

This is a preview - click here to buy the full publication



IEC/TS 62492-2

Edition 1.0 2013-04

TECHNICAL SPECIFICATION



**Industrial process control devices – Radiation thermometers –
Part 2: Determination of the technical data for radiation thermometers**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

U

ICS 17.200.20; 25.040.40

ISBN 978-2-83220-737-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms, definitions and abbreviations	6
3.1 Terms and definitions	6
3.2 Abbreviations	9
4 Measurement conditions.....	9
5 Determination of technical data	9
5.1 Measuring temperature range.....	9
5.1.1 General	9
5.1.2 Test method	10
5.2 Measurement uncertainty	10
5.2.1 General	10
5.2.2 Test method	10
5.3 Noise equivalent temperature difference (NETD).....	11
5.3.1 General	11
5.3.2 Test method	11
5.4 Measuring distance	12
5.5 Field-of-view (target size).....	12
5.5.1 General	12
5.5.2 Test method	13
5.6 Distance ratio	14
5.7 Size-of-source effect (SSE)	14
5.7.1 General	14
5.7.2 Test method	14
5.8 Emissivity setting	15
5.9 Spectral range.....	15
5.10 Influence of the internal instrument or ambient temperature (temperature parameter)	15
5.10.1 General	15
5.10.2 Test method	16
5.11 Influence of air humidity (humidity parameter)	17
5.12 Long-term stability.....	17
5.12.1 General	17
5.12.2 Test method	17
5.13 Short-term stability	18
5.13.1 General	18
5.13.2 Test method	18
5.14 Repeatability	18
5.14.1 General	18
5.14.2 Test method	19
5.15 Interchangeability.....	19
5.15.1 General	19
5.15.2 Test method	19
5.16 Response time	20
5.16.1 General	20
5.16.2 Test method	21

5.17	Exposure time	22
5.17.1	General	22
5.17.2	Test method	23
5.18	Warm-up time.....	24
5.18.1	General	24
5.18.2	Test method	24
5.19	Operating temperature and air humidity range	25
5.19.1	General	25
5.19.2	Test method	25
5.20	Storage and transport temperature and air humidity range	26
5.20.1	General	26
5.20.2	Test method	26
6	Safety requirement	27
Annex A (informative) Change in indicated temperature of a radiation thermometer corresponding to a change in the radiation exchange.....		28
Bibliography.....		29
Figure 1 – Relative signal to a signal at a defined aperture size (source size) of 100 mm in diameter for two infrared radiation thermometers A and B versus the source diameter		12
Figure 2 – Demonstration of the response time to a rising temperature step		20
Figure 3 – Possible arrangement for determining the response time with two reference sources.....		22
Figure 4 – Demonstration of the exposure time		22
Figure 5 – Example of warm-up time		25
Table A.1 – The change in indicated temperature corresponding to a 1 % change in the radiation exchange with a radiation thermometer at 23 °C (Example).....		28

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL PROCESS CONTROL DEVICES – RADIATION THERMOMETERS –

Part 2: Determination of the technical data for radiation thermometers

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62492-2, which is a technical specification, has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
65B/844/DTS	65B/859/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62492 series, published under the general title *Industrial process control devices – Radiation thermometers*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International Standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INDUSTRIAL PROCESS CONTROL DEVICES – RADIATION THERMOMETERS –

Part 2: Determination of the technical data for radiation thermometers

1 Scope

This part of IEC 62492, which is a Technical Specification, applies to radiation thermometry and addresses all technical data specified in IEC/TS 62492-1. It defines standard test methods which can be used by the end user of radiation thermometers to determine or confirm the fundamental metrological data of radiation thermometers with one wavelength range and one measurement field.

The purpose of this specification is to facilitate comparability and testability. Therefore, unambiguous test methods are stipulated for determining technical data, under standardised measuring conditions that can be performed by a sufficiently skilled end user to serve as standard performance criteria for instrument evaluation or selection.

It is not compulsory for manufacturers and sellers of radiation thermometers to include all technical data given in this document in the data sheets for a specific type of radiation thermometer. Only the relevant data should be stated and should comply with this specification and IEC/TS 62492-1.

NOTE Infrared ear thermometers are excluded from this Technical Specification.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC/TS 62492-1:2008, *Industrial process control devices – Radiation thermometers – Part 1: Technical data for radiation thermometers*