

## **Proposal for amendments to the Consolidated Resolution on the Construction of Vehicles (R.E.3)**

*Renumber paragraphs "7 and 8" as "8 and 9".*

*Insert a new paragraph 7 to read:*

### **"7. Test devices and equipment**

The Table below lists specific test devices and equipment that are referenced in individual regulations made under the "1958 Agreement" as necessary for the determination of compliance of "wheeled vehicles, equipment and parts which can be fitted and/or used on wheeled vehicles" with one or more of those UN Regulations. The table refers to individual Addenda to this Consolidated Resolution in which details of the design, construction, maintenance and preparation of the test devices or equipment can be found.

Precise conditions of use for each of the specified test devices or equipment can be found in the appropriate UN Regulation.

<i>ECE/TRANS/WP.29/78/Add.</i>	<i>Generic Name of the Test Device</i>	<i>Regulation(s) requiring the Test Device</i>	<i>Date of Adoption of the Addendum dd/mm/yy</i>
1	(Reserved) BioRID Dummy	Rxx	
2	(Reserved) WorldSID Dummy	Rxx	
3	(Reserved) Q-0 Dummy	Rxx	
4	(Reserved) Q-1 Dummy	Rxx	
5	(Reserved) Q-1.5 Dummy	Rxx	
6	(Reserved) Q-3 Dummy	Rxx	

"

## Addendum 1 - BioRID

# Specifications for the Construction, Preparation and Certification of the 50<sup>th</sup> percentile male BioRID anthropometric test device for use in specified UN ECE regulations

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## 1. Introduction.

### 1.1. General Design

For the purposes of application in the context of UN ECE Regulations the BioRID-II anthropometric test dummy is defined by compliance with the engineering drawings, build and calibration requirements set out in this document. The generic build level, i.e. BioRID IIg is not sufficient to determine the status of the dummy and it is necessary to establish that the individual components that comprise the dummy are manufactured to the particular level of drawing revision that are tabled in Annex I.

The BioRID-II was developed to mimic the human car occupant behaviour in low severity rear impacts and to take relevant measurements which correlate to the risk of whiplash associated disorders. The dummy is designed with a fully articulated, two-dimensional lumbar, thoracic and cervical spine, with 24 vertebrae included.

The spine consists of seven (7) cervical (C1-C7), twelve (12) thoracic (T1-T12) and five (5) lumbar (L1-L5) vertebrae. The head assembly and the top cervical vertebra (C1) are connected using an occipital interface plate. This interface is mounted a 6-channel or 3-channel upper neck load cell. If no load cell is used, a load cell structural replacement has to be mounted instead. The superior thoracic vertebra (T1) is designed to mate the cervical and thoracic vertebrae. It is contoured as a cervical vertebra on the upper side and a thoracic vertebra on the lower side. The superior lumbar vertebra (L1) is similar to the top thoracic in its design to mate the two sections. The upper surface of the vertebra is shaped like the thoracic vertebrae and the bottom is like the lumbar vertebrae. The lowest lumbar vertebra (L5) connects the spine to the pelvis through a sacrum lumbar and pelvis interface plate.

The vertebrae for the BioRID II are made of durable plastic and are connected with pins at each joint that allow for angular motion in the sagittal plane only. The interfaces, occipital and pelvis, are made of aluminium. There are rubber blocks glued to the top of each vertebra to simulate the compression resistance of the muscles and discs between each human vertebra.

For improved neck motion response, tensioning cables have been designed into the neck region of the spine. There are three cables that originate at the top of the neck with threaded adjustments for controlling cable tension. One cable goes through the cervical vertebrae and around a damper assembly at the T4 vertebra, then back through the vertebrae to the top of the neck. The two other cables also start at the top of the neck but terminate at two spring-loaded cable-tensioning devices mounted on the right side of the torso.

The upper torso flesh is made of moulded silicone. Included in the flesh mould are: the left and right arm attachment yokes with reinforcement plates, abdomen interface attachment, abdomen cavity, abdomen valve, spine-torso interface.

The arms and legs are standard Hybrid III 50<sup>th</sup> percentile dummy assemblies and the head and pelvis are modified Hybrid III 50<sup>th</sup> percentile assemblies.

The flesh material and/or external surface characteristics shall enable positive attachment of adhesive targets.

### 1.2. Instrumentation

# Annex 1

## Engineering Drawings

Appendix 1 - Assemblies

Appendix 2 - Head

Appendix 3 – Cervical Spine

Appendix 4 – Thoracic Spine

Appendix 5 - Torso

Appendix 6 – Muscle Substitute

Appendix 7 - Limbs

Appendix 8 - Tools

1. The drawing files and parts lists contained within this Annex define the essential elements of which the BioRID dummy is defined for regulatory use. Discrete parts of the dummy are identified under separate appendices with each appendix prefaced with a table of the drawings contained within and a list of additional parts that are available as standard commercial parts.

2. Drawings that have been subject to amendment are listed in the following table for ease of reference. This table contains a brief description of the issue that necessitated the drawing change. The revised drawing is also referenced in the content table of the individual appendix. All revised drawings in the appendix are positioned chronologically after the original and carry the suffix “Rev.x”.

Table 1  
**Table of Drawing Revisions**

<i>Drawing Ref</i>	<i>Appendix / Table</i>	<i>Title</i>	<i>Description of change</i>
<i>TRANS/WP.29/78/Add.1/...</i>			
<u>Example</u> Dwg.4/Rev.1	1 / 1	Plate, Interface – Occipital Condyle	Material change

2. The drawings in this Annex are intended for reference purposes to establish the suitability of a particular device for use in the assessment of vehicles or their components as required by regulations made under the 1958 Agreement. They are not intended for use as engineering drawings for the purpose of the manufacture of components.

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## Annex 1 -Appendix 1

### Engineering Drawings Index Parts List: Head

Table 1  
Drawing Index

<i>TRANS/WP.29/78/Add.1/...</i>	<i>Part Number</i>	<i>Description</i>	<i>Drg. Rev.</i>	<i>No. of Sheets</i>	<i>QTY Per Assembly</i>	<i>QTY Per Dummy</i>	<i>Common with Addenda(s)</i>
App.1/Drg. 1	4947	Ballast, Skull	C	1	1	1	
App.1/Drg. 2	4956	Assy - S.R. Neck Loadcell	C	1	1	1	
App.1/Drg. 3	4956	S.R. Neck Load Cell	C	1	1	1	
App.1/Drg. 4 App.1/Dwg.4/Rev.1	ARA-100	Plate, Interface-Occipital Condyle	P S	1	1	1	
App.1/Drg. 5	ARA-103	Head Assembly	D	1	1	1	
App.1/Drg. 6	ARA-104	Skull, BioRID	J	1	1	1	
App.1/Drg. 7	78051-311	Insert - Threaded - 1/2-20					
App.1/Drg. 8	ARA-105	Assembly, Occipital Condyle Plate	B	1	1	1	
App.1/Drg. 9	ARA-106	Cap, Skull	G	1	1	1	
App.1/Drg. 10	ARA-107	Accelerometer Mount For Endevco 7264-2000	F	1	1	1	
App.1/Drg. 11	ARA-108	Skin, Head	B	1	1	1	
App.1/Drg. 12	ARA-110	Cap Skin, Skull	C	1	1	1	

Table 2.  
Parts Index

<i>Part Number</i>	<i>Description</i>	<i>Drwg. Rev.</i>	<i>No. of Sheets</i>	<i>QTY Per Assembly</i>	<i>QTY Per Dummy</i>	<i>Common with Addenda(s)</i>
9010104	Helicoil, M6 X 1.0 X 9mm LG.					

## **Annex 2 - Certification**

Appendix 1 - Schematic and General Arrangement of Equipment

Appendix 2 – Certification Corridors

### **II. Justification.**

1. At the 152<sup>nd</sup> session of WP.29, the Executive Committee considered a request from the Chair of the GTR 7 informal group for guidance on their preference for managing files that define the technical details associated with the dummy (e.g. drawings, calibration etc.) and in particular, to ensure legislative control of technical revisions to the tool (version control). The Executive Committee noted the relevance of the issue to regulations developed in the framework of both the 1958 and 1998 Agreements and also to other test devices employed for the purpose of regulatory assessment. A proposal was invited from the gtr No. 7 informal group that may be considered for adoption, to serve not only the issue of dummies but also the wider interests of WP.29.

2. At its 155th session, the World Forum agreed with the approach for indexing the information for test devices, (as indicated in ECE/TRANS/WP.29/2011/85), as Addenda to the Consolidated Resolution on the Construction of Vehicles (R.E.3) and hence for application under the 1958 Agreement. The World Forum invited the Chair to develop further the proposal in cooperation with the Secretariat.

3. As a first step it is necessary to establish the use of Addenda for this purpose within the body of the Consolidated Resolution. Drafted in the convention of the Consolidated Resolution, this proposal introduces “Test Devices” as a discrete subject of interest. It also establishes:

- a) That a discrete Addendum will be added for each test device added,
- b) the numbering format for each discrete Addendum added,
- c) the relationship between the Test Device and the regulations annexed to the 1958 Agreement, and
- d) the date of adoption of the Addendum into the Consolidated Resolution.

4. “Test Device” is used as a descriptor to provide the flexibility for equipment or tools of any description to be added, if considered appropriate.

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