 2.  Time period for observing indication after unloading to be determined by TC9 |
| Netherlands | 38 | 9.12 | 9.12 contains detailed test sequences. Compared to other recommendations R6o is rather unique in such detailing.  To ease the use of such test sequences please consider implementing flowcharts instead of sub-sub clauses. | TC9 members that would like to submit a draft flowchart for this purpose are encouraged to do so. Any proposals will be circulated among the technical committee and if approved, the proposal would be included in future drafts of this Recommendation |
| Netherlands | 46 | 9.12.5.13 | Split the clause in 2 parts, first part dealing with the removing of the load cell, second part (new 9.12.5.14) dealing with repeating the 9.12.5.1 to 9.12.5.11 test steps | Amended as proposed |
| Netherlands | 46 | 9.12.5.14 | Renumber to 9.12.5.15 when the comment concerning splitting 9.12.5.13 is accepted | Amended |
| Netherlands | 46 | 9.12.6 | Include possibility that the last step in the procedure at 20 °C in 9.12.1.13 can serve as first step in procedure in 9.12.5 | Same comment as above:  TC9 members that would like to submit a draft flowchart for this purpose are encouraged to do so. Any proposals will be circulated among the technical committee and if approved, the proposal would be included in future drafts of this Recommendation |
| Netherlands | 50 | 9.12.7.3 | Include AC adapter tests (see comment on 6.11.3.3) | Per resolution of TC 9 meeting, paragraphs related to “load cell with indicator” (6.11.3.1 – 6.11.3.4) deleted. Tests involving components other than the load cell itself should be conducted using other appropriate Recommendations |
| Netherlands | 54 | 9.12.7.7 | In final phase adapt to new OIML D11 and at least to OIML R76-1 Ed 2006 where 10 V/m is required and where conducted immunity test at 10 Vemf added. | Field strength changed from 3 V/m to 10 V/m.  TC9 input needed on whether conducted immunity test be added. (at 10 Vemf)  Need draft language for conducted immunity test from Technical Committee members. |
| Netherlands | 54 | 9.12.... | Include Surge test in line with R76 | Added as proposed. Language and test conditions need to be vetted. |
| U.S.A. | General |  | [The] main concern is that design requirements not be added ...  ... with the addition of what otherwise might appear to be helpful design-related information indicating "acceptable" solutions, new and different solutions might not be looked at with an open mind but resisted in favour of known "acceptable" solutions. | As decided at the TC9 meeting, requirements related to load cell design that are included in R60 will remain generic and non-limiting to alternative design concepts. |
| U.S.A. | General |  | A load cell is a transducer that produces an output signal when a load is applied. R-60 needs to set forth the performance requirements of a transducer without becoming tied to only load cells of certain technical designs. Some included performance requirements might appropriately only apply to load cells of a certain design, yet they should remain as performance requirements.  The proper time to consider a transducer’s technical design is when defining the family of load cells that may be included on a single certificate based on the evaluation of samples therein. | See above |
| U.S.A. | General |  | Many of the proposals seek to move R60 in the direction of a design standard. Some are technocratic and might constrain new development. R60 should remain performance based.  Under the supervision of competent evaluation labs, the load cell evaluation procedure has survived the test of time. Unless proven significant, the introduction of technical minutia into the procedure should be avoided. | See above |