INTERNATIONAL STANDARD

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**AMENDMENT 1**
2008-07-15

# Road vehicles — Measurement techniques in impact tests — Instrumentation

## AMENDMENT 1

*Véhicules routiers — Techniques de mesurage lors des essais de chocs — Instrumentation*

*AMENDEMENT 1*



Reference number
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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to ISO 6487:2002 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

## Introduction

On the basis of studies carried out by technical experts, no significant difference has been identified between the characteristics of the load transducer when measuring using static as opposed to dynamic calibration methods. This Amendment helps to define the dynamic calibration method for force and moment data channels, in accordance with the current knowledge base and studies available.

The temperature of the anthropomorphic test device (ATD) used in a collision test needs to be monitored to confirm that it has been used within the acceptable temperature range prescribed for the whole ATD or body segment. The objective is to prevent temperature from being a variable that will influence the ATD response. The actual ATD temperature can be influenced by various factors, including ambient air, high-speed photography lighting, sunshine, heat dissipation from transducers and ATD in-board data acquisition systems. In order to respond to these objectives, this Amendment specifies the performance requirements for the ATD temperature measurement.

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## AMENDMENT 1

*Page 1, Clause 2*

Add the following to the list of normative references.

ISO/TR 27957, *Road vehicles — Temperature measurement in anthropomorphic test devices — Definition of the temperature sensor locations*

*Page 5, 4.6.2.3.2*

Replace the existing subclause with the following two subclauses.



**4.6.2.3.2 Forces and moments**

Static calibration is a sufficient method for the calibration of force and moment data channels and can therefore be used to determine transducer sensitivity.



**4.6.2.3.3 Displacements**

A method for the evaluation of the dynamic response during the calibration of data channels for displacement has not been included in this International Standard, since no satisfactory method is known at present. The problem is to be reconsidered at a later date.

*Page 6*

Add the following new subclause after 4.10.

### 4.11 ATD temperature measurement

Measurements shall be recorded at a rate of one reading per minute. The minimum measurement range shall be from 10 °C to 40 °C. The location of the measurement probe shall be in accordance with ISO/TR 27957.

The accuracy tolerance of the complete measurement chain shall be three times narrower than the temperature tolerance specified for the ATD.

EXAMPLE For a Hybrid III, the specified temperature span is from 20,6 °C to 22,2 °C, which corresponds to a tolerance of ± 0,8 °C; the accuracy tolerance for the temperature measurement would then be ± 0,26 °C.

The error contribution of the transducer, extension wire (if applicable) and data acquisition equipment shall be taken into account.

Dynamic response: after a temperature step, the transducer shall indicate 90 % of the new value within one minute.

The measurements shall be carried out in accordance with recognized standards (see Annex C).

*Page 11*

Add the following new annex after Annex B.

# Annex C
(informative)

# Temperature measurement systems

Notes and references on most common temperature measurement systems are as described below.

— **Thermocouples** Accuracy tolerances of the various thermocouple types are specified in IEC 60584, ISA MC 96.1-1982, or equivalent standards. Tolerances are specified for the thermocouple element as well as for any extension wire used. Thermocouples and extension wires having a better accuracy tolerance than the “standard” products are available from manufacturers; calibration within a limited temperature range, which results in narrower tolerances, is also available. The accuracy of the whole measurement chain should be verified before use. Periodic calibration should be done, as it will change with time and use.

— **Thermistors** Thermistors are sensitive to small temperature changes and can be made in small sizes. The most common type is the negative temperature coefficient (NTC) thermistor. This type of sensor will dissipate a small amount of heat; the user should verify that this self-heating characteristic does not produce errors depending on the sensor location. Temperature/resistance characteristics are provided by each supplier.



NOTE ASTM E879-01 provides specifications, even though it is directed to clinical applications.



— **Platinum resistance thermometers** These are part of the resistance temperature detector (RTD) family. The sensitivity of these sensors is generally stable with time. Since the resistance value of the sensor is low, the contribution of the wires to the total resistance value should be compensated. This type of sensor will dissipate a small amount of heat; the user should verify that this self-heating characteristic does not produce errors depending on the sensor location. Main specifications, as well as temperature/resistance relations, are provided in IEC 60751, ASTM E1137/E1137M-04, or equivalent standards.

*Page 12, Bibliography*

Add the following to the list of bibliographical references.

[5] IEC 60584-2, *Thermocouples — Part 2: Tolerances*

[6] IEC 60584-3, *Thermocouples — Part 3: Extension and compensating cables — Tolerances and identification system*

[7] ISA MC 96.1-1982, *Temperature measurement thermocouples*

[8] ASTM E879-01, *Standard specification for thermistor sensors for clinical laboratory temperature measurements*

[9] IEC 60751, *Industrial platinum resistance thermometer sensors*

[10] ASTM E1137/E1137M-04, *Standard specification for industrial platinum resistance thermometers*

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