# Proposal for Amendment 3 of the GTR9

**Submitted by the Chair (Republic of Korea) of the Informal
Working Group on the Deployable Pedestrian Protection
Systems of UN Global Technical Regulation No. 9.**

The text reproduced below was prepared by the experts from the Informal Working Group on
the Deployable Pedestrian Protection Systems of UN Global Technical Regulation No. 9.
It is to amend the Proposal for Amendment 3 of GTR9 and proposed modifications to the current
text of the Working Document ECE/TRANS/WP.29/GRSP/2023/6e are marked in bold for new
or strikethrough for deleted characters.

# I. Proposal

*Part I, Statement of Technical Rationale and Justification,*

## "C. Phase 3,

*Paragraph 233.,* amend to read:

The IWG-DPPS had held the following meetings:

....

(w)  **12-13 April 2023; virtual**

(y)  **24 April 2023; virtual**


*Paragraph 279.,* amend to read:


279. The IWG DPPS understood that HBM simulations were the common method for determination of the HIT. In order to ensure comparability and applicability of HBM for that purpose, a qualification procedure for HBMs was developed within a subgroup of the IWG DPPS, ⟨led by the experts of Austria and OICA. All Generic Vehicle models used for the qualification are made available ⟨as Addendum **5**4 of Mutual Resolution No. 1 (M.R.1) of the 1958 and the 1998 Agreements ECE/TRANS/WP.29/1101 **by Austria**⟩.⟩


*Insert new paragraph 281,* amend to read:

**281. A subgroup of the IWG on DPPS investigated the corridors required for the qualification of human body models for HIT and WAD determination. It was unanimously agreed that realistic HIT and WAD strongly depend on biofidelic whole-body kinematics of the HBM. However, a required location of the acetabulum (AC) at the time of head impact, as e.g. described by means of a corridor, is not seen as an appropriate kinematic criterion. It was thus, for the time being, abstained from introducing AC corridors for the HBMs at HIT; however, the values will be recorded for monitoring purposes and evaluated during a possible next phase of GTR9 towards the introduction of significant, meaningful kinematic criteria for biofidelic and reliable HBM trajectories.**


*Paragraph 281 (former),* renumber as paragraph 282 and amend to read:

**282.**  In order to create an independent baseline, reference simulations have been used to determine requirements and tolerances described in the Annex 2 "Qualification Process of HBMs for Pedestrian HIT-Determination". The HBMs that were used for these reference simulations have been validated by comparing their simulation responses (HIT, kinematics) with PMHS tests. ⟨The background concerning the validation of reference HBMs are submitted at the seventy-third session of GRSP (GRSP-73-03.⟩ **The background concerning the validation of reference HBMs are available in Addendum 6 of Mutual Resolution No. 1 (M.R.1) of the 1958 and the 1998 Agreements ECE/TRANS/WP.29/1101.**


*Paragraphs 282 to 290 (former),* renumber 283 to 291, *and insert new paragraph 292,* amend to read:

**292. The IWG discussed several approaches to define tolerances for the validation tests of the different height and time values specified by the manufacturer.**
**Two main sources for tolerances were identified: a) the variation of parts due to production process (geometry, assembly, material properties, micro gas generator propellant), b) different methods to measure the Sensing Time during compliance testing.**
**Experts of VDA explained that Deployment Height, Deployed Position and Deployment Time strongly depend on the variation of parts and their assembly so that a great portion of the specified values are related to the specified tolerances during production processes. Therefore, a percentage of the specified values would appear to be most convenient as tolerances for Deployment Height, Deployed Position as well as Deployment Time.**

VDA added that the scatter of Sensing Time, on the other hand, strongly depends on the procedure of time measurement (electronical, visual, etc.) in the test lab. It was recommended to introduce tolerances on this measurement as absolute values. Therefore, a time corridor around the specified Sensing Time was introduced.

*Paragraphs 291 to 294 (former),* renumber 293 to 296, *and insert new paragraph 297,* amend to read:

**297.    For the dynamic test option, the IWG investigated possible misinterpretations of the calculated and actual launching time of the headform impactor during dynamic tests. Since the fire delay between the initiation of the launch of the headform and the triggering of the DPPS actuators is, amongst other things, based on the HIT of the HBM on the undeployed DPPS (HIT_s), but the actual headform impact takes place on the deploying DPPS (see Fig. 1 (a)), the actual launching duration will deviate from the calculated one, as depicted in Fig 1 (b).**

**This needs to be taken into account in the course of verification of ambient conditions for dynamic tests.**
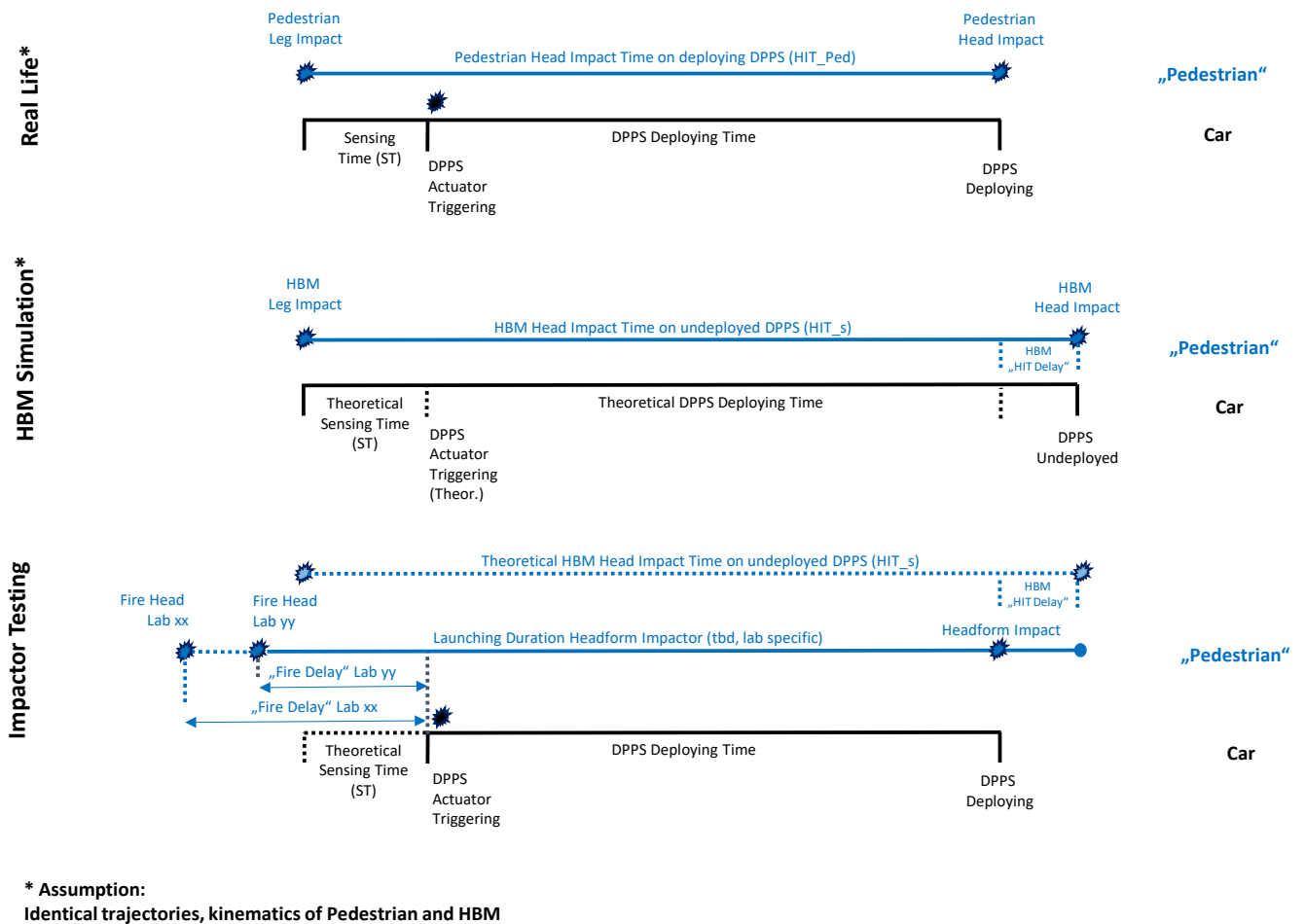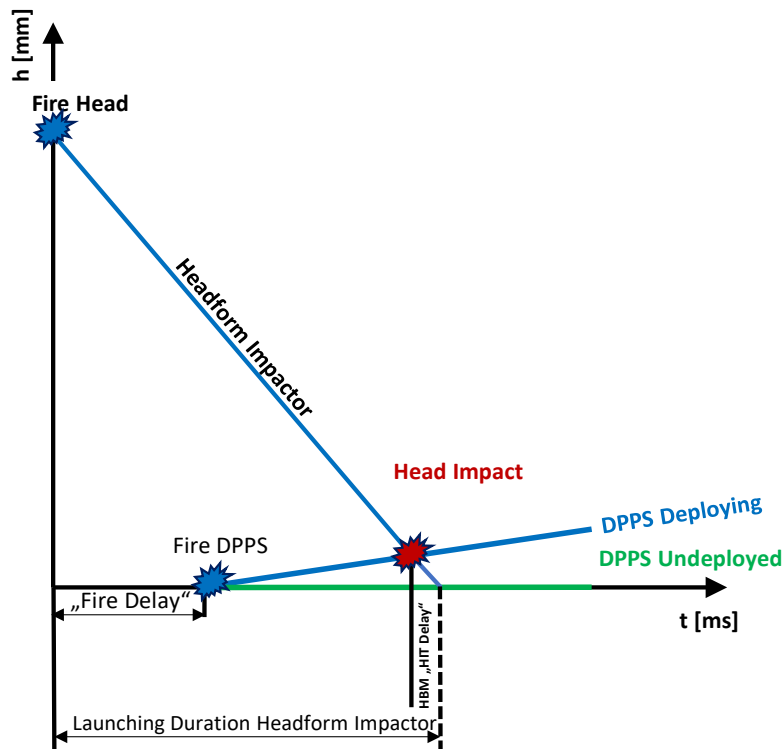


**Fig. 1 (a): Transfer of real-life accident situation with deploying DPPS to ambient conditions for impactor testing.**

**Fig. 1 (b): Effect of DPPS Deployment on Launching Duration Headform Impactor (Example).**

*Paragraphs 295 to 298 (former),* renumber as paragraphs 298 to 301.

*Insert new section 10,* amend to read:

**10. List of documents discussed in the TF-DPPS and IWG-DPPS on UN GTR NO. 9 Amendment 3**

| *Doc. No.* | *Rev.* | *Name* |
|---|---|---|
| **DPPS-1-01** | | **1st Meeting Agenda** |
| **DPPS-1-02** | **1** | **Minutes of the First Meeting** |
| **DPPS-1-03** | | **Task Force Outline** |
| **DPPS-1-04** | | **Test Procedure of Deployable Systems for Pedestrian Protection (Korea)** |
| **DPPS-1-05** | **1** | **OICA proposal based on GRSP-58-31 as revised during the meeting – 20170227** |
| **DPPS-1-06** | | **Comments on Scope (Japan)** |
| **DPPS-1-06-Appe** | | **Comments on Scope – Appendix (Japan)** |
| **DPPS-1-07** | | **Euro NCAP Pedestrian Testing Protocol v8.3 December 2016 (Germany)** |
| **DPPS-1-08** | | **JNCAP Ped Active Device Test Protocol (unofficial) (Japan)** |
| **DPPS-1-09** | | **Testing Deployable Bonnet Systems within Euro NCAP (Germany)** |

| Doc. No. | Rev. | Name |
|---|---|---|
| DPPS-1-10 | | **Bonnet Deflection of Deployable Bonnet Systems (Germany)** |
| DPPS-1-11 | | **Industry Understanding on Rulemaking (OICA)** |
| DPPS-1-12 | | **Input bonnet deflection discussion (OICA)** |
| DPPS-2-01 | **1** | **2nd meeting agenda** |
| DPPS-2-02 | **1** | **Minutes of the 2nd meeting** |
| DPPS-2-02-Annexe | | **Annex to the minutes of the 2nd meeting: Attendance list** |
| DPPS-2-03 | **3** | **Requirements Overview DPPS (Korea)** |
| DPPS-2-04 | | **Prerequisites for Deployable Bonnet Systems in Deployed State (Germany)** |
| DPPS-2-05 | **1** | **Comments on OICA proposal (Japan)** |
| DPPS-2-06 | | **Comments on document TF-DPPS/1/05 Rev. 20170227 (Japan)** |
| DPPS-2-07 | | **Comments BASt on OICA Input Presentation (Germany)** |
| DPPS-2-08 | | **OICA comment for static and dynamic test (OICA)** |
| DPPS-2-09 | | **Marking of Deployable Bonnets: Differences of Bonnet Marking Positions and Challenges in Performance Assessment (OICA)** |
| DPPS-2-10 | | **Explanation JNCAP details for Items for DPPS Amendment (Japan)** |
| DPPS-2-11 | | **Development Head Test Procedure (Germany)** |
| DPPS-2-12 | | **Text for validation of simulation methods (OICA)** |
| DPPS-2-13 | | **Comments on document TF-DPPS/2/04 (OICA)** |
| DPPS-2-14 | | **Development of a Head Impact Test Procedure for Pedestrian Protection (Germany)** |
| DPPS-2-15 | | **Validity of a Headform to be used for a Specific Impact Test Speed Condition (Japan)** |
| DPPS-2-16 | | **Comments on document TF-DPPS/2/13 (Germany)** |
| DPPS-3-01 | **Corr 1** | **3rd meeting agenda** |
| DPPS-3-02 | **Corr 1** | **Minutes of the 3rd meeting** |
| DPPS-3-03 | | **Definition of sensing area (Japan)** |
| DPPS-3-04 | | **Proposal for Definition of Head Impact Test Area (Japan0** |
| DPPS-4-01 | **1** | **4th meeting agenda** |
| DPPS-4-02 | | **Minutes of the 4th meeting** |
| DPPS-4-03 | | **Scope and Limitations of the PDI-2 (OICA)** |
| DPPS-4-04 | | **Static and Dynamic Testing of Deployable Systems (OICA)** |

| Doc. No. | Rev. | Name |
|---|---|---|
| DPPS-4-05 | | **Marking + Deployed Position (OICA)** |
| DPPS-4-06 | | **JASIC proposals for document TF-DPPS/1/05-Rev.1 (Japan)** |
| DPPS-4-07 | | **Validity of Applying the Current Headform at Low Impact Speed (Japan)** |
| DPPS-4-08 | | **Dynamic Headform Test (Synchronization) (Korea)** |
| DPPS-4-09 | | **Discussion Issues for DPPS Testing (Korea)** |
| DPPS-4-10 | | **Alternative Determination of Head Impact Time (BGS)** |
| IWG-DPPS-1-01 | | **1st IWG-DPPS meeting agenda** |
| IWG-DPPS-1-02 | 1 | **1st IWG-DPPS meeting notes** |
| IWG-DPPS-1-03 | | **IWG-DPPS Terms of Reference** |
| IWG-DPPS-1-04 | Corr 1 | **Presentation of the Euro NCAP CoHerent Project (Tu Graz)** |
| IWG-DPPS-1-05 | | **Comments: Deploy Height vs. Fully Deployed (OICA)** |
| IWG-DPPS-1-06 | | **Comments: Dynamic Testing (OICA)** |
| IWG-DPPS-1-07 | | **Comments: Pedestrian Sensing Impactor (OICA)** |
| IWG-DPPS-1-08 | | **ACEA Input: Definition of Sensing Width (ACEA)** |
| IWG-DPPS-1-09 | | **Summary of Compliance Test Procedure for Pedestrian Protection (Korea)** |
| IWG-DPPS-1-11 | | **Head Impact Time of Human Body Models (BASt)** |
| IWG-DPPS-2-01 | 1 | **2nd IWG-DPPS meeting agenda** |
| IWG-DPPS-2-02 | 1 | **2nd IWG-DPPS Meeting notes** |
| IWG-DPPS-2-03 | | **Summary Report Meeting 14 June 2018 (Sub-group Prerequisites)** |
| IWG-DPPS-2-04 | 2 | **Contracting Parties' positions on DPPS amendments** |
| IWG-DPPS-2-05 | 2 | **Proposal: Decision on Deployed Testing of DPPS (OICA)** |
| IWG-DPPS-2-06 | 1 | **Proposal for a Rev. 4 of Document TF-DPPS/2/03** |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-2-07 | | Summary of SAE Standard for Full-Scale Pedestrian Dummy (Japan) |
| IWG-DPPS-2-08 | | Quick check of proposed logic to not activate DPPS outside of sensing width (OICA) |
| IWG-DPPS-2-09 | | 2nd IWG-DPPS Attendance list |
| IWG-DPPS-2-10 | | JLR Presentation on synchronisation comparison (OICA) |
| IWG-DPPS-3-01 | | 3rd IWG-DPPS Agenda |
| IWG-DPPS-3-02 | | 4th IWG-DPPS Minutes |
| IWG-DPPS-3-03 | | Leg impactors and HBM simulation comparison for detection (CONCEPT) |
| IWG-DPPS-3-04 | | Study of Application of Upper Leg form to sensing test (Japan) |
| IWG-DPPS-3-05 | | Principle of a test procedure for Human Body Model numerical simulation (OICA) |
| IWG-DPPS-3-06 | | Attendance list |
| IWG-DPPS-4-01 | 1 | 4th IWG-DPPS Agenda |
| IWG-DPPS-4-02 | 1 | Draft minutes +BAST comments |
| IWG-DPPS-4-03 | | Task 27 (deploy bonnet) (OICA) |
| IWG-DPPS-4-04 | | System Information Requirement (South Korea) |
| IWG-DPPS-4-05 | | Sensing width proposal (OICA) |
| IWG-DPPS-4-06 | | Upper Leg Form Sensing Update (JASIC) |
| IWG-DPPS-4-07 | | Ped Dummy Test Procedure proposal (OICA) |
| IWG-DPPS-4-08 | | Marking of bonnet deployed/undeployed (OICA) |
| IWG-DPPS-4-09 | | Attendance list |
| IWG-DPPS-5-01 | | Draft agenda |
| IWG-DPPS-5-02 | | Draft minutes |
| IWG-DPPS-5-03 | | Marking (South Korea) |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-5-04 | | 1st tentative draft |
| IWG-DPPS-5-05 | | Intended height test condition (JASIC) |
| IWG-DPPS-5-06 | | Sensing Impactors comparison (JASIC) |
| IWG-DPPS-5-07 | | Basis for General Wording Proposal (Germany) |
| IWG-DPPS-5-08 | | GRSP & WP29 report |
| IWG-DPPS-5-09 | | Detection Area Width (Germany) |
| IWG-DPPS-5bis-01 | | Draft agenda |
| IWG-DPPS-5bis-02 | | Draft skype minutes |
| IWG-DPPS-5bis-03 | | IDIADA -HIT calculation feedback (Spain) |
| IWG-DPPS-5bis-04 | | HIT calculation feedback (JASIC) |
| IWG-DPPS-5bis-05 | | ULF study 2013 (Altran) |
| IWG-DPPS-5bis-06 | | ULF study 2013-conclusion for detection (Altran) |
| IWG-DPPS-6-01 | 2 | 6th DPPS draft agenda |
| IWG-DPPS-6-02 | | 6th IWG-DPPS Minutes |
| IWG-DPPS-6-03 | | V2 of draft text proposal (IDIADA) |
| IWG-DPPS-6-04 | | Sensing Impactor for DPPS (Germany) |
| IWG-DPPS-6-05 | | HIT-WAD calculation (South Korea) |
| IWG-DPPS-6-06 | 2 | HIT-WAD _Timing (OICA) |
| IWG-DPPS-6-07 | | Positioning of Ped HBM-v0 (OICA) |
| IWG-DPPS-6-08 | | Draft text proposal- updated (JASIC) |
| IWG-DPPS-6-09 | | Marking-up sketches (OICA) |
| IWG-DPPS-7-01 | | draft agenda |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-7-02 | | **IWG-DPPS 7-draft minutes** |
| IWG-DPPS-7-03 | | **Dynamic Static Test (South Korea)** |
| IWG-DPPS-7-04 | | **Test Area (South Korea)** |
| IWG-DPPS-7-05 | | **Draft-Annex (South Korea)** |
| IWG-DPPS-7-06 | | **THUMS Overview (Toyota)** |
| IWG-DPPS-7-07 | | **Positioning of Ped HBM (OICA)** |
| IWG-DPPS-7-08 | | **GHBMC_M50-PS_Mo (GHBMC)** |
| IWG-DPPS-7-08add | | **GHBMC addendum-publications (GHBMC)** |
| IWG-DPPS-7=09 | | **Flex-PLI as Sensing Impactor for UN-R127 - Contact Fidelity (Germany)** |
| IWG-DPPS-7-10 | | **Detection Area Width (Germany)** |
| IWG-DPPS-7-11 | | **Generic-Vehicle-Models (TU Graz)** |
| IWG-DPPS-8-01 | | **IWG - draft agenda** |
| IWG-DPPS-8-02 | | **Draft minutes** |
| IWG-DPPS-8-03 | | **Draft text Annex 2 organisation (Korea)** |
| IWG-DPPS-8-04 | | **FlexPLI Biofidelity for Detection - intermediate report (BASt/BGS)** |
| IWG-DPPS-9-01 | | **Draft Agenda** |
| IWG-DPPS-9-02 | 2 | **Official minutes** |
| IWG-DPPS-9-03 | | **GTR9 Preamble for FlexPLI as detection impactor (BASt/BGS)** |
| IWG-DPPS-9-04 | | **Proposal GTR9 DPPS Sensor Detection (BASt/BGS)** |
| IWG-DPPS-9-05 | | **UNR127 amendment justification for FlexPLI as detection impactor (BASt/BGS)** |
| IWG-DPPS-9-06 | | **GRSP report** |
| IWG-DPPS-9-07 | | **Dynamic Static Test comparison (Korea)** |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-9-08 | | **Comments on Korea Proposal for Draft Amendment (Japan)** |
| IWG-DPPS-9-09 | | **Proposal for Condition of Activation of DPPS (Japan)** |
| IWG-DPPS-9-10 | 1 | **OICA – HIT simulation (OICA)** |
| IWG-DPPS-9-11 | | **Sensing FlexPLI Impactor Final Evaluation (BASt – BGS)** |
| IWG-DPPS-9-12 | | **Comment on IWG-DPPS-9-09 (BASt)** |
| IWG-DPPS-10-01 | | **Draft Agenda** |
| IWG-DPPS-10-02 | | **Draft Minutes** |
| IWG-DPPS-10-03 | | **IDIADA -Explanation_pressure_data-requirement (Spain)** |
| IWG-DPPS-10-04 | | **Leg_Head_Impact_Location_JASIC (Japan)** |
| IWG-DPPS-10-05 | | **HIT-HBM -TB024 simplification for Regulation (OICA)** |
| IWG-DPPS-10-06 | | **Ped-HBM-Certification for HIT Draft (OICA)** |
| IWG-DPPS-10-07 | | **Decision list** |
| IWG-DPPS-10-08 | | **UN webpages proposals to store Generic Vehicle Models (UN Secretariat)** |
| IWG-DPPS-10-09 | | **Detection Area- Lateral offset of head-Accident Data (BASt)** |
| IWG-DPPS-11-01 | | **Draft Agenda** |
| IWG-DPPS-11-02 | | **Draft Minutes** |
| IWG-DPPS-11-03 | | **Pedestrian Kinematic Assumptions GTR9 (Japan)** |
| IWG-DPPS-11-04 | | **Suggestion on Introduction of HIT Numerical Simulation (Japan)** |
| IWG-DPPS-11-05 | | **Clarification of IWG-DPPS scope (BASt)** |
| IWG-DPPS-11-06 | | **Comment for Detection Area (ACEA)** |
| IWG-DPPS-11-07 | | **Decision list** |
| IWG-DPPS-12-01 | | **Draft agenda** |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-12-02 | 1 | Minutes |
| IWG-DPPS-12-03 | | Sensitivity Analysis Pressure Data Requirement (IDIADA) |
| IWG-DPPS-12-04 | | Sensitivity Analysis Pressure Data Requirement-GTR9 (IDIADA) |
| IWG-DPPS-12-05 | | Pressure Data Requirement-UNR127 (IDIADA) |
| IWG-DPPS-12-06 | | Comments on Priority of HIT Prediction Method (Japan) |
| IWG-DPPS-12-07 | | Pedestrian Kinematic Assumptions GTR9 (Japan) |
| IWG-DPPS-12-08 | | Detection Area II (VDA_SMMT-CCFA) |
| IWG-DPPS-12-09 | 1 | Clarification for HIT Regression (VDA-SMMT-CCFA) |
| IWG-DPPS-13-01 | | Draft agenda |
| IWG-DPPS-13-02 | 1 | Minutes |
| IWG-DPPS-13-03 | 1 | Updated Decision_List |
| IWG-DPPS-13-04 | | Consolidated draft proposal of DPPS GTR9 amendment -210906 |
| IWG-DPPS-13-05 | | revised 5-04 Pressure Data Requirement (IDIADA) |
| IWG-DPPS-13-05 | 1 | Rev1 wording for CP options |
| IWG-DPPS-13-06 | | System Specifications Proposal (IDIADA) |
| IWG-DPPS-13-07 | | Participant list |
| IWG-DPPS-14-01 | 1 | Official agenda |
| IWG-DPPS-14-02 | | Draft minutes |
| IWG-DPPS-14-03 | | Comment on HIT calculation-tool and HIT-WAD diagram (Japan) |
| IWG-DPPS-14-04 | | Sensing-width (VDA-CCFA) |
| IWG-DPPS-14-05 | | DPPS-HBM qualification procedure status (IWG subgroup) |
| IWG-DPPS-15-01 | 1 | Draft agenda |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-15-02 | | **Draft & official minutes** |
| IWG-DPPS-15-03 | | **HBM qualification for GTR draft (TF-HBM subgroup)** |
| IWG-DPPS-15-04 | 3 | **Draft1 & 2 technical requirements,**<br>**then working ECE-TRANS-WP.29-GRSP-2022-02e tech requirements** |
| IWG-DPPS-15-05 | 1 | **Preamble** |
| IWG-DPPS-16-01 | 1 | **Draft & official agenda** |
| IWG-DPPS-16-02 | 1 | **Draft & official minutes** |
| IWG-DPPS-16-03 | | **Draft Preamble** |
| IWG-DPPS-16-04 | | **Modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements** |
| IWG-DPPS-16-05 | | **Annex2_pedestrian_Human_Body_Model_qualification** |
| IWG-DPPS-16-06 | | **Annex3_HIT_determination_simulation** |
| IWG-DPPS-16-07 | | **Proposal HIT vs TRT requirement- OZ** |
| IWG-DPPS-16-08 | | **HIT vs TRT Explanation- OZ** |
| IWG-DPPS-16-09 | | **HBM-Simulations_Flow-Chart_AB** |
| IWG-DPPS-16-10 | | **Condition_for_Static_Test_in_Overshoot_Duration_JAMA** |
| IWG-DPPS-17-01 | 1 | **Draft agenda** |
| IWG-DPPS-17-02 | | **Draft minutes** |
| IWG-DPPS-17-03 | | **GRSP-71-26e - DPPS status report** |
| IWG-DPPS-17-04 | | **Decision list** |
| IWG-DPPS-17-05 | | **Status_Nr_Simulation subgroup** |
| IWG-DPPS-17-06 | | **Annex2_Pedestrian_Human_Body_Model_Qualification** |
| IWG-DPPS-17-07 | | **Annex3_HIT_Determination_Simulation** |
| IWG-DPPS-17-08 | | **Draft preamble** |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-17-09 | | modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements |
| IWG-DPPS-17-10 | | Overall Flowchart DPPS_ALIGNED with Annex 23 |
| IWG-DPPS-18-01 | 1 | Draft & official agenda |
| IWG-DPPS-18-02 | 1 | Draft & official minutes |
| IWG-DPPS-18-03 | | Annex2_Pedestrian_Human_Body_Model_Qualification |
| IWG-DPPS-18-04 | | Annex3_HIT_Determination_Simulation |
| IWG-DPPS-18-05 | | modified ECE-TRANS-WP.29-GRSP-2022-02e tech requirements |
| IWG-DPPS-18-06 | | Deployment test procedure doubts |
| IWG-DPPS-18-07 | | Sensing width-anonymised - Industry |
| IWG-DPPS-18-08 | | LAB_Pedestrian_DPPS_area detection width.pptx |
| IWG-DPPS-18-09 | | Action list |
| IWG-DPPS-18-10 | | Draft Wording Preamble GTR9 wrt Detection Area.docx |
| IWG-DPPS-18-11 | | Decision list |
| IWG-DPPS-18-12 | | Status Annexes 2 3 Subgroup |
| IWG-DPPS-18-13 | | Vehicle width additional fender - definition of RVW |
| IWG-DPPS-19-01 | 1 | Draft & official agenda |
| IWG-DPPS-19-02 | 1 | Draft & official minutes |
| IWG-DPPS-19-03 | | IDIADA wording subgroup results |
| IWG-DPPS-19-04 | | Marking undeployed |
| IWG-DPPS-19-05 | | Technical requirements 9Nov |
| IWG-DPPS-19-06 | | Preamble (17-08 merged with 18-10) |
| IWG-DPPS-19-07 | | Action list |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-19-08 | | Annex3_HIT_Determination_Simulation |
| IWG-DPPS-19-09 | | Annex2_Pedestrian_Human_Body_Model_Qualification |
| IWG-DPPS-20-01 | 1 | Draft & official agenda |
| IWG-DPPS-20-02 | 1 | Draft & official minutes |
| IWG-DPPS-20-03 | | Action list |
| IWG-DPPS-20-04 | | Preamble 16Nov22 |
| IWG-DPPS-20-05 | | Technical requirements 16Nov22 |
| IWG-DPPS-20-06 | | (OZ) Proposal Overshoot Phase |
| IWG-DPPS-20-07 | | (BH-IDIADA)_Dynamic Testing Sync |
| IWG-DPPS-21 | | ECE-TRANS-WP.29-GRSP-2023-xx final GTR0-03 proposal IWG-DPPS.docx |
| IWG-DPPS-21 | | ECE-TRANS-WP29-GRSP-2023-yy MR1 Amend-4 from IWG-DPPS.docx |
| IWG-DPPS-21-01 | 1 | Draft & rev1 agenda |
| IWG-DPPS-21-02 | 1 | Draft & official minutes |
| IWG-DPPS-21-03 | | Action list |
| IWG-DPPS-21-04 | | Preamble  GRSP-72-08 |
| IWG-DPPS-21-05 | | Technical requirements  GRSP-72-09 |
| IWG-DPPS-21-06 | | Status report  GRSP-72-11 |
| IWG-DPPS-21-07 | 7 | consolidated draft.rev1-7- updated 24Jan-15 Feb.2023 |
| IWG-DPPS-21-07 | | consolidated final - updated 15 Feb.2023 |
| IWG-DPPS-21-08 | | Dummy_comparison_with_HBM_rev1 Japan-draft |
| IWG-DPPS-21-09 | | Dummy_proposal_for_text_of_preamble Japan |
| IWG-DPPS-21-10 | 7 | Proposal Overshoot Phase (BAST) |
| IWG-DPPS-21-11 | 1 | Decision_List & Decision_List with text check |
| IWG-DPPS-21-12 | 1 | smallest_HBM (BAST) |

| Doc. No. | Rev. | Name |
|---|---|---|
| IWG-DPPS-21-13 | 1 | Comments to Document Comparison bet. HBMs (Annex 2) and Pedestrian Dummy (BAST) |
| IWG-DPPS-21-14 | 1 | only_Annex2-3 update (CKlug) |
| IWG-DPPS-22 | | ECE-TRANS-WP.29-GRSP-2023-06e.pdf  GTR9-03 Proposal |
| IWG-DPPS-22 | | ECE-TRANS-WP.29-GRSP-2023-07e.pdf MR1 Addendum 5 proposal |
| IWG-DPPS-22-01 | | Draft agenda |
| IWG-DPPS-22-02 | 1 | Draft & official minutes |
| IWG-DPPS-22-03 | | Head impact time verification (VDA) |
| IWG-DPPS-22-04 | | consolidated Doc with all changes GTR and UNR- 13Apr23 |
| IWG-DPPS-22-05 | | AC in preamble proposal |
| IWG-DPPS-22-06 | | Action list updated |
| IWG-DPPS-23-01 | | Draft agenda |
| IWG-DPPS-23-02 | | Draft minutes |
| IWG-DPPS-23-03 | | Test Rig Synchronization for DPPS |
| IWG-DPPS-23-04 | | Overall Flowchart DPPS_23 |
| IWG-DPPS-23-05 | | consolidated doc with all changes GTR and UNR 24Apr23 |
| IWG-DPPS-23-06 | | modified_ECE-TRANS-WP29-1101-Amend-5 |
| IWG-DPPS-23-07 | | OZ small group on tolerances Proposal on 28Apr2023 |
| IWG-DPPS-23-08 | 1 | GRSP-73-10 MR1-Amend4 Addendum5 GVM consolidated 28Apr, 11May |
| IWG-DPPS-23-09 | 1 | GRSP-73-11 MR1-Amend5 Addendum6 HBM informal 28Apr |
| IWG-DPPS-23-10 | 1 | GRSP-73-12 GTR9-03 informal doc |
| IWG-DPPS-23-11 | 1 | GRSP-73-13 IWG-DPPS final status report |

*Part II, Text of the Regulation*,
*Paragraph 3*, amend to read:
## "3. Definitions

*Paragraph 3.30.*, amend to read :

"3.30. [̶"Outer surface" means those components of the vehicle ~~within the headform test areas~~, which may be contacted by the pedestrian in case of an accident. The outer surface may include **the bumper,** the bonnet, the fenders, but also external airbags or other components**.** ~~within the headform test areas.~~]̶"

*Figure 11*, enlarge CoB written spaces, amend to read :

"Figure 11
Determination of the Detection Test Area (see paragraph 3.19): examples



**CoB -42mm (l+r) > 75% of RVW**

**CoB -42mm (l+r) < 75% of RVW**
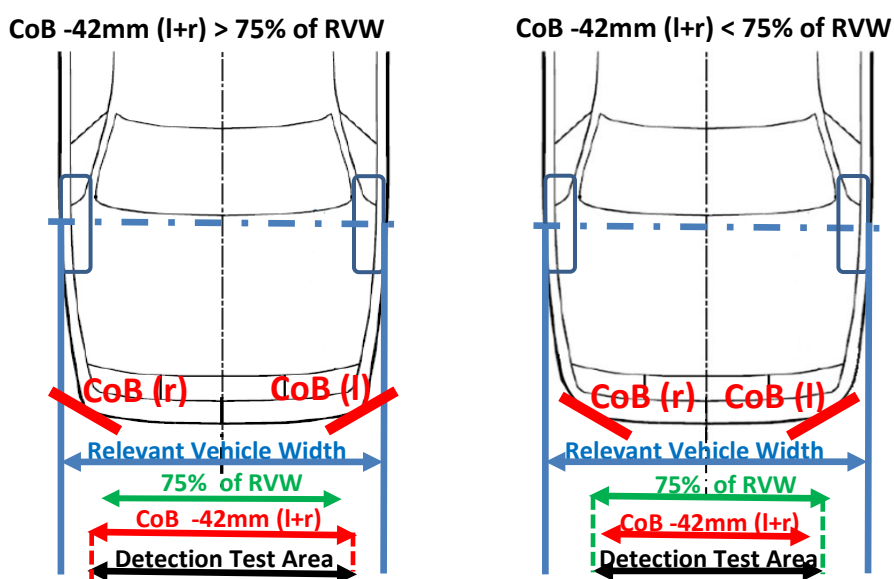
*Paragraphs 5.2. and 6.2.4.*, amend to read:

"5.2. Headform tests
[̶When~~/If the manufacturer stipulates that the vehicle shall be~~]̶ tested as a DPPS, the test conditions and requirements in Annex 1 shall apply.

6.2.4. [̶When~~/If the manufacturer stipulates that the vehicle shall be~~]̶ tested as a DPPS, the vehicle shall be adjusted as specified in the test procedure defined in Annex 1."

*In* **Annex 1,**

*Paragraph 1.6.*, amend to read:

1.6. Verification of the prerequisites for deployed static tests: Deployed Position, Maximum Deployment Height**, Sensing Time** and Deployment Time, as illustrated in the deployment time history curve (see Figure 1-1 of this Annex).

The values specified by the manufacturer shall be verified by using appropriate tracking means, such as high-speed videos, accelerometer, or laser at the reference points as indicated by the manufacturer (on the lifting devices). **The tolerance for the Sensing Time is -5ms/+3ms on the specified value, whereas the other** tolerances are ±20 percent ~~on~~for the specified values **respectively**. If **a measured value is** within the

defined tolerance~~s~~, the value specified by the manufacturer shall be used. Otherwise, the measured value~~s~~ shall be used ~~for the test~~.

*Paragraphs 1.7.1.1. and 1.7.2.*, delete the brackets:

1.7.1.1.        For the system deployment verification, sensor activation tests with the flexible lower legform impactor, as specified in paragraph 6.3.1.1 of this regulation, shall be performed ~~[~~within the detection test area~~]~~ at the DPPS lower deployment velocity threshold.

1.7.2. ~~[A]~~ test with the flexible lower legform impactor shall be performed at nominal speed at vehicle centreline (Y0).

*Paragraph 2.2.1.*, amend to read:

2.2.1   ~~For dynamic testing, only ST shall be verified.~~ If the measured ST is within a tolerance of - 5ms/+3ms, the value specified by the manufacturer shall be used. Otherwise, the measured value shall be used for the test. **For dynamic testing, only ST shall be verified.**

*Paragraph 4.2.1.3., delete former text and figure* and amend to read:

**4.2.1.3.        Fire Delay**

**The test facility shall ensure that the head impact occurs at the correct time relative to the deployment of the DPPS, taking into account the HIT_s for the corresponding WAD of the head impact point from Figure 1-3 and ST, as shown in the example in Figure 1-4 (a) below.**

**„Fire Delay" is the elapsing time between the initiation of the headform launch and the initiation of the DPPS deployment module.**

**It is determined according to the equation:**

*Fire Delay = Launching Duration Headform Impactor – (HIT_s – ST).*

**The "Launching Duration Headform Impactor" is rig-specific and is the time period between launching of the headform impactor and the theoretical time of head impact on the undeployed DPPS. Due to the DPPS deployment during testing, the *actual* launching duration of the headform impactor is expected to differ from the launching duration headform impactor (time difference: see example in Figure 1-4 (b)).**

**Figure 1-4(a): Synchronization of Test Rig and DPPS Deployment (Example)**



**Timeline of HBM simulation:**

HBM Leg impact — Suppressed initiation of deployment module — HBM Head impact on undeployed DPPS

Sensing time (ST)

HIT_s

**Timeline of dynamic test:**

Initiation of headform launch — Initiation of deployment module — Headform impact — Theoretical headform impact on DPPS undeployed

Fire delay

Launching Duration Headform Impactor
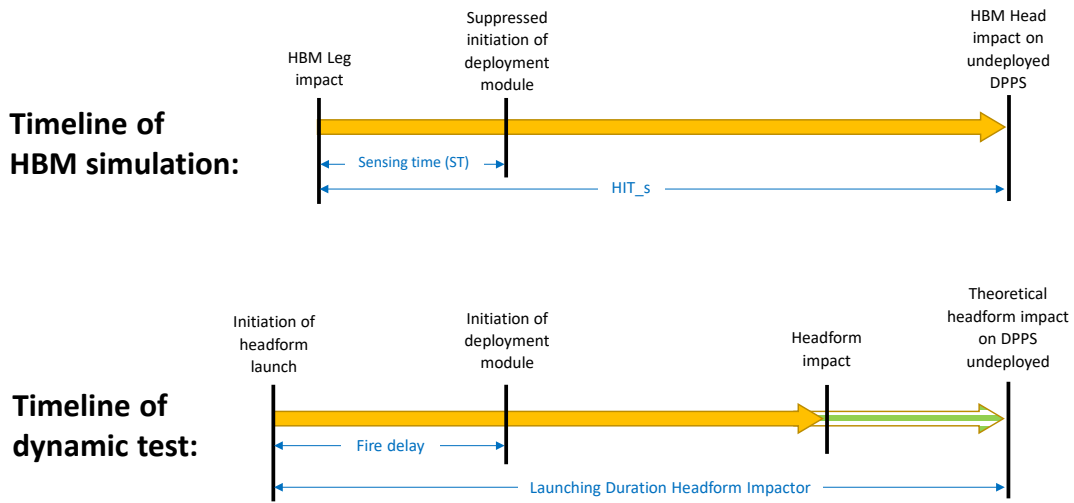
# Fire delay = Launching duration headform impactor - (HIT_s - ST)

5

**Figure 1-4 (b):**
**Effect of DPPS Deployment on Launching Duration Headform Impactor (Example)**



h [mm]

Fire Head

Headform Impactor

Head Impact

DPPS Deploying

Fire DPPS

DPPS Undeployed

„Fire Delay"

Time Difference

t [ms]

Launching Duration Headform Impactor
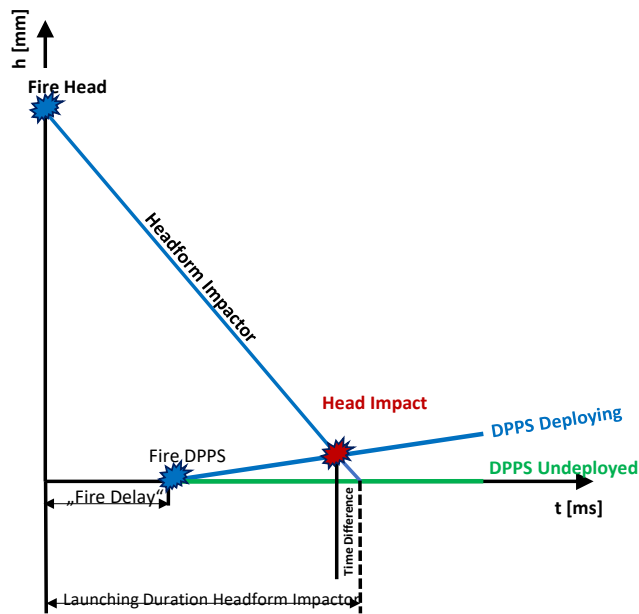
*In* **Annex 1 – Appendix,** *replace former figure as follows*:

## Flowchart DPPS Assessment[1]



| Flowchart element | References: |
|---|---|
| OEM information on DPPS | Annex 1, Chapter 1.2 |
| **Low speed protection** @ 0.9*LDT speed HIC 1000 / 1700 → no → Fail | Annex 1, Chapter 1.4 |
| **Pedestrian detection** Tests in detection area with FlexPLI | Annex 1, Chapter 1.7 |
| **HBM Qualification** Annex 2: Corridors met? → no → Headform tests with DPPS @ undeployed position | Annex 2 / Regulation |
| Selection of headform impact points | |
| CP opts to consider static tests | Annex 1, Chapter 4.1 |
| System/surrogate stability check for lab testing | Annex 1, Chapter 4.1.2 |
| **HIT_d vs WAD regression line** Annex 3: HBM simulations on deployed DPPS, 40 km/h | Annex 3 |
| TRT, as determined | Annex 1, Chapter 2 |
| HIT_d (WAD, head impact point) ≥ TRT → no → **HIT_s vs WAD regression line** Annex 3: HBM simulations on undeployed DPPS, 40 km/h | Annex 1, Chapter 4.1.1 |
| ST, as verified | Annex 1, Chapter 2.2.1 |
| Static test @ deployed position / Dynamic test @ HIT | Annex 1, Chapter 4 |
| HIC criterion HIC 1000 / 1700 → no → Fail | Regulation |
| Pass | Regulation |

Left labels:
- **I) Prerequisites**: Protection at lower vehicle speeds; Pedestrian detection; Qualification of HBM
- **II) Compliance Testing**: Timing of DPPS deployment; Test Assessment

[1]: Will be updated with DPPS Phase 2 (Generic approach)

*In* **Annex 2,**

**1.2. Definitions**

…

*Paragraph 1.3.*, continue numbering e to i (former a to g) **and amend to read:**

1.3. General Requirements

Only those HBM statures have to be qualified which are required for the HIT determination simulations described in Annex 3, paragraph 2.2.

The pedestrian Human Body Model that is qualified is the very same model as used for HIT-Determination simulations. This applies to:

 (a) Version of the Human Body Model;

 (b) Node-Position of every single node of the Human Body Model;

 (c) If available:

  (i) identical initial element stresses/strains;

  (ii) identical initial contact penetrations/contact forces;

 (d) Identical material cards (including fracture mode), contact cards, control cards and constraints.

Furthermore, it is important that all simulations (qualification and HIT-Determination) are performed with consistent settings. This applies to:

 (e~~a~~) Solver-Version; **and type (e.g. processing type, precision, parallelisation);**

 ~~(b)~~ ~~Solver Platform ([Shared Memory Parallel processing (SMP), Massively Parallel Processing (MPP)]);~~

 ~~(c )~~ ~~**Solver-Precision (Single, Double Precision);**~~

 (f~~d~~) The time-step used for simulations;

 (g~~e~~) Time-step settings (relating to initial and dynamic mass scaling);

 (h~~f~~) Contact settings (between Human Body Model and Vehicle);

 (i~~g~~) Control settings which are affecting the pedestrian model.

*Paragraph 2.6*, tables replaced and amend to read:

2.6. Reference Results for Qualification Simulations

From the qualification simulations with the generic vehicle models, HIT values and the location of HC ~~and only for AM50, also AC~~ at the time of head impact shall be compared with the references in Tables 2-3, 2-4 and 2-5.

These tables have been created using simulations with validated HBMs ~~(see Appendix B).~~ **as Addendum 6 of Mutual Resolution No. 1 (M.R.1) of the 1958 and the 1998 Agreements ECE/TRANS/WP.29/1101.**

The trajectories are measured relative to the generic vehicle model, which means that the x-displacement of the generic vehicle has to be subtracted from the measured x coordinates HCx ~~and ACx~~ in the global coordinate system. For HCz ~~and ACz~~ the global z-coordinates are used.

**[Table 2-3: 50th Percentile Male (AM 50)**

| GV Type | Velocity (km/h) | HIT (ms) | | HCx (mm) | | HCz (mm) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Min | Max | Min | Max | Min | Max |
| FCR | 30 | 152 | 197 | -1438 | -1005 | 1019 | 1117 |
| | 40 | 127 | 150 | -1489 | -1105 | 1006 | 1158 |
| | 50 | 107 | 121 | -1504 | -1179 | 1024 | 1169 |
| RDS | 30 | 163 | 199 | -1574 | -1104 | 931 | 1125 |
| | 40 | 133 | 156 | -1659 | -1191 | 931 | 1178 |
| | 50 | 112 | 127 | -1665 | -1283 | 981 | 1183 |
| SUV | 30 | 127 | 144 | -1000 | -624 | 1092 | 1193 |
| | 40 | 101 | 116 | -1032 | -737 | 1103 | 1187 |
| | 50 | 86 | 99 | -1110 | -799 | 1109 | 1191 |

## Table 2-4 Six-Year-Old (6YO)

| GV Type | Velocity (km/h) | HIT (ms) | | HCx (mm) | | HCz (mm) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Min | Max | Min | Max | Min | Max |
| FCR | 30 | 60 | 79 | -388 | -325 | 909 | 942 |
| | 40 | 49 | 61 | -427 | -358 | 905 | 954 |
| | 50 | 43 | 50 | -457 | -387 | 889 | 972 |
| RDS | 30 | 65 | 81 | -478 | -362 | 857 | 914 |
| | 40 | 52 | 63 | -495 | -409 | 852 | 923 |
| | 50 | 44 | 54 | -524 | -449 | 848 | 929 |
| SUV | 30 | 35 | 50 | -154 | -97 | 1010 | 1033 |
| | 40 | 28 | 39 | -183 | -134 | 1024 | 1050 |
| | 50 | 18 | 36 | -218 | -160 | 1023 | 1089 |

## Table 2-5 5th Percentile Female (AF 05)

| GV Type | Velocity (km/h) | HIT (ms) | | HCx (mm) | | HCz (mm) | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Min | Max | Min | Max | Min | Max |
| SUV | 30 | 90 | 102 | -622 | -447 | 1042 | 1133 |
| | 40 | 69 | 82 | -679 | -496 | 1046 | 1126 |
| | 50 | 59 | 70 | -736 | -527 | 1048 | 1127 |

**]**

95th Percentile Male (AM 95)

AM 95 does not need to be specifically qualified. AM 95 models which can be used are all derived from AM 50 models and therefore the AM9 5 only has to meet the positioning requirements and no specific qualification simulations need to be performed.

In *Table 2-7* , amend to read:

| | | |
| --- | --- | --- |
| Total weight | kg | **-5% +10%** |

In *Table 2-8,* replace all square brackets […] by round brackets (…).

*Appendix B,* to be deleted.


*In Annex 3:*
*Table 3-3 and 3-4,* replace all square brackets […] by round brackets (…).