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## Road vehicles — Anchorages in vehicles and attachments to anchorages for child restraint systems —

### Part 4: Lower tether anchorages

*Véhicules routiers — Ancrages dans les véhicules et attaches aux ancrages pour systèmes de retenue pour enfants —*

*Partie 4: Ancrages pour fixation des sangles inférieures*

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
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## Foreword

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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](http://www.iso.org/directives)).

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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](http://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*, WG 2 *Child restraint systems*.

A list of all parts in the ISO 13216 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](http://www.iso.org/members.html).

## Introduction

Lower tether anchorages (LTA), for rearward facing child restraint systems (CRSs) in passenger cars, are used to enhance protection of children in cars. The lower tethers help to reduce CRS rotation in rear impacts, during the rebound phase in frontal impacts, and in rollover events. Lower tethers, attached to the LTA, may be used together with seat bight anchorages according to ISO 13216-1 (ISOFIX), or with other methods for mounting rearward facing CRS in road vehicles, mainly using the vehicle seat belt.

In line with ISOFIX, standardization of LTA enables pre-installed anchorages with adequate performance within a designated zone. Pre-installed anchorages will improve the usability and reliability of attaching the lower tethers. In addition, having dedicated anchorages reduce the risk of tethers routed in a way that can damage the car interior, seat chassis, cables under the seat etc.

Dedicated pre-installed anchorages will ensure ease-of-use, reduce risk of misuse and simplify the mounting of a rearward facing CRS. With the use of lower tethers and specified LTA and tether connectors (click-in function in analogy with ISOFIX connectors) the CRS can be easily attached.

This document provides requirements and guidelines to facilitate the introduction of lower tether anchorages in passenger cars contributing to ease-of-use, reduction of potential damage to vehicle interior, and increased safety by facilitating increased use of rearward facing CRSs.

## Background

Rearward facing CRSs have been available on the market since late 1960's and are used for infants as well as toddlers. In the Nordic countries, they have been used since their introduction as the main CRS for children up to approximately four years of age and have provided evidence of excellent occupant protection.

Most of the large rearward facing CRSs use lower tethers, which are attached to the floor area or seat in front of or below the seating position of the CRS. There is more than 40 years of experience of lower tether usage. Some cars have pre-installed anchorages in which the lower tethers can easily be attached. The most common positions of the anchorages are on the seat rails in front of the CRS (inside, outside, or end of seat rails), but alternative placements are also used.

However, the majority of the vehicles have no pre-installed anchorages, as a consequence the tethers are instead routed around the seat chassis, the seat cushion or other parts that can be accessed.

The primary attachment of the rearward facing CRS is the ISOFIX or the vehicle seat belt. In addition, a support leg is usually used together with the lower tethers. An alternative to the lower tether is to use a bar pressed against the vehicle seat backrest (so-called rebound bar). The rebound bar provides some effect to reduce rotation in rear-end impacts and the rebound phase in frontal impacts, however it is not sufficient for the large rearward facing CRSs, especially when attached using the vehicle seat belt. The lower tethers also provide superior protection in rollover or turnover events.

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# Road vehicles — Anchorages in vehicles and attachments to anchorages for child restraint systems —

## Part 4: Lower tether anchorages

### 1 Scope

This document establishes the positioning zones, dimensions and general and static strength requirements for lower tether anchorages.

Lower tether anchorages may be used together with seat belt anchorages according to ISO 13216-1, or with other methods for anchoring child restraint systems (CRS) in road vehicles.

This document is applicable to all seating positions, intended by the vehicle manufacturer, for use with rearward-facing CRSs. These seating positions can include outer and mid positions in rear seats (second and third row), as well as the front passenger seat.

This document also specifies requirements and strength testing of retrofit lower tether anchorages.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13216-2:2004, *Road vehicles — Anchorages in vehicles and attachments to anchorages for child restraint systems — Part 2: Top tether anchorages and attachments*

ISO 13216-3:2018, *Road vehicles — Anchorages in vehicles and attachments to anchorages for child restraint systems — Part 3: Classification of child restraint system and space in vehicle*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13216-2 and ISO 13216-3, and the following apply.

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

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

#### 3.1 lower tether anchorage

##### LTA

anchorage on the vehicle seat track or on or close to the vehicle floor to which a lower tether can be attached

[SOURCE: ISO 29061-1, definition 3.15]

### 3.2

#### **retrofit lower tether anchorage retrofit LTA**

lower tether anchorage for after-market installation in the vehicle

Note 1 to entry: Retrofit LTAs can be provided by OEMs or CRS manufacturers.

### 3.3

#### **LTA mounting point**

mounting point prepared by the vehicle manufacturer for installation of retrofit LTA

### 3.4

#### **lower tether**

type of anti-rotational device intended to restrict the rearward rotation of a rearward-facing CRS

Note 1 to entry: It usually comprises a tether strap or other hardware attached near the back or base of the CRS connects to a rebound tether (lower tether) anchorage. It incorporates a device to enable it to be connected to such an anchorage.

[SOURCE: ISO 29061-1, definition 3.14]

## **4 Dimensions and installation requirements**

### **4.1 Description and applicability of lower tether anchorages or LTA mounting points**

Lower tethers are used to increase installation stability and to reduce rotation in a rear impact as well as rebound effects in a frontal impact. The usability and reliability of lower tether attachments can be greatly improved when lower tether anchorages are pre-installed in the vehicle.

Lower tether anchorages for rearward facing CRSs are similar to, and for most aspects comparable to, the top tether anchorages for forward facing CRSs.

The most common positions of lower tether anchorages are on the seat rails in front of the CRS (inside, outside, or end of seat rails), but alternative methods are also used. For most vehicles it is relatively easy to introduce lower tether anchorages, since there are already seat rails or other appropriate structures available in the applicable zones.

The requirements and guidelines of this document are intended to facilitate the introduction of lower tether anchorages in vehicles.

The specifications apply to completely installed LTAs by the vehicle manufacturer and to mounting points prepared for the installation of retrofit LTAs.

The installation requirements in [4.2](#) and the dimension requirements in [4.3](#) also apply to retrofit LTAs.

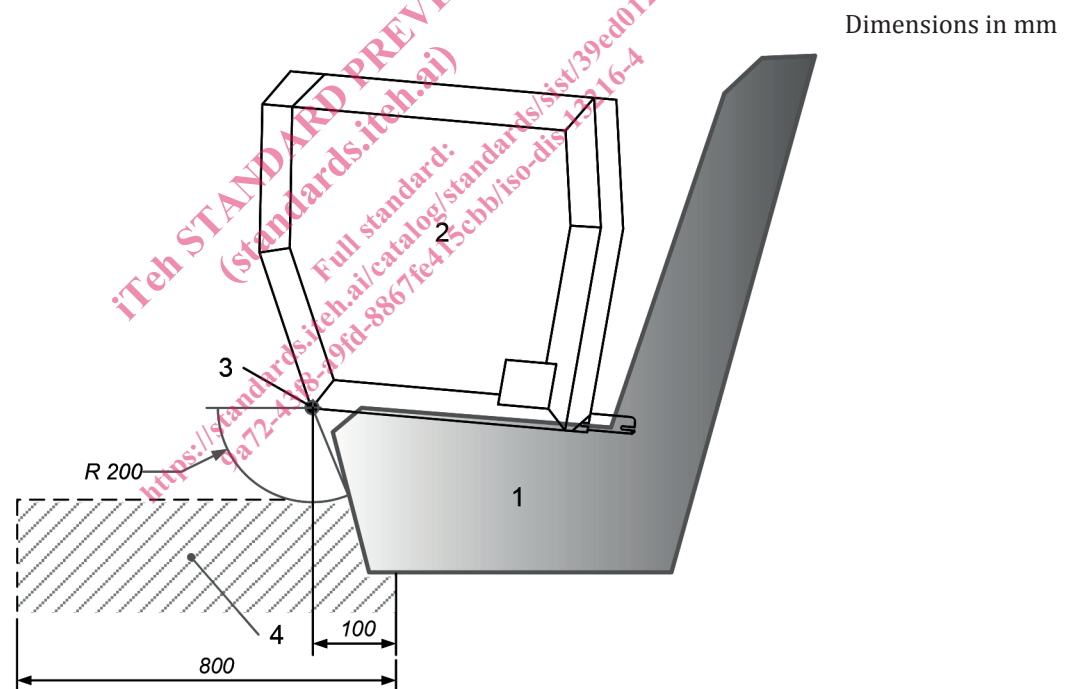
### **4.2 Positioning of lower tether anchorages**

Lower tether anchorages, two or optionally a single one for use with each intended CRS position, shall be located within the zones shown in [Figures 1 to 3](#), and according to the following specifications:

- For ISOFIX seating positions, a reference point for measurements is obtained by installing the ISO/R2 envelope (or physical fixture), in accordance with ISO 13216-3, in the vehicle seat. If adjustable, the seat shall be adjusted to its rearmost position;
- For non-ISOFIX seating positions, the reference point for measurements shall be obtained by installing the ISO/R2 envelope (or physical fixture) in the vehicle seat, using the envelope positioning procedure in [Annex A](#). If adjustable, the seat shall be adjusted to its rearmost position;



- If two lower tether anchorages are chosen, they shall be positioned with a minimum distance of 280 mm for the respective CRS position;
  - The two anchorages do not need to be symmetrically positioned with respect to the centreline through the envelope/fixture. However,
    - anchorages shall not be positioned on the same side of the envelope/fixture centreline, and
    - the offset between the centreline of the installed anchorages and of the envelope/fixture should be no more than 200 mm measured perpendicularly from the centrelines;
- If a single lower tether anchorage is chosen for the seating position, it shall be symmetrically positioned with respect to the centreline through the envelope/fixture within an offset of  $\pm 50$  mm.
- Lower tether anchorages may be placed under the vehicle floor, e.g. in a storage compartment under a floor cover, if such a positioning can be regarded as acceptable from a usability perspective;
- The zone intended for a support leg in common solutions (zone indicated in [Figure 3](#)) shall not be used for lower tether anchorages;
- Re-routing of lower tether strap path is allowed, although it should be ensured that it does not affect the function of the lower tethers or sensitive parts of the vehicle interior.

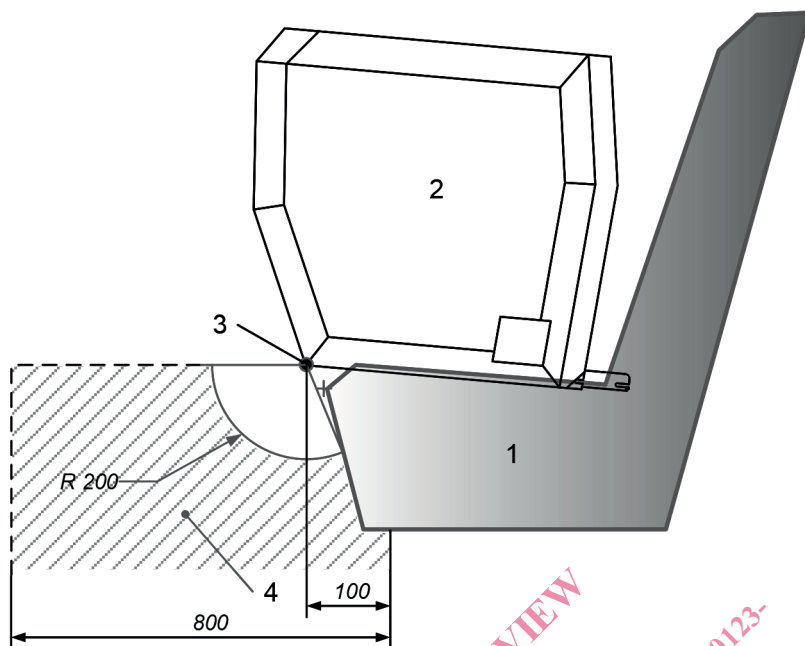


#### Key

- 1 Vehicle seat illustration (rear row seating positions)
- 2 ISO/R2 envelope installed in related vehicle seating position
- 3 Reference point on ISO/R2 envelope for LTA zone measurements
- 4 Lower tether anchorage zone in side view, with upper limitation

**Figure 1 — Lower tether anchorage zone for rear seat row(s), side view**

Dimensions in mm



**Key**

- 1 Vehicle seat illustration (front seating position)
- 2 ISO/R2 envelope installed in related vehicle seating position
- 3 Reference point on ISO/R2 envelope for LTA zone measurements
- 4 Lower tether anchorage zone in side view, with upper limitation

**Figure 2 — Lower tether anchorage zone for front passenger seat, side view**