

FINAL DRAFT
RECOMMENDATION

TC 7/SC 5/p 1
(AU + CA)



Revision of R 129

Multi-dimensional measuring instruments
Part 4: Type evaluation report format

(Marked version)



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Foreword

The International Organization of Legal Metrology (OIML) is a worldwide, intergovernmental organization whose primary aim is to harmonize the regulations and metrological controls applied by the national metrological services, or related organizations, of its Member States. The main categories of OIML publications are:

- **International Recommendations (OIML R)**, which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity. OIML Member States shall implement these Recommendations to the greatest possible extent;
- **International Documents (OIML D)**, which are informative in nature and which are intended to harmonize and improve work in the field of legal metrology;
- **International Guides (OIML G)**, which are also informative in nature and which are intended to give guidelines for the application of certain requirements to legal metrology; and
- **International Basic Publications (OIML B)**, which define the operating rules of the various OIML structures and systems.

OIML Draft Recommendations, Documents and Guides are developed by Project Groups linked to Technical Committees or Subcommittees which comprise representatives from the Member States. Certain international and regional institutions also participate on a consultation basis. Cooperative agreements have been established between the OIML and certain institutions, such as ISO and the IEC, with the objective of avoiding contradictory requirements. Consequently, manufacturers and users of measuring instruments, test laboratories, etc. may simultaneously apply OIML publications and those of other institutions.

International Recommendations, Documents, Guides and Basic Publications are published in English (E) and translated into French (F) and are subject to periodic revision.

Additionally, the OIML publishes or participates in the publication of **Vocabularies (OIML V)** and periodically commissions legal metrology experts to write **Expert Reports (OIML E)**. Expert Reports are intended to provide information and advice, and are written solely from the viewpoint of their author, without the involvement of a Technical Committee or Subcommittee, nor that of the CIML. Thus, they do not necessarily represent the views of the OIML.

This publication - reference OIML R 129-4, Edition 202x - was developed by Project Group 1 of OIML TC 7/SC 5 *Dimensional Measuring Instruments*. It was approved for final publication by the International Committee of Legal Metrology in 202x. It supersedes the previous edition dated 2000.

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Bureau International de Métrologie Légale
11, rue Turgot - 75009 Paris - France
Telephone: 33 (0)1 48 78 12 82
Fax: 33 (0)1 42 82 17 27
E-mail: biml@oiml.org
Internet: www.oiml.org

Introduction

The “Type evaluation report format”, the subject of OIML R 129-4, aims at presenting, in a standardized format, the results of the evaluation to which a type of a multi-dimensional measuring instrument shall be submitted with a view to its approval.

The “Checklist” is a summary of the evaluation and examinations carried out on the instrument. It includes the conclusions of the results of the tests performed, experimental or visual checks based on the required performance criteria and associated tests in OIML R 129-1 and -2. The words or condensed sentences intend to remind the examiner of the requirements of R 129-1 and -2 without reproducing them.

All metrology services evaluating types of multi-dimensional measuring instrument according to OIML R 129-1 and -2 or to national or regional regulations based on OIML R 129-1 and -2 are strongly advised to use this “Type evaluation report format”, directly or after translation into a language other than English or French. Its direct use in English or in French, or in both languages, is even more strongly recommended whenever the results of type evaluation may be transmitted by the country performing these evaluations to the approving authorities of another country, under bi- or multi-lateral cooperation agreements. In the framework of the OIML Certification System (OIML-CS), use of the “Type evaluation report format” is mandatory.

Explanatory notes

Symbols	Meaning
L	Indicated length
W	Indicated width
H	Indicated height
L_T	Length of the test object
ΔL	Error, $L - L_T$
W_T	Width of the test object
ΔW	Error, $W - W_T$
H_T	Height of the test object
ΔH	Error, $H - H_T$
MPE mpe	Maximum permissible error
V	The volume indicated on the instrument
V_{calc}	$L \times \times W \times \times H$
F	Conversion factor
DW	The dimensional weight indicated on the instrument
DW_{calc}	$V \times \times F$
SF	Significant fault

Identification of the instrument

Application no.:

Type designation:

Identification no.:

Manufacturer:

Software version:

Report date:

Documentation from the manufacturer

(Record as necessary to identify the equipment under evaluation)

System or module name	Drawing number or software reference	Issue level	Document identification
.....
.....
.....
.....
.....
.....
.....

Simulator documentation (if applicable)

System or module name	Drawing number or software reference	Issue level	Document identification
.....
.....
.....
.....
.....
.....
.....

Identification of the instrument (continued)

Application no.:	Type designation:
Identification no.:	Manufacturer:
Report date:		

Simulator function (summary) (if applicable)

(Simulator description and drawings, block diagram, etc. should be attached to the report if available)

Identification of the instrument (continued)

Application no.:	Type designation:
Identification no.:	Manufacturer:
Report date:		

Physical description of the instrument

Describe, using point form, the physical construction of the MDMI (materials, configuration and location of components, interfaces and communications ports). Attach photographs, diagrams or drawings if available:

Describe, using point form, the measurement technology used (include details such as physical contact method; laser class, power and wavelength; ultrasonic frequency; or camera spectrum):

General information concerning the type

Application no.: Manufacturer:

Type designation: Applicant:

Instrument category:

Parameter limits		
	Minimum	Maximum
Temperature limits (°C)		
Speed limitations (m/s)		
Voltage (V)		
Minimum spacing		/

Limitation	Check if applicable
Object	
Cuboidal	
Irregular	
Singulated	
Non-singulated, non-touching	
Touching	
Measurement dynamics	
Static measurement only	
Fixed Speed	
Variable Speed	
Unidirectional	
Bidirectional	
Installation	
Permanent	
Mobile	
Power Supply	
AC	
AC-DC converter	
Battery	
DC	

Evaluation period:

Date of report:

Observer:

General information concerning the type (continued)

Application no.: Manufacturer:

Type designation: Applicant:

Instrument category:

Scale Interval and limits of indication

Axis	Unit of measurement	Scale interval (d)	Minimum dimension	Maximum dimension
X				
Y				
Z				

Describe, using point form, each axis and its relation to the physical object being measured and/or the MDMI itself:

Use this space to describe, using point form, any other use or installation limitations not detailed in the above on the previous page (such as special applications other than postage, freight or storage; restrictions on object material, texture, reflectivity or colour; object positioning):

Use this space to indicate additional remarks and/or information: connecting equipment, interfaces, choice of the manufacturer regarding protection against disturbances, etc.

General information concerning the type (continued)

Application no.:	Manufacturer:
Type designation:	Applicant:
Instrument category:		

Indications and controls

Describe, using point form, all indications and controls of the instrument (such as wired or wireless communication with instrument; zero method; ready indication, computed quantities, error codes). Describe each measurement (L, W, and H) and its relation to the physical object being measured and/or the MDMI itself:

Sealing

Describe, using point form, the physical and electronic seals (e.g. audit trails) used to protect the metrological characteristics of the instrument, and how to access them. Also describe any remote access abilities available and how this is sealed:

Software

Describe, using point form, the means used to protect legally relevant software in the instrument and indicate the version of the software present at the time of testing and how to verify this version number:

Configuration for type evaluation

Application no.:	Type designation:
Report date:	Manufacturer:

Use this space for additional information relating to equipment configuration, interfaces, data rates, EMC protection options etc., for the instrument and/or simulator.

Selection of sample(s)

Application no.:

Type designation:

Report date:

Manufacturer:

Use this space for additional information relating to the justification for the selection of sample(s), in particular in case of a family of instruments or modules or if specific requirements are mentioned in OIML R 129-1 and -2.

Adjustments or modifications

Application no.:	Type designation:
Report date:	Manufacturer:

Use this space for additional information relating to the identification of any authorized and agreed upon adjustments or modifications made to the sample or samples during the evaluation.

Summary of test report(s)

Use the table below to summarize the test report(s) used to support the type evaluation:

Test Report Number	Issued by	Remarks*

* Use this column to record if the test report was issued:

- under the OIML Basic Certificate System, the OIML Mutual Acceptance Arrangement (MAA) or the OIML Certification System (OIML-CS) Scheme A or B. Where the test report was used as the basis for issuing an existing OIML Certificate, the relevant OIML Certificate Number should be noted.
- by a Manufacturer Test Laboratory (MTL).
- under the scope of ISO/IEC 17025 accreditation.

Appraisal of test data (where applicable)

Use this space to record the appraisal of test data:

Requirement	Check if yes	Remarks (provide information)
The correct method has been used		
Test data from acceptable testing facility		
Testing facility capable of performing the testing (accredited or peer assessed)		
The test report provided in OIML format		
Test performed against OIML R 129 (versions)		
Results acceptable for all the tests performed		
Further information/clarification needed		
Further testing to be performed		

If there is more than one test report, indicate in the remarks if the answers are not the same for all test reports by referring to test report number from previous table.

Corrective actions required

Issue identified	Details of corrective action required

Summary of the checklist

For each test, the “Summary of the checklist” below and the “Checklist” in clause 1 shall be completed according to this example:

	Passed	Failed
When the instrument has passed the test:	X	
When the instrument has failed the test:		X
When the test is not applicable:	/	/

Summary of the checklist:

Requirement	Passed	Failed	Remarks
Metrological requirements R 129-1 clause 4			
Technical requirements R 129-1 clause 5			
Additional requirements for software controlled multi-dimensional measuring instruments R 129-1 clause 6			
Test procedures R 129-2			
Overall result			

Application no.:	Type designation:
Report date:	Manufacturer:

Use this page to detail remarks from the summary of the checklist

Checklist

Report No:
 Application No:
 Manufacturer:
 Make and Model:
 Serial No:
 Date:
 Observer:

Requirement		Passed	Failed	Remarks
(R129-1)	Units of measurement			
3	Correct units and symbols used			
4.1.1	Scale intervals, minimum dimension			
	Correct minimum dimensions			
4.1.2	Value of mpe			
	mpe applicable to any of the three dimensions = $\pm 1.0 \underline{d}$			
4.1.3	Value of the fault limit			
	Value of one scale interval (d)			
4.1.4	Variation between indicators			
	No variation in indications			
4.1.5	Multi-interval instruments			
	Appropriate mpe for applicable range and axis			
4.1.6	Calculated quantities			
	Derived from displayed value of measured dimensions			
	Rounded to nearest applicable scale interval			
4.2.1	Range of special temperature limits			
	At least 30 °C			
5.1.1	Fraudulent use			
	Instrument shall not facilitate fraudulent use			
5.1.2	Suitability of construction			
	All controls, indicators etc. are suitable			
5.1.3	Suitability for use			
	Suit the method of operation and objects			
5.1.4	Suitability for verification			
	Constructed so that test of performance requirements can be carried out			
	Test mode provided (only volume indicated in normal position)			
5.1.5	Zero or Ready Adjustment			
	Facilitates for zero or ready condition			
	Can only be set with no object in the measurement area.			
	Zero or Ready condition indicated.			
	Condition set automatically or inhibited if not set correctly			
5.1.6	Tare Device			
5.1.6 (a)	Only operates negatively with respect to the zero or ready condition.			
5.1.6 (b)	Value of the tare scale interval is the same as that for the respective axis and range.			
5.1.6 (c)	Operation of tare indicated.			

Checklist (continued)

Requirement		Passed	Failed	Remarks
5.2.1	Indicators and printing devices			
5.2.1 (a)	Instrument has at least one indicator which displays dimensions or volume.			
5.2.1 (b)	Device to transmit, store and preserve measurement results			
5.2.1 (c)	Indications automatically displayed or are readily available.			
5.2.1 (d)	Other indications (e.g. DW, F0) are automatically displayed or are readily available			
5.2.1 (e)	Previously displayed indication persist long enough for easy reading by observer.			
5.2.1 (f)	Indication clearly assignable to a specific object			
5.2.1 (g)	Display of extended indication device:			
	– while pressing a key; or			
	– limited to 5 seconds			
	Printing and data transmission restricted in extended indication			
5.2.1 (h)	Extended indication device not fitted to instrument for direct sales to public.			
5.2.1 (i)	All indications are identified			
5.2.2	Clarity of indications			
	Indications, printing reliable, clear and unambiguous and printing indelible			
	Figures easy to read			
	Digital indicator stable at changeover point			
	Digits oriented normally and permit reading by simple juxtaposition.			
5.2.3	Units of measurement			
	All indications include the name/symbol of the unit of measurement			
	On tickets, name or symbol printed by printer or pre-printed			
	For any one indication, only one unit of measurement used.			
5.2.4	Value of Scale interval			
	Value of Scale interval in the form 1, 2 or 5 $\times 10^n$			
	The scale interval shall be:			
5.2.4 (a)	– the same for each axis; or			
5.2.4 (b)	– different for one axis from the other provided instructions are marked, or indication of incorrect use given; OR			
5.2.4 (c)	– variable, on one or more axes provided:			
	– All three axes are multi-interval - all the same			
	– two axes are multi-interval and the third is fixed. – instrument limitations are clearly marked.			
	– one axis is multi-interval and the others are fixed. – instrument limitations are clearly marked.			
5.2.5	Decimal numbers			
	At least one zero before decimal mark for values <1.			
	Decimal mark printed.			
	One or more fixed zeros to the right of variable numbers for values >1.			
	Printed numbers and symbols at least 2 mm high.			
5.2.6	Limits of Indication			
	Dimensions above maximum + 9 d either:			
5.2.6 (a)	– blank; or			
5.2.6 (b)	– be identified by an obvious difference in the display.			
5.2.7	Multi-interval instruments			
5.2.7	For each partial measuring range:			
5.2.7 (a)	– $d_1 < d_2 < \dots < d_n$;			
5.2.7 (b)	– Min = Min ₁ , Max = Max _r , Max ₁ = Min ₂ etc.			
5.2.8	Multi-instrument systems			
5.2.8	Indications on common indicator and test indicator agree.			
	Indication from each device clearly identified on the common indicator.			

Checklist (continued)

Requirement		Passed	Failed	Remarks
5.2.9	Printed and displayed information			
	Ticket or display includes sufficient information			
	Examples:			
5.2.9.1 (a)	– dimensions: length (<i>L</i>), width (<i>W</i>) and height (<i>H</i>)			
5.2.9.1 (b)	– date, transaction number etc.			
5.2.9.1 (c)	– volume (<i>V</i>)			
5.2.9.1 (d)	– weight (<i>W_t</i>)			
5.2.9.1 (e)	– dimensional weight (<i>DW</i>kg)			
5.2.9.1 (f)	– dimensional tare (<i>DT</i>kg) or linear tare (<i>LT</i>cm)			
5.2.9.1 (g)	– conversion factor (<i>F</i>)			
5.2.9.1 (h)	– quantity for charging			
5.2.9.1 (i)	– price rate and price			
Note 1	Icons used			
Note 2	Information displayed or available on demand			
Note 3	Price interval and price rate comply with national regulations			
5.2.9.2	A printed ticket contains printed or pre-printed notices stating:			
5.2.9.2 (a)	– dimensions and/or volume are those of the smallest rectangular box			
5.2.9.2 (b)	– dimensional weight is a calculated value			
5.3.1	Markings			
	Instrument or descriptive nameplate permanently affixed to the instrument, permanently and clearly marked and clearly visible at all times			
	Nameplate contains the following information			
5.3.1 (a)	– manufacturer's name or mark			
5.3.1 (b)	– model designation			
5.3.1 (c)	– serial number and year of manufacture			
5.3.1 (d)	– pattern approval mark			
5.3.1 (e)	– minimum and maximum dimensions for each axis			
5.3.1 (f)	– maximum and minimum measuring speeds			
5.3.1 (g)	– scale interval(s) in the form of <i>d</i> =			
5.3.1 (h)	– temperature limits (if other than $-10\text{ }^{\circ}\text{C}$ to $40\text{ }^{\circ}\text{C}$)			
5.3.2	Notices			
	Notice(s) or limitation(s) of use clearly marked and visible to the operator, or in operator's manual			
5.3.2 (a)	Special application.			
5.3.2 (b)	Minimum spacing			
5.3.2 (c)	Measure only rectangular boxes			
5.3.2 (d)	Box location			
5.3.2 (e)	Limitations of surface characteristics			
	Other special notices relating to the instrument.			
5.4.1	Verification Mark			
	Provision made for the application of a verification mark			
	The following requirements apply:			
5.4.1 (a)	mark easily affixed without affecting the metrological properties			
5.4.1 (b)	mark visible without moving or dismantling instrument when in use.			
5.4.1 (c)	the part on which the mark is located is not removable from the instrument without damaging the mark			
5.4.1 (d)	the size of the space sufficient for a mark (e.g. at least 200 mm^2)			

Checklist (continued)

Requirement		Passed	Failed	Remarks
5.4.2	Sealing			
	Provision made for sealing by mechanical or electronic means			
	Mechanical seal applied			
	For electronic seals:			
5.4.2 (a)	– access by authorised persons protected by physical key or password.			
5.4.2 (b)	– access to alter parameters automatically recorded.			
5.4.2 (c)	– record readily accessible by simple action			
5.4.2 (d)	– record readily identifiable.			
5.4.2 (e)	– reference record permanently marked on the instrument			
5.4.2 (f)	– record does not repeat in a sequence of less than 999 alterations			
	– record persists reliably for a period of at least two years.			
5.4.2 (g)	– record persists through tests for influence factors and disturbances.			
5.5.2	Ancillary devices interface			
	Interface does not allow metrological functions to be affected by the operation of the ancillary devices or connected instruments or disturbances acting on the interface.			
	Interface sealed if instructions or data affecting the measurement result can be introduced through the interface.			
5.6.1	Acting upon significant faults			
	Instrument made automatically inoperative; or			
	visible or audible indication until user takes action or fault disappears			
	Automatic instrument made inoperative automatically			
5.6.2	Indication Check			
	Display check needed			
	Display check not needed			
	All elements of the indication are active and non-active long enough to be checked by the operator.			
R 129-2, clause 1.1	Documentation			
	Submission accompanied by sufficient documentation, to ensure complete understanding of the construction and method of operation of the instrument including:			
	– drawings			
	– specifications			
	– photographs			
	– descriptions			
	Details of the measurement data contained in the memory and calculation methods provided			
	For electronic instruments, documentation includes:			
	– list of all electronic sub-assemblies with their essential characteristics			
	– description of electronic devices with drawings, diagrams and general software information explaining their construction and operation			

RESULT

PASS

FAIL

Use this page to detail remarks from the checklist