

DRAFT  
RECOMMENDATION

**DR 5**  
**(Inf.)**

13th OIML Conference

Sydney 2008 (Item 4.1.2)

INFORMATION

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**New Recommendation**

Procedure for calibration and verification of the main  
characteristics of thermographic instruments

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*Results of the postal ballot and comments received*



ORGANISATION INTERNATIONALE  
DE MÉTROLOGIE LÉGALE

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INTERNATIONAL ORGANIZATION  
OF LEGAL METROLOGY

**Project Number 42 (Procedure for calibration and verification of the main characteristics of thermographic instruments)**

**Deadline: 2008-05-05**

SLOVENIA voted **No** (Comments)

ALBANIA voted **Yes**

AUSTRIA voted **Yes**

BELARUS voted **Yes**

BRAZIL voted **Yes**

CANADA voted **Yes**

CYPRUS voted **Yes**

CZECH REPUBLIC voted **Yes**

DENMARK voted **Yes**

GERMANY voted **Yes**

IRAN voted **Yes**

JAPAN voted **Yes** (Comments)

KAZAKHSTAN voted **Yes** (Comments)

KOREA (R.) voted **Yes**

NETHERLANDS voted **Yes**

NEW ZEALAND voted **Yes**

P.R. CHINA voted **Yes**

POLAND voted **Yes**

PORTUGAL voted **Yes**

ROMANIA voted **Yes**

SAUDI ARABIA voted **Yes**

SERBIA voted **Yes**

SLOVAKIA voted **Yes**

SOUTH AFRICA voted **Yes**

SWEDEN voted **Yes**

SWITZERLAND voted **Yes**

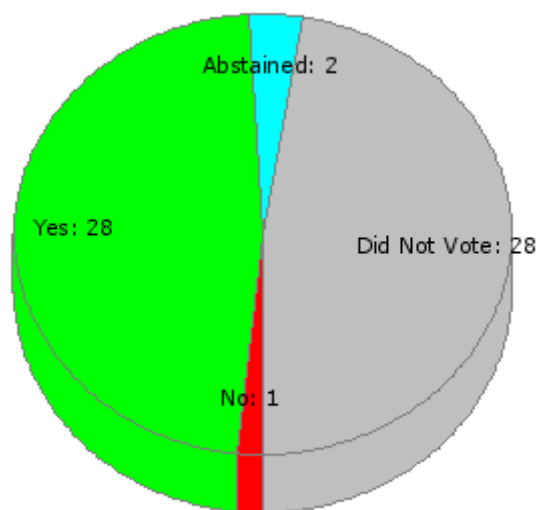
TUNISIA voted **Yes**

UNITED KINGDOM voted **Yes** (Comments)

UNITED STATES voted **Yes**

FINLAND Abstained

VIET NAM Abstained



**Countries who did not vote (28)**

ALGERIA, AUSTRALIA, BELGIUM, BULGARIA, CAMEROON, CROATIA, CUBA, EGYPT, ETHIOPIA, FRANCE, GREECE, HUNGARY, INDIA, INDONESIA, IRELAND, ISRAEL, ITALY, KENYA, MACEDONIA (F.Y.R.), MONACO, MOROCCO, NORWAY, PAKISTAN, RUSSIAN FEDERATION, SPAIN, SRI LANKA, TANZANIA, TURKEY.

## **Background**

According to the decision of the 42nd CIML Meeting held in Shanghai, the new OIML Recommendation "Procedure for calibration and verification of the main characteristics of thermographic instruments" has been submitted to CIML Direct Online Approval.

Unfortunately, only 31 votes, including a negative vote, were cast where the OIML Directives for the Technical Work request 40 positive votes and no negative votes to approve this Recommendation.

Therefore, this publication is submitted for Direct Sanction by the Conference.

## **Comments received from Slovenia**

As a member of ISO/TC 121/SC 3 /JWG 8 Clinical thermometer, with the task of development an ISO/IEC standard for clinical thermometers, which will be later adopted by the OIML, we discussed in December 2005 the topic of development of ISO/IEC standards for medical thermal imagers. Since there was not unanimous decision, in which way to proceed with such a standard, Prof. dr. John Headly Whyte from Harvard medical school gathered a small group of people particularly interested in development of standard for medical thermal imagers. The way this group proceeded with the development of standard was very strange and quick. Therefore some reactions were cause by experts and institutions (see attached files). It seems that ISO/IEC standard for medical thermal imagers will not be ready soon.

Obviously the lack of technical information motivated OIML people to develop their own recommendation on thermal imagers. In my opinion there is a need to determine some important characteristics of thermal imagers and manners of their verification or calibration. The status of suggested document is not acceptable from the technical point of view. It shall be discussed by the manufacturers, experts and experienced users so that requirements will be appropriate (cover all important aspects of thermal imagers) and procedure for checking the requirements feasible. At present this document is completely unacceptable as an OIML recommendation.

*BIML note: For information, Slovenia cast a negative vote on this new publication even though Slovenia is not a P-Member nor an O-Member of the Subcommittee (TC 11/SC 3) that drew up this new OIML Recommendation*

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<i>Country</i>	<i>Clause</i>	<i>Comments</i>	<i>Secretariat's answer</i>
<b>Japan</b>	5.4.3	"... the threshold of temperature sensitivity more than 6 times.": should be replaced by "the threshold of temperature sensitivity which is given in technical documents or manuals by the manufacturer"	Rejected. Determination of the number of defective elements is carried out for a concrete tested device.
	5.9.5	Equation (10) should be removed and non-uniformity should be assessed using a standard deviation of the effective elements on a field.	Rejected. Standard deviation characterizes noise, but not sensitivity nonuniformity in the field.
<b>Kazakhstan</b>	Table 1	Add the following procedures: verification of insulating strength and verification of insulation resistance at initial verification	Rejected. These characteristics are not metrological characteristics of measuring thermographic instruments.
		Add word "/calibration" after the word "verification" in title of column 3	Accepted
	5.2 – 5.11	Items 5.2 – 5.11 should be stated in the separate part "Conduction of verification and/or calibration procedures"	Rejected.
	-	To include the issue "Safety requirements"	This comment is not clear.
	-	For the calibration procedure it is necessary to include part of "Calculation of measurement uncertainty"	As there are many methods for the realization of what is recommended in this draft recommendation, we suggest using "The Guide to the Expression of Uncertainty in Measurement, Geneva, International Organisation for Standardisation, 1993» and documents developed by CCT-WG5 on radiation thermometry «Uncertainty budgets for realization of scales by radiation thermometry» 2003, «Uncertainty budgets for Calibration of radiation thermometers Below Silver Point» 2008.
<b>United Kingdom</b>	2.1	the term 'shooting parameters' should be changed to 'influencing parameters', or similar.	Accepted
	2.11	This sentence is not clear. In particular, what is meant by 'radiator thermogram fragments'? Are these elements of the thermogram or portions of the standard radiator?	changed to thermogram fragments of a standard large aperture radiator

<i>Country</i>	<i>Clause</i>	<i>Comments</i>	<i>Secretariat's answer</i>
	3 and 5	it is also necessary to investigate the influence of the size of the standard radiator on the temperatures measured by the thermographic instrument (the 'size-of-source effect'). This needs to be included.	Influence of the size of the standard radiator is estimated taking into account the spatial (angular) resolution of the thermographic instrument under verification.
	5.1.2	the items used for calibration of the thermographic instrument (in particular, the standard blackbody radiator) are required to have been calibrated traceable to national standards. This needs to be explicitly stated.	Relevant verification or certification documents imply traceability to national standards
	5	for some of the investigations (in particular, checking the range and accuracy of the radiation temperature measurement (5.8), determination of sensitivity to non-uniformity in the field (5.9), checking the influence of environmental conditions (5.10) and determination of the short term repeatability of the readings (5.11)) it will be necessary to determine the measurement uncertainty for the parameters measured. This is not stated anywhere in this section (although there are columns for measurement uncertainty in some of the tables in Annex D), nor how to estimate the measurement uncertainty (for example, guidance in identifying some of the components that will need to be included).	As there are many methods for the realization of what is recommended in this draft recommendation, we suggest using "The Guide to the Expression of Uncertainty in Measurement, Geneva, International Organisation for Standardisation, 1993» and documents developed by CCT-WG5 on radiation thermometry «Uncertainty budgets for realization of scales by radiation thermometry» 2003, «Uncertainty budgets for Calibration of radiation thermometers Below Silver Point» 2008.
	5	there needs to be a procedure describing the investigation of the influence of the size of the radiance source on the temperatures measured by the thermographic instrument (the 'size-of-source effect').	the investigation of the influence of the 'size-of-source effect' are given in 2.9 and 5.7, determination of spatial (angular) resolution
	5.6.2.6, 5.7.2.9	the term 'Passport' should be replaced by 'certificate' or similar.	Accepted
	5.7.3.2	the end of this section could usefully be re-worded to match the end of section 5.7.2.9, i.e. '...or certificate of the thermographic instrument, for a specified value of the slit contrast'.	Accepted

<i>Country</i>	<i>Clause</i>	<i>Comments</i>	<i>Secretariat's answer</i>
	5.8.2, 5.10.3	it is not clear what is meant by the phrase 'taking into account its radiation capacity and the temperature of the background radiation'. In particular what is the 'radiation capacity'? Also, there is no guidance on how these factors are to be taken into account.	changed to 'taking into account its emissivity and the temperature of the background radiation'
	5.9.3	I suggest rewording this: 'The emitting surface of the standard radiator is positioned successively within at least five different areas of the thermogram.....'	Accepted
	5.11	this describes the short term repeatability of the instrument readings. There is no mention of determining the longer term repeatability of the readings (e.g. over a few hours or a day). Is this required?	We consider that it is not expedient to check the repeatability during such large period of time.
	Annex C	the term should be 'line spread function' rather than 'spread function line'.	Accepted