

Slide 1



ISO information
on CRS
International Standards

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

Slide 2



Background

- Within ISO/TC22 “Road vehicles”
- SC12 deals with “Passive Safety crash protection systems”
- its WG1 concerns “**Child restraint Systems (*in road vehicles*)**”
- Beginning of International works in 1989
- Approximately 85 experts from 19 countries involved in the works

Convenor of the WG1 Lotta Jakobsson – Volvo Car Corp.
Secretariat: SIS, Swedish Standards Institute, Peter Claeson

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

SC12 also consists of 4 other active Working Groups that can give information and useful data to this WG1.

These are:

- WG5 for ATD (Anthropomorphic test devices or Dummies)
- WG6 for biomechanical criteria
- WG7 on traffic accident analysis methodology

Slide 3



Scope and focus

- International harmonization and standardisation in the field of child restraint systems in passenger cars in order to improve safety for children in cars
- Focus on compatibility aspects and reduction of misuse

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

The aim is to provide useful standards, as well for car manufacturers or suppliers and customers, in order to improve safety of child when placed in a child restraint system fitted in a vehicle.

The following will present you what has already been done within this Standardization Committee and what is forecast as future work.

Slide 4



The standards already published and the present work namely on :

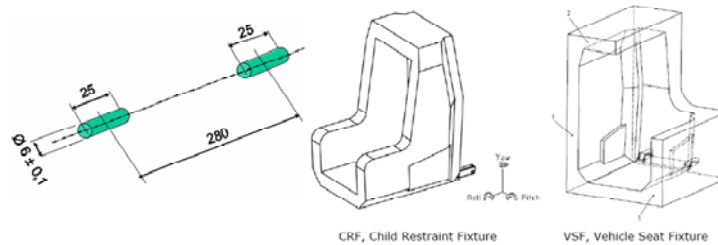
- ISOFIX (universal anchorages and attachments)
- Assessment of ISOFIX usability
- Automatic airbag suppression system
- CRS side impact test method
- Improvement of compatibility within CRS and vehicle

Slide 5



ISOFIX

- ISOFIX Standard (ISO 13216-1) published in 1999
- Part 1: Seat bight anchorages and attachments
 - Dimensions, general requirements and static strength requirements for rigid anchorages for anchoring child restraint systems (CRS) in vehicles



2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

The main Standard published by SC12 and its WG1 deals with the ISOFIX concept. It offers a universal system for anchoring child restraint systems to vehicles. The purpose of this system is to improve the overall safety performance of child restraints, particularly by enhancing the convenience of installation and reducing the risk of misuse.

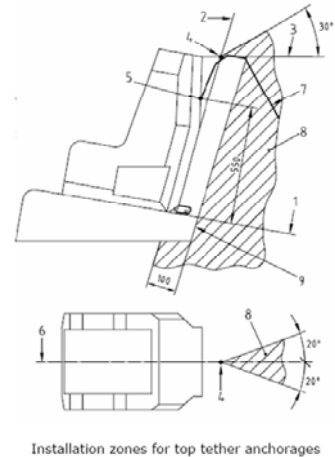
The basic ISOFIX standard **ISO 13216-1** provides requirements needed for positioning of the seat bight anchorages, the geometry around anchorage points and, to some extent, dimensional requirements for forward-facing child restraint systems.

Slide 6



ISOFIX

- ISOFIX Standard (ISO 13216-2) published in 2004
- Part 2: Top tether anchorages and attachments
 - Positioning zones, dimensions and general and static-strength requirements for top tether anchorages used together with seat bight anchorages
 - Wider installation zones are accepted for rigid ISOFIX



2008-05-13

GRSP – Informal group on Child Restraint System

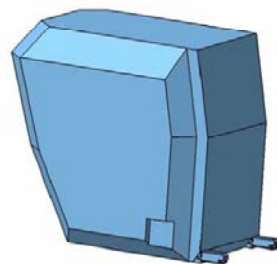
Michèle MAITRE

This part 2 of ISO 13216 specifies top tether anchorages and attachment: a means of limiting the pitch rotation of child restraint system when used in conjunction with the specifications of 123216-1 and which can be used also in conjunction with seat belt systems for CRS installation

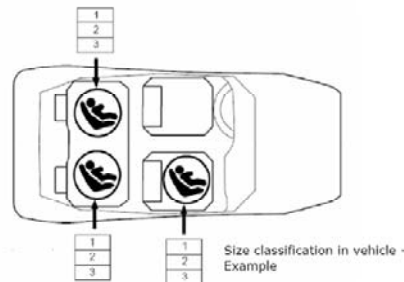


ISOFIX

- ISOFIX Standard (ISO 13216-3) published in 2006
- Part 3: Child restraint dimensions and space in the vehicles
- Provides a size classification for main CRS types, and a corresponding classification of space in vehicle



Largest envelope, ISO/R3



2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

In order to ensure that a child restraint system fully fits in a vehicle, it is also essential that the vehicle interior and the child restraint system match each other spatially.

The part 3 of ISO 13216 provides requirements for the space needed in the vehicle to accommodate child restraints in particular for rearward-facing child restraint systems.

This part provides a rough classification system to help in judging which types and sizes of child restraint systems will fit in the vehicle.



ISOFIX

- ISOFIX Revisions and amendments
 - Amendment 1: CRF for installation in low-roof cars.
Published in 2006
 - Amendment 2: ISOFIX tolerances specifications (under progress) for specification only of gauges for the tolerances checking
 - Amendment 3: Detection of installed ISOFIX CRS.
Published in 2006
 - Amendments will be included in a revised consolidated version of ISO 13216-1 to take into account experiences from practical use of ISOFIX since the publication of part 1.



Usability

- Assessment of ISOFIX usability
 - The aim is to promote easy-to-use ISOFIX solutions
 - Assessment of CRS attachments, vehicle anchorages and CRS-vehicle combination
 - ISO 29061 part 1 under process of vote

The usability of a child restraint system in terms of ease of
— installation of child restraint systems in various vehicles
— day-to-day use with a child (securing, harnessing, adaptation 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 target of this International Standard **29061-1** is to develop and validate a usability rating system for ISOFIX systems to promote improved ISOFIX 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 ISOFIX systems. At the same time, it provides consumers (parents and caregivers) with information on the key features related to the proper use of the ISOFIX system, and assist them in selecting child restraints and vehicles with ISOFIX systems that are easy to use properly.



Usability

- Usability protocol
 - Evaluation of CRS
 - Vehicle evaluation
 - Systematic evaluation of mounting CRS into vehicle, including base evaluation and detachment

The usability of ISOFIX is addressed both on the CRS side (attachment system) and the vehicle side (anchorage system) as well as the interaction of the two, emerging when child restraint systems are placed in cars.

Slide 11



Usability

<p>Form 3: Interface – Installing the CRS, or base with seat, in the vehicle</p> <p>Vehicle – Make, model and model year _____</p> <p>Child seat – Make and model _____</p> <p>Seating position(s) evaluated (see graph) _____</p> <p>Vehicle seat position (fore/mid/aft) _____</p>	<p>Evaluation includes assessment of the following interfaces</p> <p><input type="checkbox"/> Rigid attachments <input type="checkbox"/> Top tether anchorages/attachments</p> <p><input type="checkbox"/> Flexible attachments <input type="checkbox"/> Support leg</p> <p><input type="checkbox"/> Adjustable attachments <input type="checkbox"/> Secondary anti-rotational device</p> <p><input type="checkbox"/> Separate base</p>
---	--

Form 3.1: Attaching CRS or base to lower ISOFIX anchorages

		Good	Average	Poor	Importance	Notes
15	Using the CRS, are the prepared vehicle lower ISOFIX anchorages accessible (i.e. is it possible to use them)?	<input type="checkbox"/> Yes, can get positive attachment with both ISOFIX attachments, and sufficient clear space around the anchorage	<input type="checkbox"/> Yes, after single action, e.g. one-handed depression of seat cushion or moving seat belt buckle out of the way	<input type="checkbox"/> Not accessible or ready to use. Not possible without tools or physically modifying seat, or using extreme effort	A	
16	Do the CRS ISOFIX attachments remain accessible until they are secured to the vehicle anchorages?	<input type="checkbox"/> Yes	<input type="checkbox"/>	<input type="checkbox"/> No	A	
17	Is there clear feedback that the child restraint system is correctly attached to the ISOFIX anchorages?	<input type="checkbox"/> Visual plus tactile and/or audible indication that both CRS lower ISOFIX attachments are correctly attached	<input type="checkbox"/> Tactile and/or audible indication that both CRS lower ISOFIX attachments are correctly attached	<input type="checkbox"/> None, or false False means indicating correct attachment without actually being attached to anchorage.	A	

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

In the future it is also intended to develop further parts for ISO 29061 "Road vehicles — Methods and criteria for usability evaluation of child restraint systems and their interface with vehicle anchorage systems"

such as for

- Vehicles and child restraint systems equipped with non-ISOFIX anchorages and attachments
- Securing of child in child restraint system and daily handling aspects



Automatic airbag suppression system

- CPOD principle (Child seat presence and orientation detection system)
- To improve overall safety performance of passenger restraint systems, particularly by reducing the risk of a deploying airbag versus a child seat placed on a passenger seat
- Publication of TS 22239 (3 parts) under process

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

The **part 1 of ISO/TS 22239** describes the main system functionality, provides design recommendations and requirements, compatibility measurements and labelling requirements for the CPOD system.

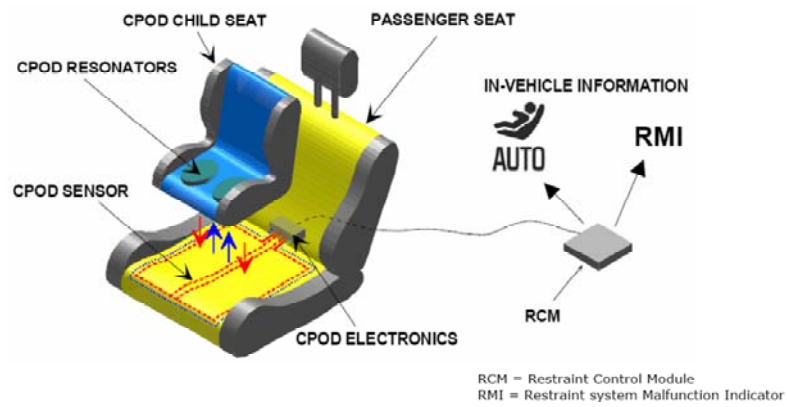
The **part 2 of ISO/TS 22239** specifies the CPOD resonator as part of the CPOD system. It defines the electrical and environmental requirements to be met by the resonators as condition for CPOD compatibility.

The **part 3 of ISO/TS 22239** specifies instructions for use as well as labelling requirements of CRS and vehicles equipped with the child seat presence and orientation detection system specified in ISO/TS 22239-1



Automatic airbag suppression system

CPOD principle



2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE



CRS side impact testing

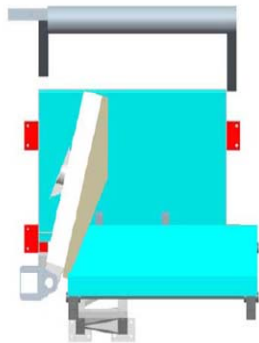
- ISO/TR 14646 describing background data, method development and experiences published in 2006
- Draft ISO 29062
 - With upgraded version of the hinged door concept to improve behaviour and reproducibility
 - Specifies a test method for child restraint systems in side impact collisions. Simulates the conditions in which most of the serious injuries occur, and for which the child restraint characteristics can improve the protection of the child

The aim of the **draft ISO 29062** is to present a test method to evaluate the ability of a child restraint system (CRS) to minimise injuries in lateral impacts.

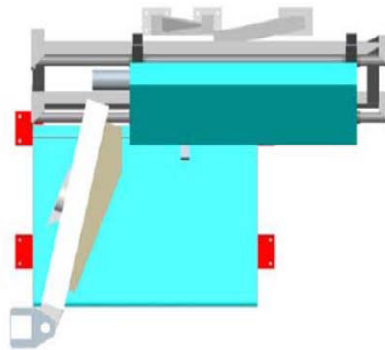


CRS side impact testing

Hinged door concept



Test bench prepared for testing of
Rearward Facing CRS (top view)



Test bench prepared for testing of
Forward Facing CRS (top view)



Compatibility issues

- Proposed new work on guidelines to improve compatibilities between vehicle seats and CRSs with regard to :
 - the positioning of anchorages (seatbelt and ISOFIX systems)
 - the belt geometry (seatbelt length and buckle height)
 - ...

Task of this new work item:

To resolve issues for fitting a CRS in a car with regards to some difficulties or even impossibilities due to some extend on buckle lengths, seat belt lengths or location of various anchorages or ISOFIX systems



Other useful standards

- ISO/TR 13214 (1996) for compilation of CRS regulations and standards
- ISO 13215 series for reduction of misuse
- ISO 13218 (1998) : report form for accidents involving child passengers

Slide 18



ISO/PDTR 13214

© ISO

Annex A
(informative)

A comparison of regulations for universal anchorages/attachments – ISOFIX, LATCH and UAS

A comparison of main characteristics of regulations covering universal anchorage/attachment system, according to ECE (R.14, R.16, R.44), FMVSS (225, 213), CMVSS (210).

Item	Requirement Description	Current FMVSS 225 (Effective 01Sep2004)	Current CMVSS 210.1 (Effective April 1, 2007)	Current CMVSS 210.2 (Effective April 1, 2007)	Current ECE R 14 (Effective Jan. 2006) For new homologation Feb. 2008 [S14.2] Effective for all produced vehicles Feb. 2013 [S 14.3]	Current ADR 34/1 (Effective Dec. 2005)
	Comments	Deals with Lower and Top Tether Anchorages	Deals with Top Tether Anchorages Only	Deals with Lower Anchorages Only	Deals with Lower and Top Tether Anchorages	Deals with Top Tether Anchorages Only
1	2	3	4	5	6	7
CURRENT REQUIREMENTS BELOW ARE FOR REFERENCE ONLY / REFER TO THE WRITTEN REGULATIONS FOR COMPLETE DETAILS LOWER ANCHORAGE SYSTEM REQUIREMENTS.						
Configuration and Dimensional Measurements of Lower Anchorages						
1	Diameter of Lower Anchorage Bar	6mm +/- 0.1mm [S 9.1.1(a)]	N / A	6mm +/- 0.1mm [S (3) (b)]	6mm +/- 0.1mm [S 5.2.3.1]	N / A
2	Relative Straightness, Orientation, Position of Lower Anchorage Bar	Straight, Horizontal & Transverse [S 9.1.1(b)]	N / A	Parallel & Collinear [S 3(c)]	Transverse and Horizontal located on the same axis [S 5.2.3.1]	N / A
3	Length of Anchorage	Min. 25 mm on flat, Max. 60 mm on inside of anchor legs (7 mm rearward) [S 9.1.1 (c)] & Fig. 21	N / A	=25mm min on flat [S 3(b)] Permit a checking device to be attached to them over the entire width of the checking device [S (3)(f) & Fig. 5]	=25mm min on flat, located on the same axis (Fig.4, Annex 9) [S 5.2.3.1]	N / A
4	Transverse Spacing of Anchorage Bars	280mm (Center-Center) [use template gauge of CRF to verify the engagement area] [S 9.1.1(e)]	N / A	280mm (Fig. 2 - 4) (Center-Center) [use template gauge of CRF to verify the engagement area] [S (3)(c)]	280mm (Center-Center) [use template gauge of CRF to verify the engagement area] [S 5.2.3.1 & S5.2.3.3] [Fig. 4/Annex 9]	N / A


2008-05-13

GRSP – Informal group on Child Restraint System

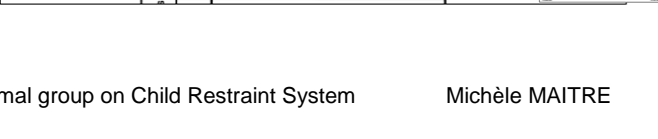
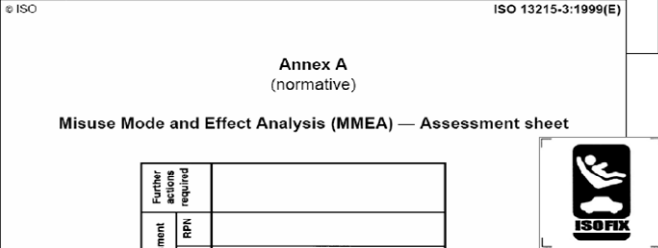
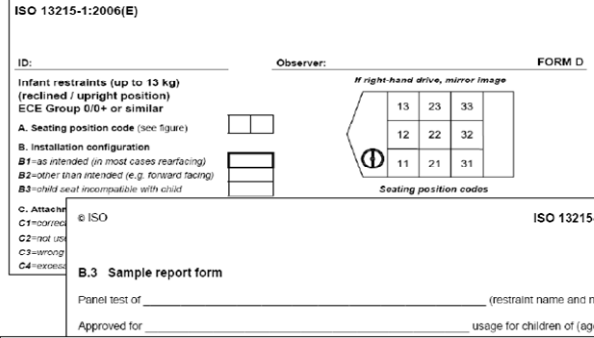
Michèle MAITRE

New draft 13214 under preparation with the latest development of various regulations

Slide 19



- Part 1 : Forms for collection of data from field studies of misuse (2006)
- Part 2 : Test methods for the evaluation of misuse risk – Panel method (1999)
- Part 3 : Test methods for the evaluation of misuse risk – MMEA (1999)



2008-05-13 GRSP – Informal group on Child Restraint System Michèle MAITRE

A clear understanding of the kind and frequency of the incorrect use has important implications for:

- the design of child restraint systems and instruction for use
- the vehicle in which they are used
- education and loan
- and also legislation

Part 1 of ISO 13215 specifies a basic methodology, including sample forms, for collection of data concerning misuse of child restraint systems in field studies. The purpose of using standardized forms is to provide a tool for quantification of misuse related to common misuse parameters, and to facilitate the exchange of data between different parties, thus making the results easily available for analysis. By using the sample forms provided, some main misuse configurations for several different groups of child restraint systems can be determined.

Part 2 of ISO 13215 specifies the requirements and test methods for judging if user-installed child restraints are correctly used.

Part 3 of ISO 13215 specifies a method to predict and quantify misuse of child restraint systems.



© ISO ISO 13218:1998(E)

ISO 13218:1998 Accident involving child passenger

1. GENERAL

1.1 Identification no.	1.2 Date	1.3 Country	1.4 Case no.
1.5 Source of reported data	1.6 Contact name, phone/fax no.		

2. CASE VEHICLE

2.1 Vehicle make/model	2.2 Model code (VIN)	2.3 Model year	2.4 Mass at impact	2.5 No. of occupants
------------------------	----------------------	----------------	--------------------	----------------------

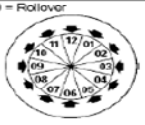
3. TYPE OF ACCIDENT / OTHER VEHICLE

3.1 Single vehicle accident <input type="checkbox"/>	3.2 Collision with other vehicle <input type="checkbox"/>	3.2.1 Vehicle make/model
3.2.2 Model code (VIN)	3.2.3 Model year	3.2.4 Mass at impact
		3.2.5 No. of occupants

4. DIRECTION OF IMPACT (CASE VEHICLE)

4.1 Direction of principal force _____

00 = Rollover



5. TYPE OF IMPACT

CASE VEHICLE (MARK ALL THAT APPLY)

5.1 <input type="checkbox"/> Frontal impact, % overlap _____	5.2 <input type="checkbox"/> Side impact	5.3 <input type="checkbox"/> Sideswipe
5.4 <input type="checkbox"/> Rear impact	5.5 <input type="checkbox"/> Skid	5.6 <input type="checkbox"/> Run off road
5.7 <input type="checkbox"/> Rollover	5.8 <input type="checkbox"/> Submersion	5.9 <input type="checkbox"/> Fire
5.10 <input type="checkbox"/> Animal	5.11 <input type="checkbox"/> Object contacted _____	
5.12 <input type="checkbox"/> Other (specify) _____		

6. COLLISION SKETCH

PICTURE OF DAMAGED VEHICLE

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

ISO 13218 specifies a report form for the collection of data in accidents with children under the age of 13 in motor vehicles.

Slide 21



Thank you for your attention ...

2008-05-13

GRSP – Informal group on Child Restraint System

Michèle MAITRE

Regulatory bodies can easily use standardization work and if not yet available they can ask for development of new standardization work when necessary.

For any other information on Standardization purposes:

- Mrs Michèle MAITRE (michele.maitre@bn-auto.com)
- Secretary of Technical Committee ISO/TC22 "**Road vehicles**" and
- Secretary of Sub-Committee ISO/TC22/SC12 "**Passive safety crash protection systems**"

Or

- Mr. Peter CLAESON (peter.claeson@sis.se)
- Secretary of Working Group ISO/TC22/SC12/WG1 "**Child restraint systems (in road vehicles)**"