

---

---

**Road vehicles — Dummies for restraint  
system testing —**

**Part 1:  
Adult dummies**

*Véhicules routiers — Mannequins pour essais de systèmes de retenue —  
Partie 1: Mannequins adultes*  
**(standards.iteh.ai)**

[ISO/TR 12349-1:1999](https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999)

<https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999>



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/TR 12349-1:1999](https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999)

<https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999>

© ISO 1999

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 734 10 79  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

Printed in Switzerland

## 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 3.

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.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this part of ISO/TR 12349 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 12349-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Restraint systems*.

[ISO/TR 12349-1:1999](#)

ISO/TR 12349 consists of the following parts, under the general title *Road vehicles — Dummies for restraint system testing*:

- *Part 1: Adult dummies*
- *Part 2: Child dummies*

# Road vehicles — Dummies for restraint system testing —

## Part 1: Adult dummies

### 1 Scope

This Technical Report describes the adult crash test dummies which are recommended by ISO for use in evaluating the occupant protection potential of restraint systems in frontal and side impact test procedures.

### 2 Recommended dummies

A review of the available adult crash test dummies was carried out by the experts of ISO/TC 22/SC 12, Working Group WG 5, *Anthropomorphic test devices*. The following adult crash test dummies are recommended for use in frontal and side impact crash tests.

— Recommended frontal crash test dummies:

- HYBRID III mid-size male;
- HYBRID III small female;
- HYBRID III large male.

— Recommended adult side impact crash test dummies:

- EUROSID-1 mid-size male;
- BIOSID mid-size male.

The mid-size male SID dummy which is specified by the USA Federal Motor Vehicle Safety Standard 214 is not recommended for use in side impact test procedures because of its poor impact biofidelity and inadequate instrumentation.

### 3 Dummy instrumentation

Table 1 lists the instrumentation that are commonly used with the frontal and side impact dummies. Interpretations of the significance of the various measurements relative to occupant protection levels that are used by various groups are cited in the bibliography, references [7] to [10].

Table 1 — Instrumentation for adult frontal and side impact dummies

Dummy instrumentation	Frontal			Side	
	HIII-5 Female	HIII-50 Male	HIII-95 Male	EUROSID-1	BIOSID
<b>Head</b> Acceleration ( $A_x, A_y, A_z$ )	Yes	Yes	Yes	Yes	Yes
<b>Neck</b> H/C1 ( $F_x, F_y, F_z, M_x, M_y, M_z$ )	Yes	Yes	Yes	No	Yes
C7/T1 ( $F_x, F_y, F_z, M_x, M_y, M_z$ )	Yes	Yes	Yes	Yes	Yes
<b>Shoulder</b> Loads ( $F_x, F_y, F_z$ )	$F_x, F_z$	$F_x, F_z$	$F_x, F_z$	$F_x, F_y, F_z$	$F_y, F_z$
Deflection ( $\delta_y$ )	No	No	No	No	Yes
<b>Thorax</b> Spine acceleration ( $A_x, A_y, A_z$ )	Yes	Yes	Yes	Yes	Yes
Sternal deflection ( $\delta_x$ )	Yes	Yes	Yes	No	No
Sternal acceleration ( $A_x$ )	Yes	Yes	No	No	No
Rib deflection ( $\delta_y$ )	No	No	No	Yes	Yes
Rib acceleration ( $A_y$ )	No	No	No	Yes	Yes
<b>Abdomen</b> Force ( $F_y$ )	No	No	No	Yes	No
Deflection ( $\delta_y$ )	No	No	No	No	Yes
<b>Lumbar</b> ( $F_x, F_y, F_z, M_x, M_y$ )	Yes	Yes	Yes	$F_y, F_z, M_x$	Yes
<b>Pelvis</b> Acceleration ( $A_x, A_y, A_z$ )	Yes	Yes	Yes	Yes	Yes
Ilium ( $F_x, F_y$ )	$F_x$	$F_x$	No	No	$F_y$
Pubic ( $F_y$ )	No	No	No	Yes	Yes
<b>Lower extremities</b> Femur ( $F_x, F_y, F_z, M_x, M_y, M_z$ )	Yes	Yes	Yes	$F_z$	Yes
Tibia/femur displacement ( $\delta_x$ )	Yes	Yes	Yes	No	No
Knee clevis ( $F_z$ )	Yes	Yes	Yes	No	Yes
Tibia loads and moments ( $F_x, F_y, F_z, M_x, M_y, M_z$ )	Yes	Yes	Yes	No	Yes

## Bibliography

- [1] ISO 3560, *Road vehicles — Frontal fixed barrier or pole impact test procedure.*
- [2] ISO 3984, *Road vehicles — Passenger cars — Moving barrier rear collision test method.*
- [3] ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation.*
- [4] ISO/TR 9790, *Road vehicles — Anthropomorphic side impact dummy — Lateral impact response requirements to assess the biofidelity of the dummy.*
- [5] ISO/TR 10982, *Road vehicles — Test procedures for evaluating out-of-position vehicle occupant interactions with deploying air bags.*
- [6] ISO 10997, *Passenger vehicles — Side impact with deformable moving barrier — Full scale test.*
- [7] MERTZ, H.J. Anthropomorphic test devices. *Accidental Injury — Biomechanics and prevention.* Springer-Verlag, 1993.
- [8] *Anthropomorphic dummies for crash and escape system testing.* AGARD advisory report 330, 1996.
- [9] *Human tolerance to impact conditions as related to motor vehicle design,* SAE 4. Information report J885. July 1996, SAE, Warrendale, PA, 1986.
- [10] MERTZ, H.J., PRASAD, P, and IRWIN, A.L. *Injury risk curves for children and adults in frontal and rear collisions.* 41st STAPP Car Crash Conference, SAE 973318, Nov. 1997.

(standards.iteh.ai)

[ISO/TR 12349-1:1999](https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999)

<https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/TR 12349-1:1999](https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999)

<https://standards.iteh.ai/catalog/standards/sist/d6cae6ec-ba20-4a84-ad9b-787929362a71/iso-tr-12349-1-1999>

---

---

**ICS 43.180**

Price based on 3 pages