Transmitted by the experts of the United Kingdom and the United States of America

Informal document **GRSP-51-37**
(51st GRSP, 21 – 25 May 2012,
agenda item 3)

Draft proposal for the establishment of:

SPECIAL RESOLUTION No. 2

CONCERNING THE DESCRIPTION AND PERFORMANCE OF TEST TOOLS AND DEVICES NECESSARY FOR THE ASSESSMENT OF COMPLIANCE OF WHEELED VEHICLES, EQUIPMENT AND PARTS ACCORDING TO THE TECHNICAL PRESCRIPTIONS SPECIFIED IN REGULATIONS AND GLOBAL TECHNICAL REGULATIONS MADE UNDER THE 1958 AND 1998 AGREEMENTS.

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PREAMBLE

THE EXECUTIVE COMMITTEES OF THE 1958 AND1998 AGREEMENTS,

DESIRING to harmonise technical requirements while ensuring high levels of safety, environmental protection, energy efficiency and anti-theft performance of Wheeled Vehicles, Equipment and Parts which can be fitted and/or be used on Wheeled Vehicles,

BEARING IN MIND that the 1958 Agreement established on 20 March 1958 provides for the adoption of uniform technical prescriptions for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles and the conditions for reciprocal recognition by Contracting Parties of approvals granted on the basis of these prescriptions,

BEARING IN MIND that the 1998 Agreement provides for the establishment of global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles was opened for signature at Geneva on 25 June 1998,

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BEARING IN MIND that both Agreements facilitate the trade of wheeled vehicles, equipment and parts with harmonized performance requirements among the respective Contracting Parties,

BEARING IN MIND that the assessment of compliance with the technical prescriptions of regulations made under the 1958 Agreement and global technical regulations made under the 1998 Agreement requires the use of test tools and equipment,

BEARING IN MIND that the assessment of compliance may take place in any of the territories of the Contracting Parties and at a variety of laboratories within those territories,

BEARING IN MIND that to facilitate the application of the Agreements the Executive Committees of the 1958 Agreement (A.C.1) and of the 1998 Agreement (AC.3) have decided that the test tools and devices necessary for compliance assessment should be comprehensively defined in terms of their essential characteristics and performance in Special Resolution 2 (S.R.2),

BEARING IN MIND that this resolution does not of itself hold regulatory status within Contracting Parties.

RECOMMENDS that Contracting Parties and manufacturers refer to this S.R.2 when establishing the suitability of their test tools and devices when used for the assessment of compliance with the prescriptions regulations or global technical regulations made under the 1958 or 1998 Agreements respectively.

A. STATEMENT OF TECHNICAL RATIONALE AND JUSTIFICATION

Harmonisation of technical prescriptions of Contracting Parties with respect to wheeled vehicles, equipment and parts is the declared objective of both the 1958 and 1998 Agreements. An essential element of this objective is the confidence that the assessment of compliance is robust and not subject to variation depending upon the test tools or devices used in the assessment process.

Informal work groups of the expert group on passive safety (GRSP) had reported that the new generation of test tools being considered were of a higher level of complexity than had previously been used. They also noted that even amongst those tools present in the market, and identified by a common descriptor from the manufacturer, different build levels existed. Also of concern is that the tools were available only from a single supplier and it was considered desirable to establish some resilience should the supplier cease to support a tool for any reason.

At its 155th session, the World Forum agreed an 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.

At the one-hundred-and-fifty sixth session of WP.29, the Secretariat and the representative of the United Kingdom, through document WP.29-156-18, presented a proposal to amend the Consolidated Resolution (R.E.3) so as to establish a repository for the technical description and performance requirements for test tools and devices that are themselves specified as necessary for use in the assessment of compliance with technical prescriptions of regulations made under the 1958 Agreement.

WP.29 reaffirmed the desirability of such a repository but also recognised the added value that would be secured were it to be applicable to regulations made under the 1958 Agreement and global technical regulations made under the 1998 Agreement. S.R.2 is written to fulfil this objective and its applicability is defined by reference to a particular test tool or device from within the individual regulations or global technical regulations.

S.R.2 is written to define the test tool or device and its preparation for use in a regulatory context. The specific conditions for the deployment of the test tool or device are contained within the body of the regulation or global technical regulation made under the 1958 or 1998 Agreements respectively.

WP.29 was clear that the repository should provide for the inclusion of a wide range of different test tools and not be restricted to the anthropometric test devices specifically recognised by the GRSP expert group. The construction of this S.R.2 is styled to permit the addition of discrete addenda for each and any test tool or device as appropriate. The essential elements of any addenda are the engineering drawings that define the tool/device and the associated user manual that is comprised of detail on its parts, assembly and disassembly. Further elements may be included according to the nature of the specific tool or device.

Additions to or amendments of the individual addenda are subject to the agreement of the Administrative Committees of the 1958 Agreement (A.C.1) and/or the 1998 Agreement (A.C.3) as appropriate to the needs of the respective Agreements.

B. CONCERNING THE DESCRIPTION AND PERFORMANCE OF TEST TOOLS AND DEVICES NECESSARY FOR THE ASSESSMENT OF COMPLIANCE OF WHEELED VEHICLES, EQUIPMENT AND PARTS ACCORDING TO THE TECHNICAL PRESCRIPTIONS SPECIFIED IN REGULATIONS AND GLOBAL TECHNICAL REGULATIONS MADE UNDER THE 1958 AND 1998 AGREEMENTS (S.R. 2).

1. SCOPE

1.1. This Special Resolution details specific test devices and equipment that are referenced in individual regulations made under the "1958 Agreement" and/or global technical regulations established under the “1998 Agreement” as necessary for the determination of regulatory compliance of "wheeled vehicles, equipment and parts which can be fitted and/or used on wheeled vehicles".

2. GENERAL PROVISIONS

2.1. This Special Resolution contains those details associated with any test tool or device that are necessary to establish that the test tool or device is appropriate for use in determining the compliance of a wheeled vehicle, equipment or part with a regulation or global technical regulation. These details are those associated with the essential design of the test tool or device, its assembly, calibration and general preparation for use for that purpose.

2.2. The technical prescriptions for each test tool or device can be found in a discrete addendum to this Special Resolution.

2.3. The regulatory prescriptions for the use of the tool can be found in the individual regulation or global technical regulation for which the test tool or device is specified.

2.4. Engineering Drawings.

2.4.1. While manufacturer part numbers and drawing numbers exist for individual components of the test tool, the protocol for this Special Resolution is to ascribe a unique UN drawing number to each drawing of a set. The number follows the convention “TRANS/WP.29/XXXX” followed by a reference to the specific Addendum for the particular tool and a drawing number, e.g. “TRANS/WP.29/XXXX/Add.1/Dwg 001”.

2.4.2. The Drawing Index is included as a Table in each Addendum and an example is shown as Table 2 in the Appendix to this Special Resolution.

2.5. In the case that a test tool shares parts with another tool that is registered within this Special Resolution, the drawings are not duplicated and reference is made from within the “daughter” Addendum to the “parent” Addendum.

2.6. By exception to paragraph 2.5., where the manufacturer makes changes to a part that is shared with one or more tools, and it is not demonstrated that the change has no effect on each of the tools in the “family”, a new drawing is listed for the tool affected by the change and the original drawing is reallocated to an alternative Addendum. Revised drawings follow the numbering convention, i.e. “TRANS/WP.29/XXXX/Add.1/Dwg 001/Rev.1”.

2.7. A Table of Drawing Revisions is provided in each Addendum and an example is shown as Table 1 in the Appendix to this Special Resolution.

2.8. Parts

2.8.1. Test tools also use parts that are generic in nature and generally available in the market. These parts are identified and described in the drawing set. For completeness these parts are identified in a separate table in each Addendum together with the Part Number ascribed by the Test Tool manufacturer.

2.8.2. The Parts Index is included as a Table in each Addendum and an example is shown as Table 3 in the Appendix to this Special Resolution.

3. SPECIFIC PROVISIONS

3.1. The table below details the individual addenda to this Special Resolution in which details of the design, construction, maintenance and preparation of the test devices or equipment can be found.

ECE/TRANS/WP.29/XXXX/Add.	*Generic name of the Test Tool*	*UN Regulations requiring the Test Tools*	Global technical regulations(s) requiring the Test Device	*Date of adoption of the Addendum dd/mm/yy*
1	(Reserved) BioRID Dummy	R.xx	GTR x	
2	(Reserved) WorldSID Dummy	R.xx	GTR x	
3	(Reserved) FlexPLI	R.xx	GTR x	
4	(Reserved) Q-Dummy	R.xx	GTR x	

3.2. The regulations and/or global technical regulations listed above require the use of the tools as prescribed in the relevant addenda to this Special Resolution. Compliance with these prescriptions may not be necessary for other regulations using tools with the same generic name.

Appendix: Example Tables for insertion in Addenda to this Special Resolution.

Table 1; Drawing Revisions

Drawing Ref *TRANS/WP.29/XXXX/Add.1/...*	*Appendix / Table*	*Title*	*Description of change*
Example Dwg.4/Rev.1	1 / 1	Plate, Interface – Occipital Condyle	Material change

Table 2: Drawing Index

TRANS/WP.29/XXXX/Add. 1/…	*Part Number*	*Description*	*Drg. Rev.*	*No. of Sheets*	*QTY Per Assembly*	*QTY Per Dummy*	*Common with Addenda(s)*
App.1/Dwg. 1	4947	Ballast, Skull	C	1	1	1	
App.1/Dwg. 2	4956	Assy - S.R. Neck Loadcell	C	1	1	1	
App.1/Dwg. 3	4956	S.R. Neck Load Cell	C	1	1	1	
App.1/Dwg. 4 App.1/Dwg.4/Rev.1	ARA-100	Plate, Interface-Occipital Condyle	P S	1	1	1	
App.1/Dwg. 5	ARA-103	Head Assembly	D	1	1	1	

Table 3: Parts Index

Part No.	*Description*	*Dwg. Rev.*	*No. of sheets*	*Qty per Assy*	*Qty per Dummy*	*Common with Addenda(s)*
9010104	Helicoil, M6 X 1.0 X 9mm LG					

Example: Addendum 1 to Special Resolution 2 - BioRID

Specifications for the Construction, Preparation and Certification of the 50th percentile male BioRID anthropometric test device.

Contents

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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^{th} percentile dummy assemblies and the head and pelvis are modified Hybrid III 50^{th} 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

Drawing Ref TRANS/WP.29/XXXX/Add.1/...	*Appendix / Table*	*Title*	*Description of change*
Example 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

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

Table 2.
Parts Index

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

Annex 2 - Certification

Appendix 1 - Schematic and General Arrangement of Equipment

Appendix 2 – Certification Corridors
