



Document: **ISO/TC 30/SC 7 N 405**

Date: 9 February 2011

Secretariat of ISO/TC 30/SC 7
Flow measurement in closed conduits
- Volume methods including water meters

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To the Members of ISO/TC 30/SC 7

Dear Member,

ISO 4064-2 – OIML R 49-2 Water meters intended for the metering of cold potable water and hot water — Part 2: Test methods
- Draft for Committee Internal Ballot (N 397)

- Resolution of comments

Further to document N 401, in which the result of voting and comments on the above document were presented, attached is the compilation of comments with the responses of the Joint Working Group (JWG) following its meeting in Paris last April. Further consultation within the JWG resolved some remaining issues, and a summary of these is also attached.

The draft has been duly revised and will now proceed to issue as ISO/DIS 4064-2 for enquiry. Corresponding ballots will take place in OIML and CEN.

Yours sincerely,

D J Michael
for the Secretariat of ISO/TC 30/SC 7

Template for comments and secretariat observations

Date: April 2010

Document: ISO/CD 4064-2

1	2	(3)	4	5	(6)	(7)
MB ¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/ Note (e.g. Table 1)	Type of com- ment ²	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
OIML (AU)			ge	There appears to be a problem with the mathematical symbols and equations throughout all of the documents.		pdf conversion problem to be addressed
OIML (CA)			ge	In general there does not seem to be consistency in use and style of bullets. Compare sections 5.3.1, 5.3.2.1 and 5.3.2.2.		Accepted – will be addressed
ID	-		ge	For implementataion of 'test methods' should concidere the local existings of material, culture & regulation.		No change agreed, but noted for future consideration
OIML (PL)			ge	All left and right margins of this document should be equal each other and have width: min 2.5 cm, max 3.5 cm. Left margin is too narrow (problems in reading this document inserted into a binder).		Noted – but house style will apply
OIML (PL)	Contents, iv			In a few places at this page there are: “Error! Bookmark not defined” instead of number of page.		Will be addressed
ID	3.		te	<i>Correction</i>	Should be changed with : 1. ambient temperature 15 °C to 35 °Cadjusted with temperature Indonesia) 2. ambient relative humidity 60% to 100 % (adjusted with climate Indonesia)	No change agreed - the temperature and humidity ranges have been discussed at length, and were agreed in Ottawa
OIML (CA)	5.3.1			Don't necessarily agree with note 3. Especially how serial number is designated.		Noted – what is proposal
FR	5.3.1		E	This paragraph differs form § 5.6 part 1. To delete this paragraph already described in part-1 and to refer to part 1, (to be completed) and to the check list described in part 3.		Agreed. Note 3 moved to Part 1, 5.6
FR	5.3.1			To add an example with, for example, T90, , MAP 25, U10D10 for specific conditions		Agreed – France to prepare N.B. Unit for pressure rating always to be shown

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OIML (PL)	5.3.1			This checking is described in ISO 4064-1/OIML R 49-1, 5.6. In the 4064-1/OIML R 49-2, 5.3.1 there is lack of verifying year of production. It cause incoherence between both of documents. We are proposing that in 4064-1/OIML R 49-2, 5.3.1 should be only link to the ISO 4064-1/OIML R 49-1, 5.6 with the statement “Verify marks and descriptions as mentioned in R49-1, 5.6”		Agreed
OIML (AU)	5.3.1 (m) and (n)			If changes concerning the alternative display of battery life (see comments re: sections 4.2.2 and 4.2.3.2 of Part 1) are accepted, then a note will need to be included here.		This has been addressed in Part 1
FR	5.3			It could be more appropriate to place this paragraph in annex. This should be changed into a checklist form.		Comment withdrawn
JP (+ OIML)	5.3.1		ed	<u>1</u>) Verify that the water meter ...	Add “1)”.	Agreed
JP (+ OIML)	5.3.1		ed	The second a) through p) should be amended to b) through q).		Agreed
JP (+ OIML)	5.3.1		ed	<u>2</u>) Complete the section reference ...	Add “2)”.	Agreed
OIML (PL)	5.3.2.3			Numbering should be like 1), 2) and so on. In these points those are like i), ii), I), II) and so on		Noted
OIML (AU)	5.3.2.4.2			If changes concerning digital indicating devices (see comments re: section 5.7.2.2 of Part 1) are accepted, then changes will need to be made here.		Noted - changes made to Part 1 to be matched here as necessary
JP (+ OIML)	5.3.2.6.2.3 5)		ed	“c)” just before the equation should be deleted.	Delete “c)”.	Noted
OIML	5.3.3			This procedure should be inserted in R49-1, 5.8. In		Agreed to remove most of

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(PL)				this document should be only link to this one with statement “ Verify marks and protection devices as mentioned in R49-1, 5.8”		5.3.3 from Part 2, and check correspondence with Part 1. "verification" to be moved from Part1, 5.6 to Part 1, 5.8. As a result of the check, the NOTE to 5.8.3.3 of Part 1 has been replaced by a requirement taken from 5.3.3 5) d) of Part 2.
OIML (AU)	6.1.1			<p>Control of water quality is important to ensure that there is consistency of results and a reliable indication of a meter's performance from the various accredited testing laboratories.</p> <p>Suggest that a more specific definition of water quality be included. For example, the Australian Standard 3565.1 defines water quality as follows;</p> <p>Drinking/potable water supply should have the following:</p> <ul style="list-style-type: none"> (i) no air bubbles; (ii) particle sizes with an absolute rating not greater than— <ul style="list-style-type: none"> (A) 50µm and a minimum concentration of smaller particles, for Q_3 less than 25 kL/h; or (B) 200µm and a minimum concentration of smaller particles, for Q_3 equal to or 		Not agreed – this would be a major and controversial change

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				greater than 25 kL/h.		
OIML (CA)	6.2			For family of meters consideration should be given to only testing one size of meter. This could be addressed in this section and Annex D (Meter Families)		Agreed – please can JW offer text
OIML (PL)	6.3.2.2.3 – 3)			The procedure about the “bleed all air from ... the meter(s)” cannot be complicated. It must assert proper bleed of air in working conditions. For instance- when there is temporary lack of water in the pipeline and water is then delivered, the water meter must bleed of air itself- without human intervention.		Not agreed
OIML (PL)	6.3.2.2.5.1			There is: “...Whilst the flow...”. Should be: Whilst the flow...”. The flow...		Yes
FR	6.3.2.2.6.1			To clarify this sensitive point to add : “ the uncertainty of the measured actual volume does not include the meters influence”		Agreed.
FR	6.3.2.27.5	2)	T	For meters marked “V” , the flow direction shall be from bottom to top and to top to bottom		Agreed
FR	6.3.2.27.5	4)	T	This specification shall be applicable to the meters that are marked “H”. A meter laying left our right could be considered as a meter installed in H position (velocity meters).		Agreed
JP (+ OIML)	6.3.2.2.7.5		te	Please add the following sentence: “The test with different orientations of a water meter may be omitted in the case that the National Metrology Authority judges there is no influence to measurement error due to orientation of the water meter.		Not agreed – this would be a major change
OIML (AU)	6.3.3.1 (3)			Can we just refer to “Part 3, 5.2” rather than ISO 4064-3/OIML R 49-3, 5.2? This comment applies		Editorial – to be addressed

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				throughout Part 2.		
OIML (CA)	6.3.4			Values differ from Part 1, 6.2.3.1		Values are correct in Part 2; those in Part 1 are nominal – now clarified.
OIML (CA)	6.3.4			If the meter is tested as part of the MAA program can the test lab choose alternative flow rates as per the note.		'alternative' changed to 'additional'
JP (+ OIML)	6.3.4, 1)		ed	The provisions of test flowrates by the range should be maintained as written in the present draft.		Agreed
OIML (CA)	6.3.5			Does this agree with new proposed requirements in Part 1 Section 6.2.3.2. Further discussion in Paris		Changed in accordance with corresponding changes in Part 1, 6.2.3.2.
FR	6.3.6.2			Converter and <u>adapters</u> are not permitted		Text taken from the amendment to EN 14154
FR	6.3.6.2			The combination of the 2 cartridges, manifold or insert with the 5 connection interfaces shall be representative of the variation of production		Text taken from the amendment to EN 14154
OIML (AU)	6.3.6.3			Need to include the following: “... a) During a test hold all other influence factors at reference conditions. b) Calculate the relative error of indication for each flowrate in accordance with Annex A. c) Complete the test report...”		Agreed, but include '...Annex B'
FR	6.3.6.4			Considering that the connection interface shall not create error variation of the meters, the criteria shall be “the standard deviation of the 5 measurements error shall be less than 1/3 of MPE ” for all kind of connection interface.		Text taken from the amendment to EN 14154

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FR	6.3.6.4			The connection interface shall be standardized		Text taken from the amendment to EN 14154
OIML (CA)	6.4			Should this test be relocated to Section 7.		Agreed
GB	6.4	1	ed	"Water meters with electronic devices" could be interpreted to apply to hybrid meters (such as mechanical meters with electronic registers). Does this imply that they should have a means of telling when they are full of water, and therefore able to discriminate between air and water.	Clarify wording to: This test is only required for electronic water meters or water meters with electronic flow or volume sensors.	Agreed
IL	6.4 [N397]	---	te	Absence of flow test is required for Combination meters as well . These meters can suffer of over registration of the bulk meter when the main valve is closed .	To modify as follows : <i>This test is only required for electronic water meters or water meters with electronic devices and for combination meters below change over flow .</i>	Not agreed – this is covered elsewhere.
OIML (CA)	6.5			For family of meters consideration should be given to only testing one size of meter. This could be addressed in this section and Annex D (Meter Families)		JW requested to offer text on families of meters
JP (+ OIML)	6.5.3 4)		ed	Complete test report <u>ISO 4064-3/OIML</u> R 49-3, 5.4.	Add "ISO 4064-3/OIML".	Agreed – editorial style to be addressed
FR	6.6.3			The tolerance of the temperature shall be (0°C ; - 5 °C)		See below
OIML (AU)	6.6.3 (I)			Need to include a working temperature range. For example: “...a flow of water at a temperature of MAT+10 °C (+5,-0 °C) for a period of 1 h...”		Range ± 2,5 °C agreed
FR	6.6.4		R	To add : “ the <u>relative</u> error “		Not yet clear – for further attention
OIML	6.7			For family of meters consideration should be given		JW requested to offer text on

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(CA)				to only testing one size of meter. This could be addressed in this section and Annex D (Meter Families)		families of meters
OIML (CA)	6.7.3			Why is only one meter selected for this test and not for some of the other tests (excluding Determination of intrinsic errors test).		Under consideration in Table 3 – see changes
FR	6.8.1		E	Sentences are not clear		Text changed
FR	6.8.1		E	In case meters designed to prevent reverse flow, it should be more appropriate to test the absence of reverse flow in case of a MAP pressure applied at the outlet connection		Text changed in 6.8.3.3
FR	6.8.1		T	In case of a reverse flow, the register shall be decremented or the dedicated register for reverse flow , shall be incremented		Text changed
JP (+ OIML)	6.8.3.1; 6.8.3.2; 6.8.3.3		ed	The provisions of test flowrates by the range should be maintained as written in the present draft.		Agreed
OIML (CA)	6.9			Why perform this test. Is it metrological test??		No change agreed
OIML (AU)	6.9.5			First paragraph is not strictly an acceptability criterion. Suggest moving paragraph to clause 6.9.3.1.		Agreed to move
JP (+ OIML)	6.10		te	Please delete the entire section (6.10) regarding flow disturbance tests according to our proposal of deletion of 5.3.5 in Part 1.		Not agreed – this was accepted before
OIML (AU)	6.10.3			Agree that some wording is required to link this section with the flow profile sensitivity classes. The proposed wording is good.		Wording accepted
OIML (CA)	6.10.3			This section is quite complicated perhaps further explanation and discussion required.		Can Canada make proposal

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OIML (CA)	Table 1			Any flexibility on the time of pauses for discontinuous endurance test.		No change agreed – can Canada make proposal
FR	6.11		T	For the endurance tests, the same meters shall submitted to the continuous and discontinuous test		Change agreed
FR	6.11		T	For the endurance tests, the acceptance criteria for continuous and discontinuous test shall the error variation with the initial error (made before the whole endurance test)		Consultation to be undertaken on C-B versus C-A
OIML (CA)	6.11.1.4 1)			Does this agree with new proposed requirements in Part 1 Section 6.2.3.2. Further discussion in Paris		No change agreed – there is no inconsistency
FR	6.11.1.4			To add the requirements for classe 1 meters		Agreed
OIML (CA)	6.11.2.3 3)			Redundant with Table 1		Agreed (why does it need some more attention?)
OIML (CA)	6.11.2.4			Does this agree with new proposed requirements in Part 1 Section 6.2.3.2. Further discussion i.n Paris		No change agreed – there is no inconsistency
FR	6.12			To consider the meters with a pulse output with magnet		Agreed
JP (+ OIML)	6.13.3		ed	There is no provision of the completion of the test results to the test report.	Add a sentence for an example, “c) Complete test report ISO 4064-3/OIML R 49-3, xxx.”	Agreed
ID	6. 6.15		te	<i>Addition</i>	Should be added with : 6.15 Starting Flow Test This test to Determine the minimum flowrate which is required by flow sensor of water mater to start to sensing the water that is flowing through	Not agreed to add starting flow test
ID	6.15.1		te	<i>Addition</i>	Should be added with : 6.15.1 Object of Test To verify that there is change in the indication of the meter in starting flow 0,4xQ ₁ ⁴ flowrate	Not agreed – see above
ID	6.15.2		te	<i>Addition</i>	Should be added with : 6.15.2 Test Procedure	Not agreed – see above

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					1. Fill the meter with water, purging out all air 2. Ensure there is no flow through the measurement transducer 3. Open the upstream and downstream valve following flowrate 0.4xQ ₁ 4. Observe the meter for 15 minutes	
ID	6.15.3		te	<i>Addition</i>	Should be added with : 6.15.3 Acceptance criteria Water meter flow indicator shall move (number wheel to start to moving)	Not agreed – see above
JP (+ OIML)	7.1.1		ed they correspond to the mechanical, electrical and climatic environmental conditions to	Delete “, electrical”.	Agreed
IL	7.1.5 [N397]	b	ed	Paragraph b is coming just after paragraph 1 .	Change paragraph b to paragraph 2 .	Agreed
JP (+ OIML)	7.1.5		ed	b) should be 2).		Agreed
OIML (CA)	7.1.7			Further clarification and discussion of this section in Paris.		Canada to offer text
JP (+ OIML)	7.4.1		te	... ISO 4064-1/OIML R 49-1 (4.1.1) ... We consider this test is a disturbance test.	4.1.1 shall be cited instead of 3.2.	Agreed
JP (+ OIML)	7.4.3		ed	c) When measuring the error (of indication), the installation and ...	Add “c)”.	Agreed
OIML (AU)	7.4.4			I believe that the first criterion is correct, i.e. “The relative error of indication of the EUT, at reference conditions, shall not exceed the maximum permissible error of the upper flowrate zone.”		After discussion this was deemed not to be correct
JP (+ OIML)	7.4.4		te	The proposal in italics is correct. This test is a disturbance test.		After discussion this was deemed to be correct

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OIML (CA)	7.5.2.3			Are subsections 2) and 3) clear.		
OIML (CA)	7.5.2.4			Was the wording of this section finalized in Ottawa????		
JP (+ OIML)	7.5.3.2		ed	3) interrogate the functions of the meter.	Add "3)".	Agreed.
JP (+ OIML)	7.6.1		te	... ISO 4064-1/OIML R 49-1 (4.1.1) ... This test is a disturbance test.	4.1.1 shall be cited instead of 3.2.	Agreed.
JP (+ OIML)	7.6.4		te	The difference between two relative errors should be applied because it is a disturbance test.		Agreed.
JP (+ OIML)	7.7.1		te	3.2 should be amended to 4.1.1, because it is a disturbance test.	4.1.1 shall be cited instead of 3.2.	Agreed.
JP (+ OIML)	7.7.4		te	The difference between two relative errors should be applied because it is a disturbance test.		Agreed
OIML (CA)	7.8.4			Agree there seems to be a difference in wording.		OIML/TC 8/SC 5 (MA) to look at
JP (+ OIML)	7.8.4		te	The provision should be maintained as they are according to OIML R 49, ISO 4064 and EN 14154.		See above
OIML (CA)	7.9.3			AGREE what is E3, not previously defined.		Text from NMO inserted
OIML (CA)	7.9.3			The wording does appears to be different between OIML and ISO.		Text from NMO inserted
JP (+ OIML)	7.9.3 a)		ed	E2 and E3 should be amended to E1 and E2 respectively. (Severity level 2 for E1 and severity level 3 for E2) We consider they might be mere misprints.		Text from NMO inserted (this point agreed)
JP (+ OIML)	7.9.3 c)		te	According to the requirement in IEC 61000-4-4(2004), we propose to amend 7.9.3 c).	c) As far as possible, the capacity coupling clamp shall be used for coupling the test voltage into the line.	Text from NMO inserted (this point largely agreed)

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JP (+ OIML)	7.9.3		te	The provision concerning the length of cables should be added according to EN 14154-3:2005, Table 14.		Text from NMO inserted (this point not agreed)
JP (+ OIML)	7.9.3		te	The proposed additional three sentences are not necessary.		Text from NMO inserted (this point not agreed)
OIML (CA)	7.94			Yes, add from Part 1.		Text from NMO inserted (this point agreed)
JP (+ OIML)	7.9.4		te	The provisions of all those tests should be maintained as they are according to the present OIML R 49, ISO 4064 and EN 14154.		Text from NMO inserted
JP (+ OIML)	7.10 3		te	The provision concerning the length of cables should be added according to EN 14154-3:2005, Table 14.		Text from NMO inserted (this point not agreed)
JP (+ OIML)	7.10.3		te	3.2 should be amended to 4.1.1, because it is a disturbance test.		No appropriate reference to 3.2.
OIML (CA)	7.11.3			Do not understand what is meant by “do we want any of the following from Part 1”		Text from NMO inserted
OIML (AU)	7.12.3			Suggest discussion regarding possibly increasing the frequency range up to 2400 MHz. An increasing amount of communication devices and protocols (such as ZigBee) are now using frequencies up to and beyond 2400 MHz. Is it appropriate to increase the frequency range?		Text from NMO inserted (test goes up to 2000 MHz)
OIML (CA)	7.12.3			Further elaboration on digital radio telephones please.		Text from NMO inserted
JP (+ OIML)	7.12.3		ed	E2 and E3 should be amended to E1 and E2 respectively. (Severity level 2 for E1 and severity level for E2) We consider they might be mere misprints.		Text from NMO inserted (this point agreed)
JP (+ OIML)	7.12.3		ed	The numbers 1) through 9) should be changed to the alphabets a) through i).		Secretariat to sort out all the numbering)

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MB ¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/ Note (e.g. Table 1)	Type of com- ment ²	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
JP (+ OIML)	7.12.3		te	It is unlikely to use a cellular phone near water meters. Therefore, it is unnecessary to add an interference test in the radio frequency of digital cellular phone.		Text from NMO inserted
JP (+ OIML)	7.13.3		te	The technical level in these test requirements is too high for water meters. The test content does not exist in the original OIML R 49 and seems to be directly cited from OIML D 11. It would be most appropriate to cite the sentence in the present EN 14154-3, which is specifically provided for water meters.		Text from NMO inserted
OIML (CA)	7.13 and 7.14			Was this section discussed in Ottawa?? Is it part of D11.		Text from NMO inserted
JP (+ OIML)	7.14.3		te	Same as our comments in 7.13.3. It is appropriate to cite the requirements in the present EN 14154-3.		Text from NMO inserted
ID	7.15		te	Please enclose the conversion unit (Gauss) for the unit of the magnetic field (kA/m) for where the national regulation permit.		To note: 1 Tesla = 10 ⁴ Gauss
OIML (CA)	8.1.1			Agree with additional meter option.		Noted
FR	8.2	15	T	Magnetic test: shall be made before endurance test. No reason to be considered a different way than a "normal" meter		Agreed
FR	8.2	13	T	Combined meter endurance : in the prescribed order		Text changed
FR	8.2	14	T	Combined meter endurance : in the prescribed order		Text changed
FR	8.2	10	T	The relative error measurement is not mandatory as the criteria of acceptance is the variation of the error between the error at the end of the total endurance and the error at the very beginning of the test.		Consultation necessary
FR	6.11 & 8.2			After each part of the endurance test, the variation of error shall be compared to the initial error (before endurance test). The acceptance shall be decided after each part of		Consultation necessary

1 **MB** = Member body (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

NOTE Columns 1, 2, 4, 5 are compulsory.

Template for comments and secretariat observations

Date: April 2010

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				endurance test.		
FR	8.3			Shall be added “ five <u>others</u> samples”		The text has been simplified
FR	9.1		T	Delete the Part-1 § 6.3 for initial verification procedure		Change made to text
FR	9.1		T	The meter water tightness shall be ensured during the initial verification test by an appropriate test, if necessary. Test in production could insure this with an equivalent level of confidence.		No change agreed
JP (+ OIML)	9.1.3, 7)		ed	The provisions of test flowrates with the range should be maintained as they are in the present revision.		Agreed
JP (+ OIML)	A.1 1)		ed	Both “devices” should be changed to “facilities”.		Agreed
JP (+ OIML)	A.2.4.2, 6)		ed	7 a) by disconnecting all or part of the indicating device; or	Delete “7)”.	Agreed
OIML (CA)	Annex D			Are there any more opportunities to perform certain tests on only one size of meter in the family. Would reduce costs.		Canada (JW) and France (FB) to look at
FR	Annexe D			For orientation criteria, to add : “ where the highest wear is expected”		Effectively agreed – text changed
OIML (PL)	Figure E.2			Badly drawing of inside thread (lack of horizontal thin line connecting bottom part of the thread)		UK (IHH) to provide marked-up figure
OIML (PL)	Figure E.3 a)			Badly drawing of thread (under point 1 and 3) like above.		UK (IHH) to provide marked-up figure
OIML (PL)	Figure E.3 b)			Edge indicated by digit “7” should be drawn in thick line, end of the thread- thin one (all the drawings should be made in this same manner).		UK (IHH) to provide marked-up figure

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Convenor's Summary of changes made in response to questionnaire answers

Part 1

3.2.1 The last sentence in this clause 'Accuracy class 1 designation shall be applied only to water meters with $Q_3 \geq 100 \text{ m}^3/\text{h}$ regardless of the temperature range.' has been deleted and following the Australian comment the last sentence in 3.2.2 has also been deleted.

6.3 The following has been added after 6.3.2: 'The water meter shall be shown to be capable of withstanding the following test pressure without leakage or damage: 1.6 times the maximum admissible pressure applied for 1 minute (ISO 4064-2/R 49-2 9.1.2).'

Part 2

6.10.2.3 The words 'of 6.10.1.3' have been added after 'at step 1' in 7).

6.10.3 and Test 13 in Table 3 have been deleted. Test numbers in the text of 8.2 have been altered for consistency. 'or at $Q = 2 \times Q_{x2}$ ' has been added to Test 10. In Test 13 (previously Test 14) '6.10.2.3 3) c)' has become '6.10.2'.

Note 4) of Table 3 has been deleted. In 6.10.2.3 5) 'each' has been replaced by 'the' and 'test' by 'test(s)'. This gives consistency with 6.10.2.3 3) and with 5.9.2 of R49-3.

7.12.3 The NMO text (as inserted in the draft) has been accepted.