

CPD surrogates

Brief status of the ISO work to UN IWG CLIV 2025-11-26

Status update since the last report given on 2025-06-04

Future ISO **26315**, *Road vehicles — Surrogates for assessment of in-vehicle child presence detection systems*

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Project leaders of ISO work on CPD surrogates

Background

Same as before, except for the last line:

There is a rapid development of in-vehicle sensing systems and related communication to address the situations where children have been unattended left behind or trapped in cars.

The functionality of these systems can be evaluated using real children, or surrogates having child-like essential properties.

For objective and repetitive evaluations there are benefits of using surrogates – provided that they have trustworthy properties similar to those of real children.

What are these “trustworthy properties”? And how should they be validated to ensure that a surrogate is fit for its purposes?

These are tasks that we are currently trying to address in the ISO specifications under development. The goal is that CPD surrogates fulfilling the agreed ISO specifications will have the functionality and quality needed, regardless of the provider.

The ISO Working Group (ISO/TC22/SC33/WG16) has already developed several ISO standards on surrogate targets used to evaluate active safety systems in near collision events - the ISO 19206 series.

With the stakeholders and competence present in this ISO group, WG 16 has been given the task to develop specifications for CPD surrogates.

News: After presentation at several ISO levels (including top level ISO/TC 22 *Road vehicles*) it was agreed to register the new work with ISO number **26315**.

Project status

- Since the kick-off meeting in February 2025, seven short meetings have been held with the project leaders and the dedicated Task Force on CPD surrogates.
- Current activities are focused on bringing the necessary information into the working draft, in a structured way.
- Max time frame 36 months until publication, including balloting and processing - but a stable draft is intended to be achieved much earlier.
- Around 20 active experts from Austria, China, France, Germany, Japan, Luxembourg, Sweden, UK, and USA
- Shared project leadership: Jingjing Hao (CATARC, CN); Thomas Wimmer (4a, AT); Alex Kiendl (Messring, DE)
- Status November 2025: A more developed working draft version (N 471) is available within the ISO Working Group.



Examples of child surrogates in child seats above are only for illustration, not yet specified in the ISO document

Scope of the current ISO draft

No change since the version in June 2025:

This document specifies performance requirements for child presence detection (CPD) surrogates used to assess the detection and activation performance of in-vehicle child presence detection systems.

This document specifies the properties of CPD surrogates to represent children inside the vehicle, in terms of appearance properties (sizes, shapes, reflection), vital signs etc. for testing purposes.

This document addresses the detection requirements for CPD surrogates in terms of sensing technologies commonly in use at the time of publication of this document, and where possible, anticipated future sensing technologies.

This document does not address the test procedures in terms of positions or timing of events. Performance criteria for the in-vehicle CPD system are also not addressed.

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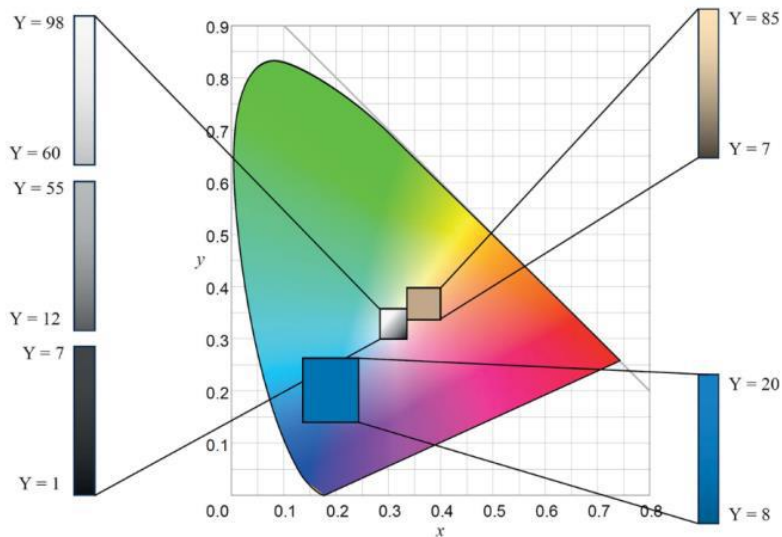
Contents of the current ISO
Working Draft (2025-11)

Compared to the Working
Draft in June, the document
has grown about three times.

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Decision topics for the ISO CPD draft

- Decisions on required sizes. Current proposal:
 - newborn (5pt), 1 yo (50pt), 3 yo (50pt), 6 yo (95pt)
- Decisions on required optical properties
- Decisions on required radar properties
- Decisions on required posture/motion properties
- Validation and related measurement procedures



Specifications of optical properties, not yet decided

Table A.2 — Comparison of size data from several sources

		NIST (mixed sexes)	CDC Growth Charts	Canada	WHO (mixed sexes)	UN R129 (Q-dummy 50pt)	WS T 423-2022	ISO/CD TS 24929-1:2024		
Newborn 5pt	Body height (excl. shoes)	Standing posture	460	459	462	464	-	477	465	mm
	Sitting height		326		323		355		347	mm
	Knee height		121							mm
	Head width	Temple - temple	93							mm
	Head length	Back - front	117							mm
	Head height	Chin - top								mm
	Shoulder width		129			145		146		mm
	Upper arm length	Shoulder - elbow	92							mm
	Lower arm length	Including hands	131							mm
	Torso depth		75			-		80		mm
	Waist circumference		257							mm
	Forearm circumference		88							mm
	Calf circumference		97							mm
Ankle circumference		77							mm	
1yo 50pt	Body height (excl. shoes)	Standing posture	725	736	751	749	740	760	744	mm
	Sitting height		462		481		479		476	mm
	Knee height		197							mm
	Head width	Temple - temple	124							mm
	Head length	Back - front	161							mm
	Head height	Chin - top								mm
	Shoulder width		202				227		212	mm
	Upper arm length	Shoulder - elbow	145							mm
	Lower arm length	Including hands	192							mm

Excerpt of table comparison of size data from different sources

Some questions and challenges ...

- Are the four sizes mentioned optimal? Are all sizes needed?
- Should the CPD surrogates be evaluated together with a well-specified child seat, for the respective size?
- Optical properties: Should the face attributes be specified? How about eye reflections?
- Which movements (related to age) are important to specify?
- Current proposal: Breathing pattern (mandatory), heartbeat pattern (optional)
- Current proposal: Limb and head movement (mandatory), with different degrees of freedom for respective sizes
- Setup for evaluation of breathing patterns, using radar micro-Doppler effects
- Radar properties are very difficult to specify, in order to provide a realistic response:
 - Lack of detailed radar measurement data on real children (ethical reasons)
 - Many interferences if an in-vehicle measurement environment is chosen (child seat, vehicle seat, vehicle structures)
 - A radar measurement setup removing all interference factors (radar absorption chamber) can be an alternative
 - Many different types of radar and radar frequencies are used for in-vehicle sensing

Many of the above challenges are related to the intended evaluation procedures, using the CPD surrogates.

UN CLIV and ISO WG16

How can CLIV and ISO WG16 cooperate and support each other?

For example:

- Share common definitions, like CPD system and CPD surrogate (noting that it is called CLIV surrogate in the GTR draft)
- Expected test procedures using the CPD surrogate, as input for the ISO CPD surrogate specifications
- Necessary sizes and other properties of CPD surrogates
 - Feedback on the four sizes currently proposed within ISO (are all of them necessary?)
 - Necessary “vital signs” properties (motions, breathing, ...)
 - Specification of child seats to be used for the respective ages?
 - Specific postures and use cases to be met by the CPD surrogates?
- Reference studies within CLIV
- Future exchange and status reporting

Questions, comments?

Please contact your National Standards Body if you are interested in participating in the ISO activities as a nominated expert.

<https://iso.org/members>

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