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Road vehicles — Reduction of misuse risk of child restraint systems —

Part 2: Requirements and test procedures for correct installation (panel method)

Véhicules routiers — Réduction du risque de mauvaise utilisation des systèmes de retenue pour enfants —

Partie 2: Exigences et méthodes d'essai pour une installation correcte (méthode par panel)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 36, *Safety and impact testing*.

This second edition cancels and replaces the first edition (ISO 13215-2:1999) which has been technically revised.

The main changes are as follows:

— added introduction;

— general update to cover ISOFIX / LATCH solutions, which did not exist by the time of publication of the first edition;

— new illustrations;

— editorial improvements.

A list of all parts in the ISO 13215 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Whether or not adequate protection is provided to a child occupant in a vehicle crash depends not only on the inherent capability of the child restraint system to provide protection, but also on its proper installation and subsequent correct use. It is known that certain misuse configurations and interface problems can have serious consequences for child occupants in vehicle crashes.

A clear understanding of the kind and frequency of incorrect use has important implications for the design of child restraint systems and instructions for use, the vehicle in which they are used, education and loan programs, and legislation.

The panel method presented in this document is supporting anyone who works with a panel of parents, caregivers or other panel participants to evaluate child restraint systems in terms of likelihood of correct installations or risk of misuse.

This document can be used in conjunction with the MMEA method presented in ISO 13215-3, to predict and evaluate possible misuse of the intended design, and to address possible misuse modes by an improved design. This document can also provide additional support in the use of panels for usability evaluations according to the ISO 29061 series.

Road vehicles — Reduction of misuse risk of child restraint systems —

Part 2: Requirements and test procedures for correct installation (panel method)

1 Scope

This document specifies the requirements and methods for judging the risk of installation misuse of child restraint systems (CRS) with the help of assigned evaluation panels.

The methods described can be used regardless of type of installation of the CRS, e.g. with vehicle seat belts, ISOFIX/LATCH and different types of anti-rotation devices. The installation can include the evaluation of the interface between the child and the CRS, e.g. a harness or an impact shield.

This document is intended for technical assessment. It can be applied separately or in conjunction with the MMEA evaluation, described in ISO 13215-3.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
child restraint system
CRS
free-standing device intended to provide child vehicle occupants with an approved restraint

Note 1 to entry: Child restraint systems comprise various categories, such as infant restraints, toddler seats, booster cushions and booster seats.

3.2
misuse
any deviation from the intended application and use which might reduce the protective performance of the *child restraint system* (3.1)

3.3
ISOFIX
system for the connection of a *child restraint system (CRS)* (3.1) to vehicles, which has two rigid anchorages in a vehicle seating position located near the seat bight, corresponding rigid attachments on the CRS, and a means to limit the pitch rotation of the CRS

Note 1 to entry: In this document, the term ISOFIX includes flexible CRS attachments (LATCH, UAS).

[SOURCE: ISO 13216-1:1999, 3.6, modified — Note 1 to entry has been added.]

3.4
vehicle seatbelt
approved webbing used to restrain vehicle occupants

3.5
buckle
quick-release device which enables the child to be held by the *child restraint system* (3.1), or the child restraint system by the structure of the car, and can be quickly opened

3.6
harness
internal webbing, in relevant cases, intended to restrain the child within the *child restraint system* (3.1)

3.7
anti-rotational device
device intended to restrict forward or rearward rotation of a *child restraint system* (3.1)

3.8
correctly installed
fitted or installed in accordance with manufacturer's instructions and in harmony with nationally accepted measures of goodness of use, for example, the tightness of *child restraint system* (3.1) in *vehicle seatbelt* (3.4)

4 General

4.1 Conformance with this document

A user-installed CRS tested in accordance with the requirements of this document is shown to be capable of being correctly installed. The test is designed for technical assessment and can also be used in conjunction with type approval or self certification.

4.2 Child restraint systems for testing

Sufficient number of CRSs shall be supplied to enable practical testing and one sample shall be retained for reference. It is not necessary to provide a new sample for each member of the test group.

4.3 Test panels

Enough adults to ensure 200 participants[1)] between the ages of 18 and 45 years, with an even distribution of age and gender, shall be available. As far as possible they shall represent the social, ethnic and cultural origins of the country or region. They shall all be healthy with no evident physical or mental handicap associated with manual dexterity. Appropriate subjects are parents with children in the age or mass group for which the CRS is approved. It is suggested that parents be allowed to participate either as couples, or alone. See Annex A.

Each CRS is intended for a given size, age or mass group, expressed by the manufacturers marking. Parents with children within the designated size, age or mass group are selected as subjects, when possible.

4.4 Location

The recommended location is within a shopping mall or toy store, in a space selected to prevent extraneous distraction. If a garage is used, it is important to provide good general lighting, and a seating area where the test panel participants can study the installation instructions. Suitable arrangements

1) Smaller samples can be used with the sequential method, see 7.2.

should be made for keeping the child amused, and to avoid distracting the adult subjects whilst studying the instructions and during the CRS installation test.

4.5 Vehicle

The panel shall perform the test with a vehicle seat rig or in an actual vehicle. The vehicle should, when possible, be selected from the ten most sold vehicles in the country of use. The general layout of an example vehicle seat rig is shown in Annex B.

5 Requirements

5.1 General

This document can be used for the evaluation of currently approved CRSs or for prototype CRSs.

5.2 Requirements concerning installation

When the CRS is tested in accordance with 6.3, the following requirements shall be met:

a) at least 85 % of the adults in the test panel shall be able to install the CRS correctly in the vehicle within 10 min, and

b) at least 85 % of the adults in the test panel shall be able to fit the harness correctly to the child within 5 min.

Supplementary requirements:

For height-adjustable harness systems, at least 85 % of the adults in the test panel shall be able to correctly adapt the harness from the lower position to the upper position within 5 min.

For combination products, at least 85 % of the adults in the test panel shall be able to correctly alter a CRS from its initial mode to its alternative mode within 10 minutes, insofar as this installation constitutes a new installation.

NOTE The maximum allowed time given above can be adjusted depending on the objective and technology of installation.

6 Test procedures

6.1 Test supervision

All procedures shall be carried out under the supervision of (an) impartial and appropriately qualified person(s). Guidance for observers carrying out the tests is given in Annex B.

Panel testing should be led by a person who has:

— knowledge of the panel testing method and statistical methods and how to combine them according to the circumstances;

— knowledge of how to conduct interviews and how to guide the panel participants without influencing them in any specific direction;

— at least basic knowledge in the physiology of the senses, perception and psychology.

The observer should not be personally involved in the design, production, or marketing of the products under evaluation.

6.2 Preliminary checking and preparation

The observer shall inspect the CRS prior to testing, to ensure that the instructions correspond to the version of the CRS to be evaluated. The supervisor should also perform the installation, determining that the installation is in accordance with the manufacturers' specification.

6.3 CRS installation test

6.3.1 Procedure

Regardless of installation type, the object of the test is to install the CRS correctly to an actual vehicle seating position or to a vehicle seat rig (see Figure B.1). This also includes any anti-rotational devices intended for the CRS installation.

The test may be carried out on all 200 panel participants or by a sequential procedure. If the latter is used, the panel size will depend on the results. When testing sequentially, the age and gender constraints specified in 4.3 shall be adhered to. It should be noted that a small sample will not be representative for the entire population, and any distinct bias in terms of age, socio-economic group, ethnic origin, earlier product experience or otherwise should be stated in the presentation of the results.

The installation instructions associated with the product shall be drawn to the attention of the subjects. Demonstrations, instructions, such as pamphlets and printed instruction leaflets are not to be shown to the subjects. It is however allowed to present the permanent labels in enlarged form, in the shape of an A4 plastic card or poster placed in a position visible to the user.

The participants shall not be able to observe the efforts of others to install the CRS. The observer should check the CRS prior to giving it to each participant to ensure that it is not worn or damaged in any way that may affect its ease of installation.

Each participant shall be given a CRS with the request that the participant first study the permanent instructions and then install the CRS. The participants may re-examine the instructions at will.

6.3.2 Expression of results

Record the time needed by the subject to install the seat, or if the allotted time is used without being able to install the seat. Note how much time was used to study the instructions and to perform the installation. In the case of CRSs requiring the use of anti-rotational devices, it shall be recorded if these are fitted.

6.4 Child in CRS installation test

6.4.1 Procedure

Ask each subject to study the installation instructions, to be able to fit the child into the harness, webbing or shield used by the CRS.

In case of integral CRS, in which the child is kept within the CRS by means of internal webbing or shield, the object of the test is to fit the webbing or shield to the child.

In the case of non-integral CRS, in which the child is restrained by the vehicle seatbelt, the object of the test is to fit the vehicle seatbelt to the CRS and child.

6.4.2 Expression of results

Record the time needed to fit the harness or shield, or whether the webbing or shield is not fitted, as defined in the drawings or representations provided by the manufacturer. If the subjects do not succeed in closing the buckle, record this information as well.