



Fourth Committee Draft (4CD)

Project: Revision of OIML R 129:2000

Title: Multi-dimensional Measuring Instruments
Part 4 – Type evaluation report format

Date: 20 December 2019

Document number: TC7_SC5_P1_N045 (clean)

Supersedes document:

Project Group: TC 7/SC 5/p 1

Convenership: Australia and Canada

INTERNATIONAL **OIML R 129-4**
RECOMMENDATION Edition 202x (E)

Multi-dimensional Measuring Instruments
Part 4: Type evaluation report format

Instruments de mesure multidimensionnels

Partie 4: Format du rapport d'évaluation de type



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Foreword

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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 and will be submitted to the International Conference of Legal Metrology in 202x for formal sanction.

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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.

Type evaluation report**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	Maximum permissible error
V	The volume indicated on the instrument
V_{calc}	$L \times W \times H$
F	Conversion factor
DW	The dimensional weight indicated on the instrument
DW_{calc}	$V \times F$
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	Serial no.
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Simulator documentation (if applicable)

System or module name	Drawing number or software reference	Issue level	Serial no.
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

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 xxx-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 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.

Summary of appraisal of test data (where applicable)

Use this space to record the appraisal of test data [reference OIML-CS PD-05 and PD-07]:

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

1 Checklist

Application no.:

Type designation:

Requirement		Passed	Failed	Remarks
(R129-1)	Units of measurement			
3	Correct units and symbols used			
4.1	Scale intervals, minimum dimension			
	Correct minimum dimensions			
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.			
5.2.1	Indicators and printing devices			
5.2.1 (a)	Instrument has atleast 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 (eg. 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.			

Checklist (continued)

Requirement		Passed	Failed	Remarks
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 preprinted 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 x 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			
	Atleast 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 + 9d 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			
	For each partial measuring range:			
	5.2.7 (a) - d ₁ <d ₂ <.....<d _n ; 5.2.7 (b) - min = min ₁ , max = max _r , max ₁ = min ₂ etc.			
5.2.8	Multi-instrument systems			
	Indications on common indicator and test indicator agree. Indication from each device clearly identified on the common indicator.			
5.2.9	Printed and displayed information			
	Ticket or display includes sufficient information			
	Examples:			
5.2.9.1 (a)	- dimensions: length (L), width (W) and height (H)			
5.2.9.1 (b)	- date, transaction number etc.			
5.2.9.1 (c)	- volume (V)			
5.2.9.1 (d)	- weight (W)			
5.2.9.1 (e)	- dimensional weight (DW.....kg)			
5.2.9.1 (f)	- dimensional tare (DT.....kg) or linear tare (LT.....cm)			
5.2.9.1 (g)	- conversion factor (F)			
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 preprinted 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			

Checklist (continued)

Requirement		Passed	Failed	Remarks
	Markings			
5.3.1	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 $d =$			
5.3.1 (h)	- temperature limits (if other than -10°C to 40°C)			
	Notices			
5.3.2	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.			
	Verification Mark			
5.4.1	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)			
	Sealing			
5.4.1	Provision made for sealing by mechanical or electronic means			
	Mechanical seal applied as in 9.1			
	For electronic seals:			
5.4.1 (a)	- access by authorised persons protected by physical key or password.			
5.4.1 (b)	- access to alter parameters automatically recorded.			
5.4.1 (c)	- record readily accessible by simple action			
5.4.1 (d)	- record readily identifiable.			
5.4.1 (e)	- reference record permanently marked on the instrument			
5.4.1 (f)	- record does not repeat in a sequence of less than 999 alterations			
	- record persists reliably for a period of at least two years.			
5.4.1 (g)	- record persists through tests for influence factors and disturbances.			

Checklist (continued)

Requirement	Passed	Failed	Remarks
5.5.2	Auxillary devices interface		
	Interface does not allow metrological functions to be affected by the operation of the auxillary 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 <input type="checkbox"/>
			FAIL <input type="checkbox"/>

Use this page to detail remarks from the checklist