

Draft Requirements and Procedures for Buses Carrying Children

The 8th IWG-CLIV Meeting (April 2025)

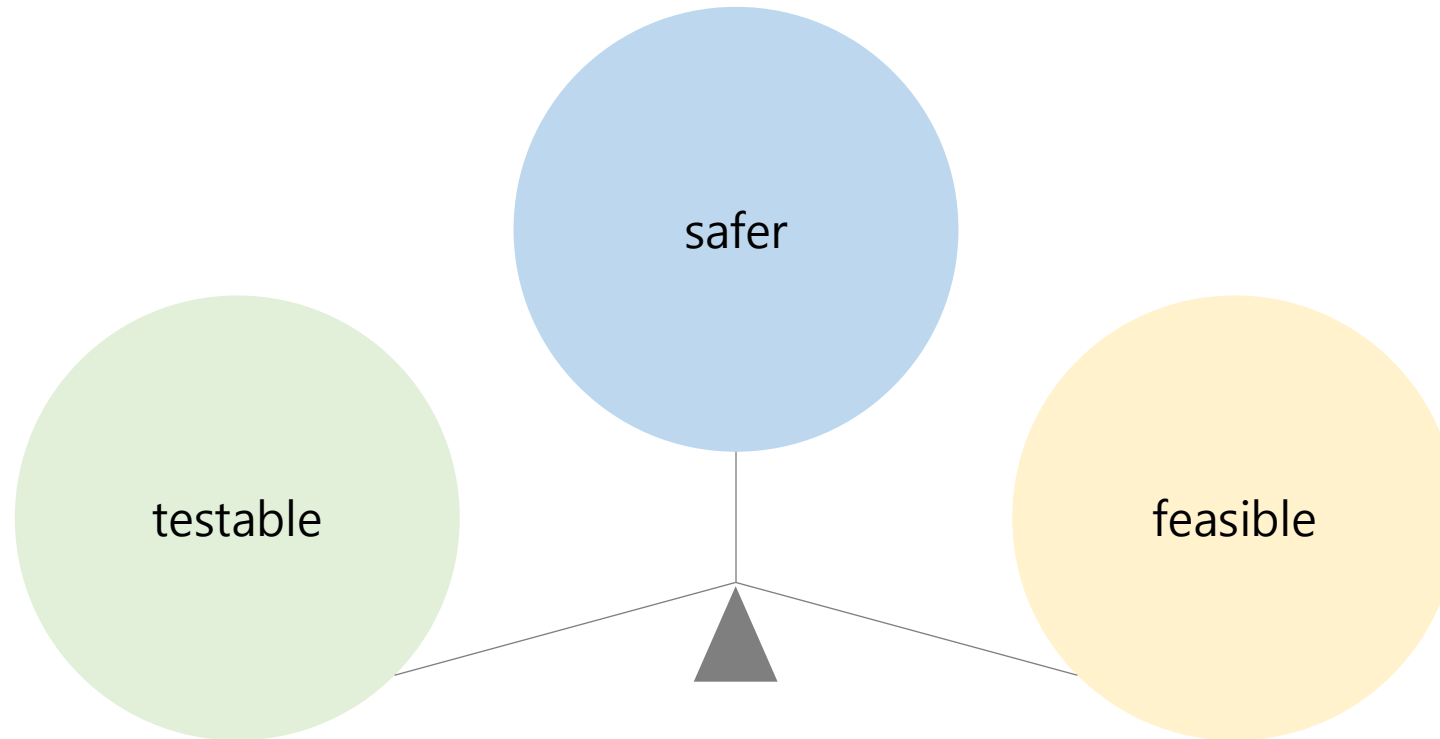
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Background and update

- **IWG-CLIV discussed countermeasures for buses carrying children in the 7th meeting and agreed on providing feedbacks to the Republic of Korea for the preparation of draft requirements and procedures (high level, major matters) for the 8th meeting**
- **Feedback summary**
 - **some preferred system for physical inspection (A)**
 - **some preferred system for direct detection (C)**
 - **majority favored the combination of (A & C)**
 - **all did not prefer system for indirect detection (B)**
- * **refer to the feedback file**

Preparation for draft requirements and procedures

- Based on the feedbacks and discussions
- Considering the balance of various factors



Discussion on “scope”

- **Already agreed on M1, M2, M3, category 1-1, and category 1-2**
- **GTR: applies to category 1-1 and category 1-2 vehicles designed for the carriage of children**
 - **light vehicles: category 1-1**
 - **buses: category 1-2 vehicles designed for the carriage of children ***
- **UN Regulation: applies to M1, and M2 and M3 designed for the carriage of children**
 - **light vehicles: M1**
 - **buses: M2 and M3 designed for the carriage of children**
- **The categories and the vehicles designed for the carriage of children may be defined by each CP’s vehicle regulation**

Discussion on “definition”

- **System for physical inspection**
- **System for direct detection**
- **System for indirect detection**
- **Vehicle master control switch**
- **Others**

Discussion on general requirements

- **System for physical inspection (“A” standalone)**
- **System for direct inspection (“C” standalone)**
- **(“A & C” combination)**
- * **Exclusion of “B” → refer to “additional suggestion” slide**
- **Category 1-2 vehicles (M2 and M3 vehicles) designed for the carriage of children shall be equipped with [a system for physical inspection, a system for direct detection, or the combination of a system for physical inspection and a system for direct detection] which satisfy(/ies) the requirements of this Regulation**

Discussion on general requirements

- **Category 1-1 vehicles (M1 vehicles) shall be equipped with [a system for direct detection] which satisfies the requirements of this Regulation**

Discussion on requirements of “A”

- **The system for physical inspection shall place a driver at the rearmost row of seats in the compartment to activate the system [within 3 minutes after the ignition switch or vehicle master control switch is deactivated]**
- **How to activate the system (e.g. push a button, etc.) shall be specified in the vehicle manual by the manufacturer**
- **[The device to activate the system (e.g. button, etc.) shall be located behind the transverse vertical plane passing through the foremost point of the rearmost seat cushion]**
- **If the system is not activated [within 3 minutes after the ignition switch or vehicle master control switch is deactivated], the system shall generate a warning [to a driver / a person around the vehicle / a person exterior to and in the direct vicinity of the vehicle / a person in charge / or all]**

Discussion on requirements of “A”

- **The warning shall be [a visual and audible signal]**
- **The warning shall be activated [for 15 seconds or longer and repeated at least every 1 minute for no shorter than [10] minutes]**
- **The visual warning shall be steady or flashing visual signal ([pauses shall not exceed 3 seconds]), or message information. Where message information is employed, the vehicle manufacturer shall ensure that the alert is able to employ the languages of the market into which the vehicle is intended to be placed***

Discussion on requirements of “A”

- **The audible warning shall consist of a continuous or an intermittent sound signal ([pauses shall not exceed [3] seconds]) or of continuous vocal information. Where vocal information is employed, the vehicle manufacturer shall ensure that the alert is able to employ the languages of the market into which the vehicle is intended to be placed***
- **[Audible warning volume: greater than 60dB(A)
- test procedure is described in the measurement procedure of the test procedure section (paragraph X.X.X.)]**

Discussion on requirements of “A”

- [Additionally, warnings notifying the driver and/or another person in charge either on the same journey or located elsewhere may be with any of the following either independently or a combination of:
 - haptic and audible feedback via the vehicle key
 - mobile device(s) via a dedicated application*in this case, the warning instruction shall be described in the vehicle manual]
- [The warning may be stopped when the same system as in paragraph X.X.X. is activated, or the ignition switch or vehicle master control switch is activated]
- Warning delay*
 - necessary for refueling, resting, etc.?
 - only for category 1-1 or M1 or all?

* Referred to Euro NCAP protocol

Discussion on requirements of “A”

- **Others**

- **warning: distinguishability (regulation conflict), synchronization (visual & audible)**
- **visual: telltale (ISO?), visibility**
- **internal warning (during the warning)**
- **message for encouraging**

Discussion on test procedures of “A”

- **Test conditions**

- [test site:

- The test site shall be in accordance with ISO 10844:2014 or a dry, level, asphalt road surface, an open area within 50 meters of the center of the measurement, free of large reflectors such as fences, etc.]

- [for measurement

- temperature: 5°C - 40°C

- wind speed: less than 5 m/s at a height of 1.2 m above the ground]

Discussion on test procedures of “A”

- **Test conditions (continued)**
 - [The background noise shall be measured for duration of 10 seconds immediately before and after a series of vehicle tests. The measurements shall be made with the same microphones and microphone locations used during the test. The A-weighted maximum sound pressure level shall be reported. The background noise (including any wind noise) shall be at least 10 dB(A) below the A-weighted sound pressure level produced by the vehicle under test]
 - [others: humidity, etc.]

Discussion on test procedures of “A”

- **Test process (as a minimum)**
 - [the ignition switch or vehicle master control switch is activated
 - the ignition switch or vehicle master control switch is deactivated
 - the system for physical inspection is not activated
 - the fulfillment of warning requirements is checked
 - [· the audible warning requirement shall be measured as specified in (annex X / paragraph X.X.X.)]]

Discussion on test procedures of “A”

- [Measurement procedure of audible warning requirements
 - the microphone center of the audible warning volume measurement device shall be located at $2\text{ m} \pm 0.05\text{ m}$ from the front or rear end of the vehicle and $1.2\text{ m} \pm 0.05\text{ m}$ above the ground as shown in Figure X
 - the direction of the microphone center shall be parallel to the ground and on the vertical plane passing through the vehicle center
 - the measurement shall be conducted for at least 5 seconds 3 times
 - in case of voice messages, one sentence is considered as 1 time
 - the maximum value (F_{\max}) rounded to the nearest tenth of a decimal point as the measurement value
 - the arithmetic mean of the 3 times measurements shall be calculated, and the calculated value is rounded to the nearest tenth place for the final measurement]

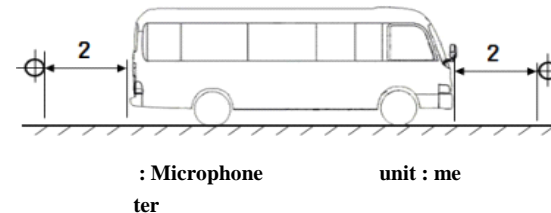


Figure X

Discussion on test procedures of “A”

- [Others: visual signal measurement?]

Discussion on requirements of “C”

- **The system shall detect [children / CLIV-ATD in the compartment] [within 3 minutes] [after the ignition switch or vehicle master control switch is deactivated, and doors are closed / doors are locked] and generate a warning [to a driver / a person around the vehicle / a person exterior to and in the direct vicinity of the vehicle / a person in charge / or all]**
- **The [CLIV-ATD, hereafter without square bracket] shall fulfill the requirements specified in [annex X / M.R.1 X / ISO XXX:XXX]**
- **The test procedures for the requirements are described in [paragraph X.X.X.] (-> commented in the last part of the requirements section)**

Discussion on requirements of “C”

- **[In case where vehicle doors are open while parked (after the detection process is completed / after the vehicle doors are closed / ...), the detection system shall be retriggered or reactivated]**
→ **for gained access?**

Discussion on requirements of “C”

- **The warning shall be [a visual and audible signal]**
- **The warning shall be activated [for 15 seconds or longer and repeated at least every 1 minute for no shorter than [10] minutes]**
- **The visual warning shall be steady or flashing visual signal ([pauses shall not exceed 3 seconds]), or message information. Where message information is employed, the vehicle manufacturer shall ensure that the alert is able to employ the languages of the market into which the vehicle is intended to be placed***

Discussion on requirements of “C”

- **The audible warning shall consist of a continuous or an intermittent sound signal ([pauses shall not exceed [3] seconds]) or of continuous vocal information. Where vocal information is employed, the vehicle manufacturer shall ensure that the alert is able to employ the languages of the market into which the vehicle is intended to be placed***
- **[Audible warning volume: greater than 60dB(A)
- test procedure is described in the measurement procedure of the test procedure section (paragraph X.X.X.)]**

Discussion on requirements of “C”

- [Additionally, warnings notifying the driver and/or another person in charge either on the same journey or located elsewhere may be with any of the following either independently or a combination of:
 - haptic and audible feedback via the vehicle key
 - mobile device(s) via a dedicated application*in this case, the warning instruction shall be described in the vehicle manual]
- [The warning may be stopped by acknowledging the warning, for example by unlocking the vehicle and/or opening a door when in vicinity of the vehicle]
- **Warning delay***
 - necessary for refueling, resting, etc.?
 - only for category 1-1 or M1 or all?

Discussion on requirements of “C”

- [A journey is deemed to be finished 15 minutes after the activation of the master control switch and the driver’s door being opened
 - reactivate? (→ Euro NCAP CPD 3.1.1.) ?]
- Others
 - warning: distinguishability (regulation confliction), synchronization (visual & audible)
 - visual: telltale (ISO?), visibility
 - internal warning (during the warning)
 - message for encouraging

Discussion on requirements of “C”

- **Warning deactivation**
 - only M1 or category 1-1
 - short-term (temporary)
 - long-term

Discussion on requirements of “C”

- **CLIV-ATD interim requirements (before specific discussion)**
 - **Can test labs be ready for numerous different [CLIV-ATDs] for compliance or type approval testing?**
- **ISO**
 - **also M.R.1?**
 - * **World-SID dummy: ISO 15830, M.R.1 Addendum 2**
 - **IWG-CLIV input?**

Discussion on requirements of “C”

- **Anthropometric requirement of CLIV ATD (discussable, interim)**
 - **age**
 - **bus: [3 years old]**
 - * **GRSP-74-15: avg. about 3 years (US) & 4 years (Korea)**
 - **light vehicle: [0 years old]**
 - * **worst case**
 - **dimension & weight (overall stature & weight?)**
 - **bus: [based on Q3]**
 - **light vehicle: [based on Q0]**
 - **if possible, face must simulates children face appearance?**
 - **if possible, reference point must be located and visible for positioning or measuring (e.g. h-point and chest area point)?**

Discussion on requirements of “C”

- **Performance requirement of CLIV ATD (discussable, interim)**
 - [**respiration rate**
 - **0 years old: 30 bpm**
 - **3 years old: (20 / 22 / 24 / 25) bpm**
 - * Euro NCAP / emergency medical textbook(Korea) / US PALS / US APLS guideline
 - **respiration movement displacement (where & how?)**
 - **0 years old: ?**
 - **3 years old: less than 22 mm***
 - * Korea's R&D report: anteroposterior diameter at no.4 rib (deep breathing (CT))]

Discussion on requirements of “C”

- Regulation confliction?
- Is false positive provision necessary? – Euro NCAP SD-102
- Is heat-resistance provision necessary?

Discussion on test procedures of “C”

- **Test conditions**

- [test site:

- The test site shall be in accordance with ISO 10844:2014 or a dry, level, asphalt road surface, an open area within 50 meters of the center of the measurement, free of large reflectors such as fences, etc.]

- [for measurement

- temperature: 5°C - 40°C

- wind speed: less than 5 m/s at a height of 1.2 m above the ground]

Discussion on test procedures of “C”

- **Test conditions (continued)**
 - [The background noise shall be measured for duration of 10 seconds immediately before and after a series of vehicle tests. The measurements shall be made with the same microphones and microphone locations used during the test. The A-weighted maximum sound pressure level shall be reported. The background noise (including any wind noise) shall be at least 10 dB(A) below the A-weighted sound pressure level produced by the vehicle under test]
 - [others: humidity]

Discussion on test procedures of “C”

- **The positions of adjustable seats for testing shall be adjusted by the way identified by the vehicle manufacturer**
- **CRS for testing shall be identified by the vehicle manufacturer in case that the vehicle requires CRS for the carriage of children**
 - **the CRS shall be installed as specified by the manual**

Discussion on test procedures of “C”

- **Test position (coverage)**
 - [- driver seat
 - all passenger seats
 - all footwell areas (driver, passenger)
 - light vehicles: luggage area?]

Discussion on test procedures of “C”

- Placing and posture

- [- with CRS: as referred to in paragraph 8.3.7.1.9 of UN R170

- without CRS: as referred to Figure XX]

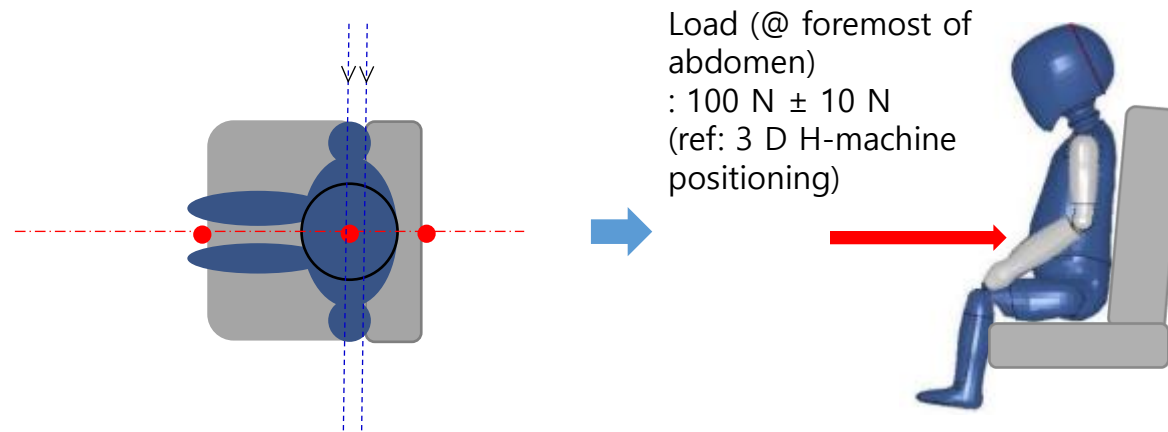


Figure XX

Discussion on test procedures of “C”

- Placing and posture
 - [- footwell: as referred to Figure XXX (tolerance ± 25 mm)
 - in case where ATD is not able to be placed by fulfilling the conditions of Figure XXX due to being located outside of the footwell area or the floor being uneven, the position may be excluded for testing]

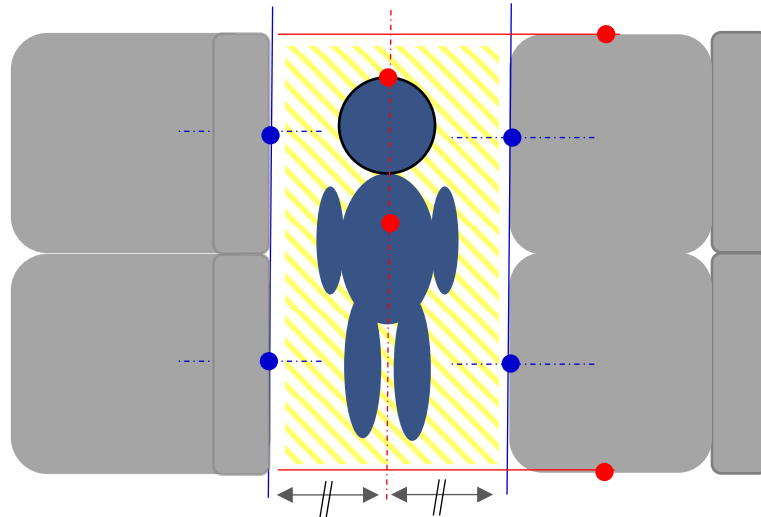


Figure XXX

Discussion on test procedures of “C”

- [Light vehicles: blanket or sun shield is covered]
 - blanket specifications?

Discussion on test procedures of “C”

- **Test process for knowingly & unknowingly (as a minimum)**
 - **CLIV-ATD in the test position is placed (may be placed after the ignition switch or vehicle master control switch is activated)**
 - **[the ignition switch or vehicle master control switch is activated / the vehicle shall be driven with one or any combination of conditions in paragraph X.X.X.**
 - **X.X.X : speed → not less than 25km/h, distance → not less than 500m, time → not less than 60s]**
 - **the ignition switch or vehicle master control switch is deactivated**
 - **[doors are closed / door are locked / both?]**
 - **CLIV-ATD is activated**
 - **the fulfillment of warning requirements is checked**
 - [· **the audible warning requirement shall be measured as specified in (annex X / paragraph X.X.X.)]]**

Discussion on test procedures of “C”

- **test process for gained access (as a minimum)**
 - [the ignition switch or vehicle master control switch is activated]
 - the ignition switch or vehicle master control switch is deactivated
 - doors are closed, but not locked
 - doors are open
 - [CLIV-ATD in the test position is placed (may be placed and undetectably blocked earlier and exposed)]
 - [doors are closed / doors are locked / both?]
 - CLIV-ATD is activated
 - the fulfillment of warning requirements is checked
 - [- the audible warning requirement shall be measured as specified in (annex X / paragraph X.X.X.)]]

Discussion on test procedures of “C”

- [Measurement procedure of audible warning requirements
 - the microphone center of the audible warning volume measurement device shall be located at $2\text{ m} \pm 0.05\text{ m}$ from the front or rear end of the vehicle and $1.2\text{ m} \pm 0.05\text{ m}$ above the ground as shown in Figure X
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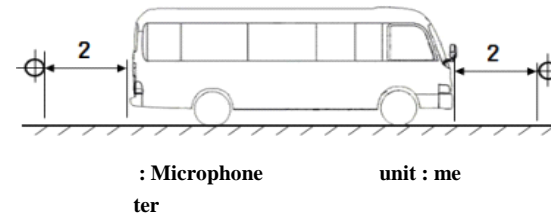


Figure X

Discussion on test procedures of “A”

- [Others: visual signal measurement?]

Additional suggestion

- **Republic of Korea would like to discuss the way not to close the door of possibility of systems for indirect detection (B) with all members (CPs, industry) of IWG**
 - **in terms of optional & combination requirement**
 - **in terms of technology neutrality**
 - **in terms of unpredictable technological progress**

(cf.) Euro NCAP warning (system for direct detection)


▪ Initial warning & escalation warning & intervention

Initial Warning




- Targets the driver
- Directly after locking <10s
- Visual and audible warning for ≥3s
- Temporary delay or cancellation

Escalation Warning
(direct sensing systems only)



- After initial warning, warn driver and others
- Repeats every 60s for 20 min period
- Vehicle and/or mobile phone warning

Intervention
(direct sensing systems only)



- Supersedes or replaces escalation warning, 10 min from locking
- Open to possibilities - must actively reduce the threat of hyperthermia

- **Warning delay**
 - one time by the driver, 10 min. (refueling, resting, etc.)
- **Warning cancellation**
 - the warning may be canceled by e.g. unlocking and/or opening a door or vehicle key or allowed app

고맙습니다.
Thank you for your attention