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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Industrial platinum resistance thermometers and platinum temperature sensors

Thermomètres à résistance de platine industriels et capteurs thermométriques en platine

IEC 60751:2008

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INDUSTRIAL PLATINUM RESISTANCE THERMOMETERS AND PLATINUM TEMPERATURE SENSORS

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.
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International Standard IEC 60751 has been prepared by subcommittee 65B: Devices and process analysis, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 1983, amendment 1 (1986) and amendment 2 (1995). This edition constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

While the temperature/resistance relationship in 4.2 remains unchanged, there are several changes in the other chapters. Most important are:

– tolerance classes follow a new scheme;
– tolerance acceptance test is included;
– hysteresis test is included;
– several changes in the individual tests;
– appendices are deleted.

The text of this standard is based on the following documents:

FDIS	Report on voting
65B/664/FDIS	65B/683/RVD

Full information on the voting for the approval of this standard 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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INDUSTRIAL PLATINUM RESISTANCE THERMOMETERS AND PLATINUM TEMPERATURE SENSORS

1 Scope

This standard specifies the requirements and temperature/resistance relationship for industrial platinum resistance temperature sensors later referred to as “platinum resistors” or "resistors" and industrial platinum resistance thermometers later referred to as "thermometers" whose electrical resistance is a defined function of temperature.

The International Standard applies to platinum resistors whose temperature coefficient α, defined as

$$\alpha = \frac{R_{100} - R_0}{R_0 \cdot 100\,°\mathrm{C}}$$

is conventionally written as α = 3.851 x 10^{-3} °C^{-1}, where R_{100} is the resistance at t = 100 °C and R_0 is the resistance at t = 0 °C.

Values of temperature in this standard are in terms of the International Temperature Scale of 1990, ITS-90. Temperatures in degrees Celsius are denoted by the symbol t, except in Table 1 where the full nomenclature t_{90}/°C is used.

The standard covers resistors or thermometers for all or part of the temperature range -200 °C to +850 °C with different tolerance classes, which may cover restricted temperature ranges.

For temperature/resistance relationships with uncertainties <0,1 °C, which are possible only for resistors or thermometers with exceptionally high stability and individual calibration, a more complex interpolation equation than is presented in this standard may be necessary. The specification of such equations is outside the scope of this standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:.

IEC 61152, *Dimensions of metal-sheathed thermometer elements*

IEC 61298-1, *Process Measurement and Control devices – General Methods and Procedures for Evaluating Performance – Part 1: General considerations*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
dielectric strength
maximum voltage between all parts of the electric circuit and the sheath of the thermometer or, in the case of a thermometer with two or more sensing circuits, between two individual