
**Road vehicles — Design and
performance specifications for
the WorldSID 50th percentile male
side-impact dummy —**

Part 1:

Terminology and rationale

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*Véhicules routiers — Conception et spécifications de performance pour
le mannequin mondial (WorldSID), 50^e percentile homme, de choc
latéral —*

ISO 15830-1:2005
Partie 1. Terminologie et raisonnement

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

ISO 15830-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

ISO 15830 consists of the following parts, under the general title *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side impact dummy*.

- *Part 1: Terminology and rationale*
- *Part 2: Mechanical subsystems*
- *Part 3: Electronic subsystems*
- *Part 4: User's manual*

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Introduction

This first edition of ISO 15830 (all parts) has been prepared on the basis of the existing design, specifications and performance of the WorldSID 50th percentile adult male (PAM) side impact dummy. The purpose of ISO 15830 is to document the design and specifications of this side impact dummy in a form suitable and intended for worldwide regulatory use.

In 1997, ISO/TC22/SC12 initiated the WorldSID 50th PAM dummy development, with the aims of defining a global-consensus side impact dummy, having a wider range of human-like anthropometry, biofidelity and injury monitoring capabilities, suitable for regulatory use. Participating in the development were research institutes, dummy and instrumentation manufacturers, governments, and vehicle manufacturers from around the world.

With regard to potential regulatory, consumer information or research, and development use of ISO 15830, users will need to identify which of the permissive (i.e. optional) sensors and other elements defined in Part 3 are to be used in a given application.

In order to apply ISO 15830 properly, it is important that all four parts be used together.

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Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy —

Part 1: Terminology and rationale

1 Scope

This part of ISO 15830 provides the definitions, symbols and rationale used in all parts of this International Standard for the WorldSID 50th percentile side impact dummy, a standard anthropomorphic dummy for side impact testing of road vehicles. It is applicable to impact tests involving:

- passenger vehicles of category M1 and goods vehicles of category N1,
- impacts to the side of the vehicle structure, and
- impact tests involving use of an anthropomorphic dummy as a human surrogate for purpose of evaluating compliance with vehicle safety standards.

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.

ISO 1207, *Slotted cheese head screws — Product grade A*

ISO 4026, *Hexagon socket set screws with flat point*

ISO 4027, *Hexagon socket set screws with cone point*

ISO 4029, *Hexagon socket set screws with cup point*

ISO 4762, *Hexagon socket head cap screws*

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

ISO 7379, *Hexagon socket head shoulder screws*

ISO 7380, *Hexagon socket button head screws*

ISO/TR 9790:1999, *Road vehicles — Anthropomorphic side impact dummy — Lateral impact response requirements to assess the biofidelity of the dummy*

ISO 10642, *Hexagon socket countersunk head screws*

SAE J211-1:2003, *Instrumentation for impact test – Part 1: Electronic instrumentation*

3 Terms and definitions

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

- 3.1**
1-to-2-G-setting
joint friction setting which will support the weight of a horizontally extended limb segment but will not support twice the limb segment weight
- 3.2**
abdomen rib
lowest two ribs of the six mechanical ribs in the WorldSID dummy
- 3.3**
aluminium honeycomb
manufactured material comprising multi-layered bonded sheets of aluminium bent or corrugated in a rib pattern, in which there is an internal pattern of hexagonal cylindrical spaces, and which is used in this International Standard as an energy-absorbing element in certification tests
- 3.4**
capacity
maximum force or moment which can be measured by a load cell without causing load cell damage
- 3.5**
certification
process by which the relevant dummy component or whole dummy is verified and documented to meet the specifications
- 3.6**
cheese screw
slotted button head screw, also referred to as a slotted cheese head screw as defined by ISO 1207
- 3.7**
docking station
data recorder connection point inside the dummy which allows the recorder to be conveniently disconnected from the sensors
- 3.8**
full arm
assembly of the WorldSID dummy comprising the articulated upper arm and lower arm including hand
- 3.9**
frontal
forward facing or anterior surfaces of the dummy, when it is in a standing posture
- 3.10**
H-point
a point on the outer surface of the dummy on an imaginary line which passes through the left and right hip ball centres
- 3.11**
H-point tool
device which can be inserted into index holes in the dummy pelvis, which provides an external surface for indicating the orientation of the pelvis, and an imaginary line connecting the left and right hip ball joint centres
- 3.12**
half arm
assembly of the WorldSID dummy comprising dedicated upper arm components which are different from the components of the full arm

3.13**head form**

mechanical device with the same mass and I_{xx} inertia as the WorldSID head, used for lateral neck certification tests

3.14**infrared telescoping rod for assessment of chest compression****IR-TRACC**

sensor for deflection measurements

3.15**lower leg**

portion of the lower extremity between the knee and the ankle

3.16**mass replacement**

non-electronic component which is substituted for a given dummy electronic component, which has the same mass as the given electronic component and which does not act as a structural component of the dummy (e.g. an accelerometer)

3.17**rigid seat**

specialized seat with defined seat bottom and seat back angles used to position the dummy for impact testing

3.18**shoulder rib**

upper-most rib of the six mechanical ribs in the WorldSID dummy

3.19**structural replacement**

non-electronic component which is substituted for a given dummy electronic component (e.g. a load cell), which has the same mass as the given component and which also acts as a structural component of the dummy

3.20**thoracic rib**

second, third and fourth upper-most ribs of the six mechanical ribs in the WorldSID dummy

3.21**T1**

location corresponding to the first thoracic vertebra in a human

3.22**T4**

location corresponding to the fourth thoracic vertebra in a human

3.23**T12**

location corresponding to the twelfth thoracic vertebra in a human

3.24**tilt sensor**

sensor internal to the dummy which transduces the two orientation angles of the respective body region relative to gravity

3.25**universal**

capable of being mounted at several different locations on the dummy