TECHNICAL REPORT

ISO/TR 12349-2

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Road vehicles — Dummies for restraint system testing —

Part 2: Child dummies

Véhicules routiers — Mannequins pour essais de systèmes de retenue —

Partie 2: Mannequins enfants

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Foreword

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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is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 12349-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Restraint systems*.

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 2:
Child dummies

1 Scope

This Technical Report describes the infant and child crash test dummies which are recommended by ISO for use in evaluating child restraints and their interactions with deploying air bags.

2 Recommended dummies

A review of the available infant and child crash test dummies was carried out by the experts of ISO/TC 22/SC 12, Working Group WG 5, *Anthropomorphic test devices*. The following infant and child crash test dummies are recommended for use in restraint system evaluation.

- Recommended for restraint system evaluation:
  - Infant: CRABI 6-month;
  - 3-year old: Part 572, HYBRID III, TNO-P3, CRABI 3;
  - 6-year old: Part 572, HYBRID III, TNO-P6.
- Recommended for out-of-position airbag interactions:
  - Infant: CRABI 6-, 12- and 18-month; TNO-P 3/4 and P1 1/2;
  - 3-year old: GM “Air bag” dummy, HYBRID III;
  - 6-year old: HYBRID III.

When evaluating belt restraints, the experts cautioned that specific attention should be paid to the lap belt interaction with the pelvis. Further, the experts noted that more experience is needed with the Part 572 K, the TNO-P0, P 3/4 and P1 1/2, and the CRABI 12-month and 18-month for restraint system evaluation.

3 Dummy instrumentation

Tables 1 and 2 list the instrumentation that are commonly used with the infant and child 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 [4] to [7].

Table 1 — Infant dummy instrumentation

Dummy instrumentation	CRABI 6-month	CRABI 12-month	CRABI 18-month	TNO-P 3/4	TNO-P1 1/2
Head Acceleration (A_x, A_y, A_z)	Yes	Yes	Yes	Yes	Yes
Neck Head/neck interface (F_x, F_y, F_z, M_x, M_y, M_z)	Yes	Yes	Yes	Yes	Yes
Neck/T. spine interface (F_x, F_y, F_z, M_x, M_y, M_z)	Yes	Yes	Yes	No	Yes
Shoulder (F_x, F_y)	No	Yes	Yes	No	No
Thorax Spine (A_x, A_y, A_z)	Yes	Yes	Yes	Yes	Yes
Abdomen Lumbar/pelvis interface (F_x, F_y, F_z, M_x, M_y, M_z)	Yes	Yes	Yes	No	Yes
Pelvis Acceleration (A_x, A_y, A_z)	Yes	Yes	Yes	No	Yes
Pubic loads (F_x, F_z)	No	Yes	Yes	No	No

Table 2 — Child dummy instrumentation

Dummy instrumentation	3-year old					6-year old		
	Part 572	TNO-P3	H-III	CRABI	"Air bag"	Part 572	TNO-P6	H-III
Head Acceleration (A_x, A_y, A_z)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Angular acceleration (α_y)	No	No	Yes	No	Yes	No	No	No
Neck Head/neck interface (F_x, F_y, F_z, M_x, M_y, M_z)	No	Yes	Yes	Yes	Yes	No	No	Yes
Neck/torso interface (F_x, F_y, F_z, M_x, M_y, M_z)	No	No	Yes	No	No	No	No	Yes
Thorax Spine acceleration (A_x, A_y, A_z)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sternal acceleration (A_x)	No	No	Yes	No	Yes	No	No	Yes
Sternal deflection (δ_x)	No	No	Yes	No	No	No	No	Yes
Abdomen Lumbar/pelvis interface (F_x, F_y, F_z, M_x, M_y, M_z)	No	No	Yes	No	No	No	No	Yes
Acceleration (A_x)	No	No	No	No	Yes	No	No	No
Pelvis Acceleration (A_x, A_y, A_z)	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Illium load (F_x)	No	No	No	No	No	No	No	Yes
Femur Axial load (F_z)	No	No	No	No	No	Yes	No	6-axis