
**Road vehicles — Methods and criteria
for usability evaluation of child
restraint systems and their interface
with vehicle anchorage systems —**

Part 5:

**Installation and securing of child in a
booster system**

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*Véhicules routiers — Méthodes et critères pour l'évaluation de la
facilité d'utilisation des systèmes de retenue pour enfants, et leurs
interfaces avec les systèmes d'ancrage dans le véhicule —*

*Partie 5: Installation et fixation d'un enfant dans un système de
réhausseur*

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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 on 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 the following URL: www.iso.org/iso/foreword.html. (standards.itech.ai)

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

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A list of all parts in the ISO 29061 series can be found on the ISO website.

Introduction

The usability of a child restraint system (CRS) in terms of ease of:

- installation of child restraint systems in various vehicles; and
- day-to-day use with a child (securing, harnessing, adaption for a growing child, etc.)

is of utmost importance to ensure that a child restraint system is used properly in accordance with the manufacturer's intentions, and to ensure that it will provide maximum protection in a crash situation. An international agreement on usability criteria and measurements is beneficial for both consumers and manufacturers.

The aim of this document is to develop and validate a usability evaluation system for installation of child restraint systems with vehicle seat belts, to promote improved design for easy and correct use.

It provides child restraint and vehicle manufacturers with a tool for the assessment of the usability of new and current systems. At the same time, it provides consumers (parents and caregivers) with usability information on the key features related to the proper use of the attachment system, and assist them in selecting child restraints and vehicles that are easy to use properly.

The ISO usability evaluation system has been developed with participation from, and considering the experiences from, usability rating systems of Canada (Transport Canada and ICBC), USA (NHTSA), EU (NPACS and consumer rating programmes, such as ICRT, ADAC).

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Road vehicles — Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchorage systems —

Part 5: Installation and securing of child in a booster system

1 Scope

This document provides criteria for judgement of usability of booster seat child restraint systems (CRS) when installing them and securing a child.

The document provides criteria for judgement of:

- ease of availability of instructions;
- clarity of instruction manual and labelling; and
- ease of use of design related features of the CRS related to the installation in a vehicle.

The procedure can also be used for evaluation of vehicle integrated booster systems.

NOTE Although ISOFIX is defined in the original “ISOFIX” standard (ISO 13216-1) to be a rigid system, the term “ISOFIX” in this document is extended to include flexible CRS attachments (LATCH, UAS).

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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 terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

audible

capable of being heard in normal environmental conditions

3.2

booster system

any kind of belt-positioning *child restraint system* (3.3) where the adult seat belt is the primary restraint for the child

**3.3
child restraint system
CRS**

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

Note 1 to entry: CRSs comprise various categories such as car beds, infant restraints, toddler seats (forward and rearward-facing), booster cushions, and booster seats. Combination products may cover two or more of these product categories.

**3.3.1
multiple modes CRS**

type of *CRS* (3.3) that can be used in several modes, for example converting from integral to non-integral, or for use in different orientations

**3.4
misuse**

any deviation from the intended application and use of a *CRS* (3.3) that might reduce its protective performance

**3.5
pictogram**

illustration or photo used to represent a concept or an operation, which can be supplemented by text

**3.6
single action**

operation that can be completed without the need to undertake a secondary action

EXAMPLE A single action includes tightening a strap by pulling it without the need to release a locking system, or attaching to an anchorage without the need to depress the seat cushion.

**3.7
slack**

unintended looseness of a strap that is likely to affect the performance of the *CRS* (3.3) adversely

**3.8
usability**

extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

Note 1 to entry: Interpretation of the generic definition for the purpose of this document: the extent to which a *CRS* (3.3) is capable of being used and is convenient and practical in use (separately or in combination with a vehicle).

[SOURCE: ISO 9241-11:1998, 3.1, modified — a new Note 1 to entry has been added.]

4 Usability evaluation procedure and scoring principles

4.1 Evaluation procedure

This document provides a procedure to evaluate the usability of booster systems, i.e. booster seats with or without seatbacks, including booster seats integrated in the vehicle seat, and the securing of a child in the seat. The procedure evaluates the ease of availability of instruction, clarity of instruction manual and labelling, and the ease of use of design-related features of the CRS related to the installation in a vehicle.

The assessment is done in three steps:

- a separate assessment of the booster system;
- a usability assessment when installing the booster system in specified vehicle seating positions; and

- securing a child or child dummy in the booster system.

The evaluation takes into consideration the various modes of installation and conversions between installation modes. The usability protocol, consisting of two forms, is intended to be objective and repeatable.

The evaluation is most easily accomplished using a team of two people having basic knowledge of child restraints and being familiar with the technical terms used. However, they should preferably be unfamiliar with the CRS model to be evaluated. The procedure takes about 30 min.

The necessary materials include:

- the usability evaluation form (in either paper or electronic format);
- the vehicle owner's manual;
- the CRS manual, including instruction video if applicable; and
- a force gauge for measuring belt tension.

A copy of the terms and definitions from this document may also be helpful.

Initially, the booster system should be in the condition as supplied to the consumer. The evaluation process includes all the steps, including assembly, to complete the installation.

Unpacking the CRS, removing the box and plastic protections, detaching the handbook, etc., should be disregarded in the evaluation, but other initial one-time preparations are considered and assessed in the forms.

The mode of use for the booster system and the seating position in the vehicle should be determined in advance and documented in the evaluation form.

The evaluation process first addresses the labels and instructions, then the ease of positioning the booster seat followed by securing the child or child dummy, and finally the removal of the child restraint system. Installation and removal does not apply to integrated systems.

4.2 Scoring system

The scoring system consists of a Good/Average/Poor rating (scored with 3/1/0 points) of each item assessed, and an importance rating A/B/C (scored with 3/2/1 points) for each item. For each assessment, the scoring of the above are multiplied. A maximum score for a "Good" solution on an item with "A" importance is 9 points.

In this document, "average" means "mid-level" and should not be perceived as a statistical average between good and poor.

The maximum possible score will depend on the features of the booster system. Different products may have different maximum possible scores, and therefore, comparisons of the raw number of total points would not be meaningful. The final rating consists of a total number of points that should be expressed as a percentage of the maximum possible score for the particular conditions. See also further recommendations given in [Annex A](#).

5 Usability evaluation forms

See the following pages.

To enhance the value and applicability of this document, the forms are also provided in a revisable [MS Excel¹] format. These forms are provided at the following URL: <http://standards.iso.org/iso/29061/-5/ed-1/en>.

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1) MS Excel is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

Date of evaluation _____		Test no. _____	
Evaluated by _____			
Form 1: Booster system, separate evaluation			
Child restraint system evaluated	<input type="checkbox"/> Backless booster cushion	<input type="checkbox"/> Booster seat with seatback	<input type="checkbox"/> Integrated booster system
Manufacturer	Describe: <input type="checkbox"/> Other (convertible/combination, etc.)		
Child seat make and model			
Country/Region of use	Booster system features:		
Approval no. (where applicable)	<input type="checkbox"/> Multiple modes CRS (2-in-1)		
Production no.	<input type="checkbox"/> Booster seat using ISOFIX anchorages		
Date of manufacturing, yyyy-mm-dd	<input type="checkbox"/> Booster seat with removable seatback:		
	<input type="checkbox"/> Multiple modes CRS (3-in-1) evaluated <input type="checkbox"/> with / <input type="checkbox"/> without ISOFIX		
	<input type="checkbox"/> Seatback on <input type="checkbox"/> Seatback off		
Appropriate child size range for this mode according to manual	Mass range (kg):	Height range (cm):	Age range (months or years):

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