TECHNICAL SPECIFICATION

ISO/TS 15830-5

First edition
2017-04

Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy —

Part 5: Dummy design updates

Véhicules routiers — Conception et spécifications de performance pour le mannequin mondial (WorldSID), 50e percentile homme, de choc latéral —

Partie 5: Mise à jour de conception applicables

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 36, *Safety and impact testing*.

A list of all parts in the ISO 15830- series can be found on the ISO website.

Introduction

The purpose of the ISO 15830- series is to document the design and specifications of this side-impact dummy in a form suitable and intended for worldwide regulatory use.

In 1997, ISO/TC 22/SC 12 initiated the WorldSID 50th percentile adult male dummy development, with the aims of defining a global-consensus side-impact dummy, having a wider range of humanlike anthropometry, biofidelity, and injury monitoring capabilities suitable for regulatory use. Participating in the development were research institutes, dummy and instrumentation manufacturers, governments, and vehicle manufacturers from around the world.

With regard to potential regulatory, consumer information, or research and development use of the ISO 15830- series, users will need to identify which of the permissive (i.e. optional) sensors and other elements defined in ISO 15830-3 are to be used in a given application.

WorldSID drawings in electronic format as of June 6, 2004 are available.

This document is intended to document information and design changes which have become available since the publication of the second edition of the ISO 15830- series, (2013-05-15).

In order to apply the ISO 15830- series properly, it is important that all five parts be used together.

Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy —

Part 5: Dummy design updates

1 Scope

This document specifies requirements and other design information which became available since 2013 for the WorldSID 50th percentile side-impact dummy, a standardized anthropomorphic dummy for side-impact tests of road vehicles. It is applicable to impact tests involving:

— passenger vehicles of category M_1 and goods vehicles of category N_1;

— impacts to the side of the vehicle structure; and

— impact tests involving use of an anthropomorphic dummy as a human surrogate for the purpose of evaluating compliance with vehicle safety standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/TR 27957, *Road vehicles — Temperature measurement in anthropomorphic test devices — Definition of the temperature sensor locations*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
angular rate sensor
ARS
sensor which records angular velocity

3.2
data acquisition system
DAS
system that includes sensors, recorders, cables, and other associated hardware

3.3
H-point tool
device which can be inserted into index holes in the dummy pelvis, which provides an external surface for indicating the orientation of the pelvis and an imaginary line connecting the left and right hip ball joint centres

3.4
infrared telescoping rod for assessment of chest compression
IR-TRACC
sensor for deflection measurements

4 Mechanical requirements for WorldSID

4.1 Mass properties

4.1.1 Body segment mass specifications

The body segment specifications noted in ISO 15830-2 were based on the parts that are included in specified assembly drawings. For statistical purposes, prior to delivery, actual body segment mass measurements are made, but the split line used between the upper leg and the lumbar spine and pelvis is different than that specified by the assembly drawings. Specifically, the ISO specification included the upper femur and ball socket in the upper leg, whereas the measured masses included these parts in the lumbar spine and pelvis assembly. As a result of the different split lines, some confusion has existed as users compare the measured dummy body segments masses with ISO 15830-2 specifications. In addition, with time, more manufactured dummies have been included in the statistical database, resulting in minor changes to the specified masses. To clarify this situation, Table 1 shows the ISO 15830-2 specifications, updated mass specifications based on recent statistical studies, and updated mass specifications with the alternative split line.

Table 1 — Body segment mass specifications

Body segment	ISO 15830-2:2013 **mass specification** kg	**2015 updated specifications** kg	**2015 updated specifications with alternative split line** kg
Head	4,22 ± 0,05	4,29 ± 0,05	4,29 ± 0,05
Neck	2,84 ± 0,15	2,86 ± 0,02	2,86 ± 0,02
Thorax/abdomen/shoulder	20,55 ± 1,0	20,56 ± 0,35	20,56 ± 0,35
Two full arms	7,44 ± 0,30	7,44 ± 0,30	7,44 ± 0,30
Two half arms	3,54 ± 0,18	3,52 ± 0,08	3,52 ± 0,08
Lumbar spine and pelvis	17,75 ± 0,90	17,76 ± 0,20	19,30 ± 0,20
Two upper legs	13,42 ± 0,60	13,26 ± 0,08	11,72 ± 0,08
Two lower legs/ankles/feet	10,18 ± 0,26	10,12 ± 0,14	10,12 ± 0,14
Clothing	1,85 ± 0,09	1,54 ± 0,10	1,54 ± 0,10
Total with clothing and half arms	74,35 ± 3,74	73,91 ± 1,02	73,91 ± 1,02

4.1.2 DAS mass

The body segment masses shown in Table 1 include sensors and allocations for DAS components (data recorders, batteries, and other DAS-related components). Each non-load bearing sensor and DAS component shall have a mass replacement and load cells shall have structural replacements which are to be installed any time the actual component is removed from the dummy. Thus, body segment masses shall not change as DAS components are added or removed from various segments. Over time, DAS mass allocations and locations have changed slightly. Table 2 shows DAS mass allocations from 2005, 2013, and the current specifications which reflect actual DAS component masses measured by VRTC.

Table 2 — DAS mass allocation specifications

Body segment	2005 kg	2013 kg	2015 specification kg
Spine box/thorax	1,35 ± 0,300	1,56 ± 0,350	2,23 ± 0,30[a]
Pelvis	0,21 ± 0,040		0,22 ± 0,04
Left femur	0,287 ± 0,060	0,287 ± 0,060	0,26 ± 0,06
Right femur	0,287 ± 0,060	0,287 ± 0,060	0,26 ± 0,06
Thorax cabling	0,075 ± 0,015	0,075 ± 0,030	0,08 ± 0,03
Total	2,21 ± 0,500	2,21 ± 0,500	3,05 ± 0,50

[a] The spine box DAS mass may be placed inside the spine box, on the non-struck side of spine box, or some combination.

4.2 Permissible DAS mounting locations

Volumes within the thorax, pelvis, and upper leg have been designated as permissible locations for the mounting of various DAS components within the WorldSID. The general locations and basic dimensions of these volumes are shown in Figures 1 to 4.

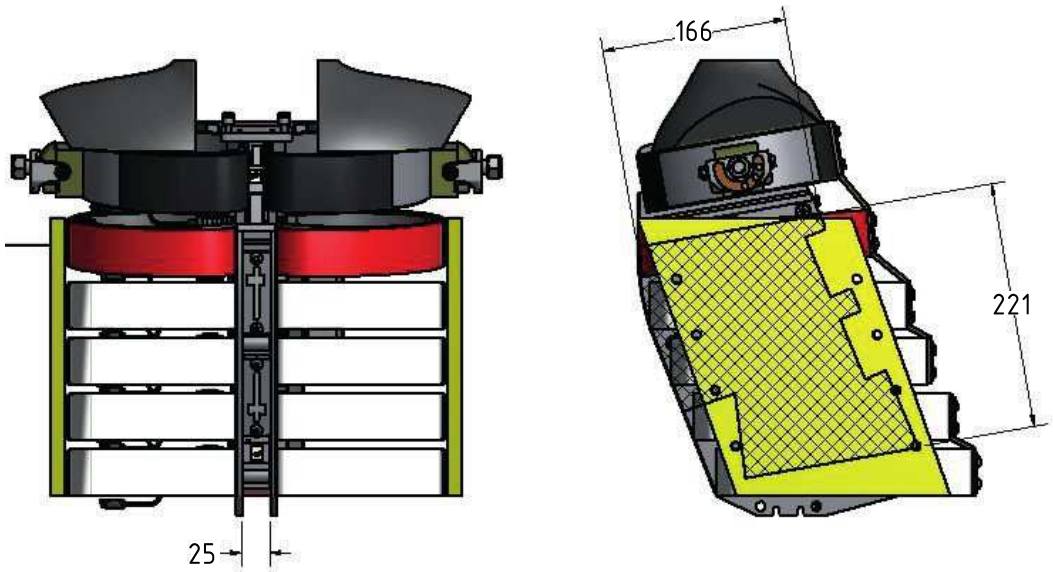

Figure 1 — Spine box volume available for DAS components

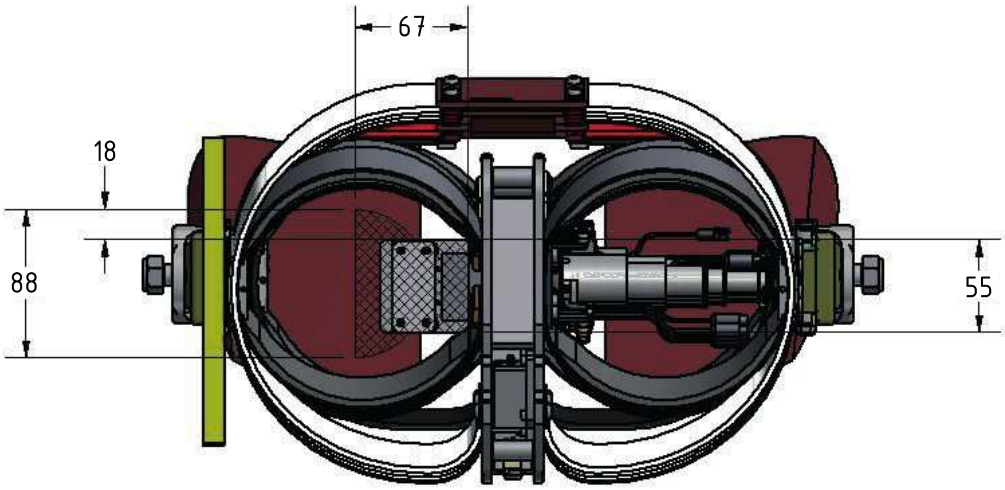

Figure 2 — Non-struck thorax volume available for DAS components

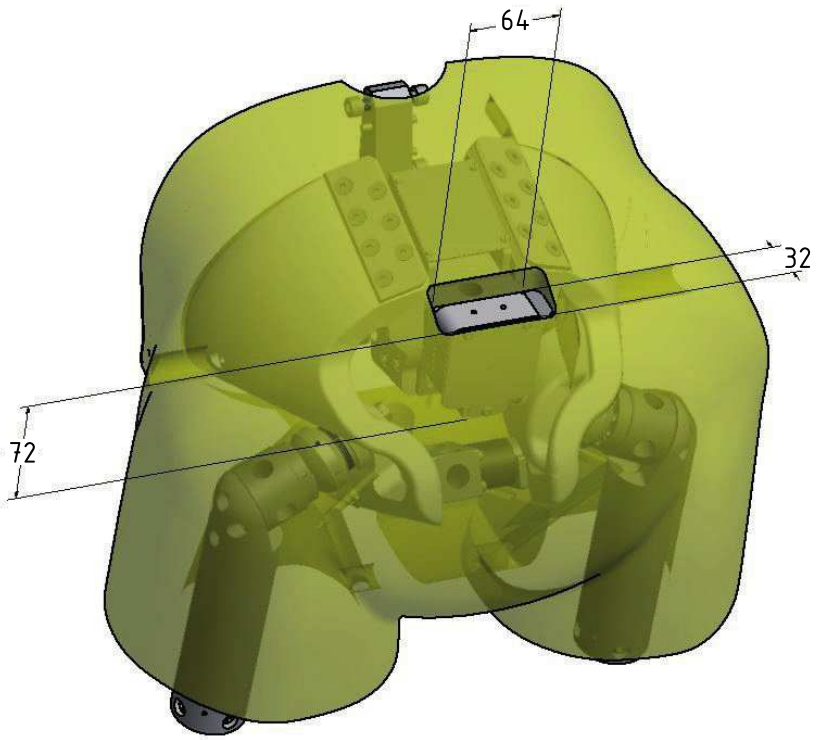

Figure 3 — Pelvis volume available for DAS components

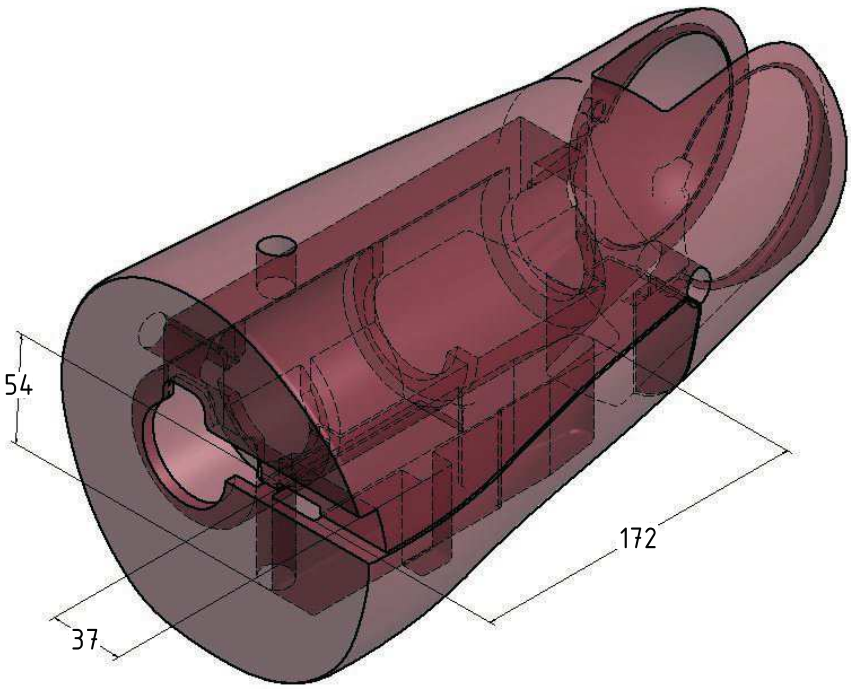

Figure 4 — Upper leg volume available for DAS components

4.3 Mechanical modifications

4.3.1 Arm detents

A system with a spring loaded ball and detents, to help users properly position the arms for testing, exists between the shoulder and upper arm mount fittings. The design was changed in 2015 to facilitate the positioning of the arm in three different positions as shown in Figure 5. The detent position did not change between 2008 and 2015, but the ball detent size and spring tension were increased to better hold the arm at the correct angle during positioning. The extra detent positions that allowed a universal clevis were removed to eliminate confusion of which positions were to be used. The new design requires separate right and left side clevis components.

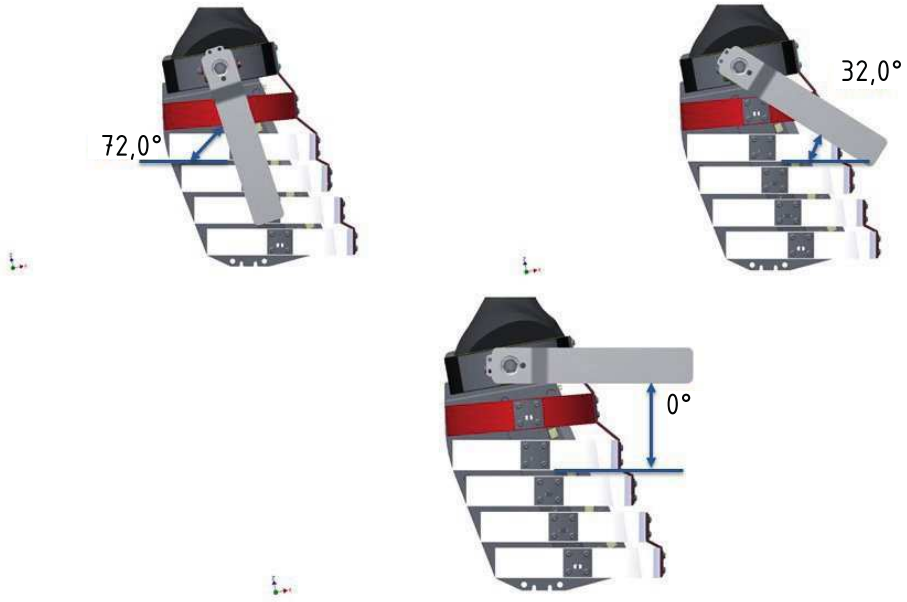

Figure 5 — Arm detent positions

4.3.2 Suit modifications

The WorldSID suit has been improved as follows.

— The H-point tool opening was repositioned.

— The front of the suit was reinforced locally to minimize wear caused by shoulder belts.

— The front pockets have been removed.

— The arm sleeves have been removed and the arm openings have been made smaller (incorporated in 2015).

NOTE Some users modified older suits by cutting off the sleeves which resulted in suits with no sleeves and larger arm openings.

4.3.3 Ankle design

The ankle design was changed to eliminate resistance until the end of travel stops are engaged. This aids in the dummy set-up in the vehicle environment as the ankle angle can be set and will remain in the required position. A friction element has been added to allow 1-2 G adjustment for the ankle. The 1-2 G ranges of motion before engaging stops are:

— plantarflexion = 40° (see Figure 6);

— dorsiflexion = 55° (see Figure 7); and

— inversion and eversion = 30° (see Figure 8).

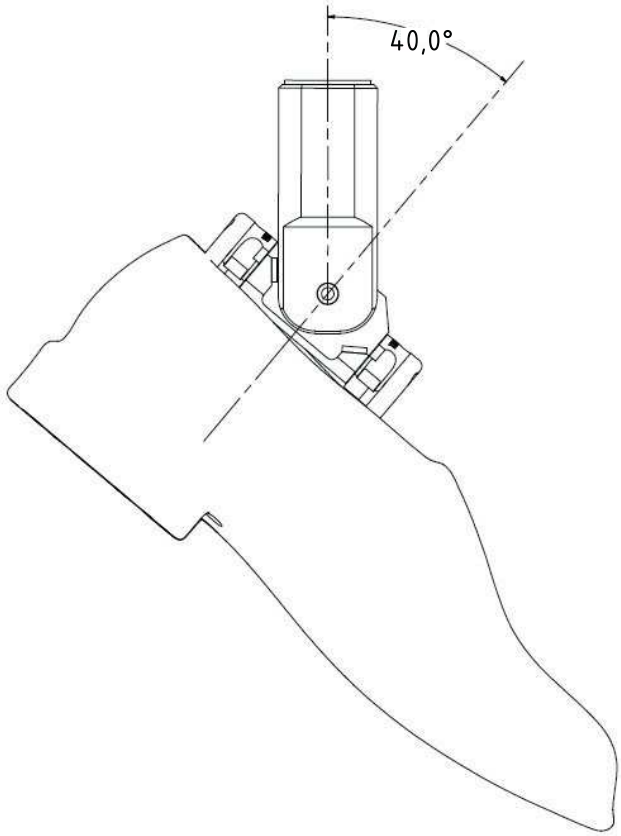

Figure 6 — Ankle plantarflexion

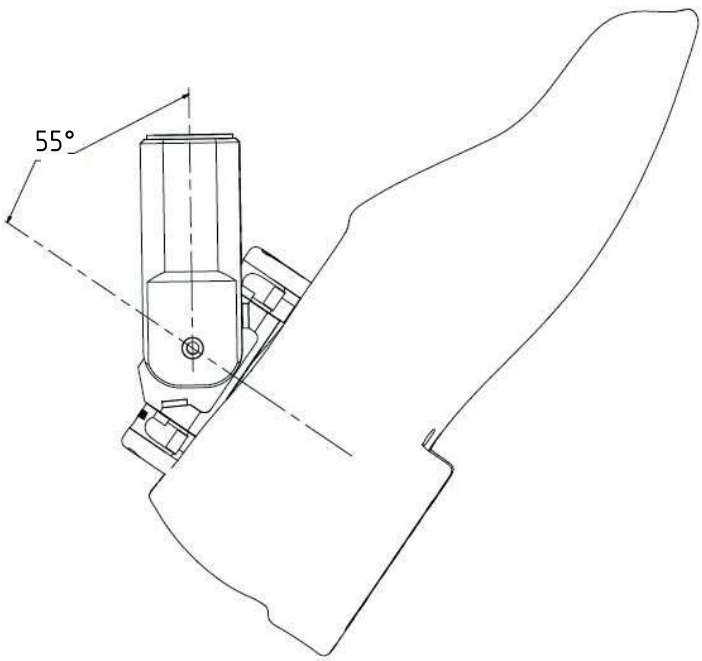

Figure 7 — Ankle dorsiflexion

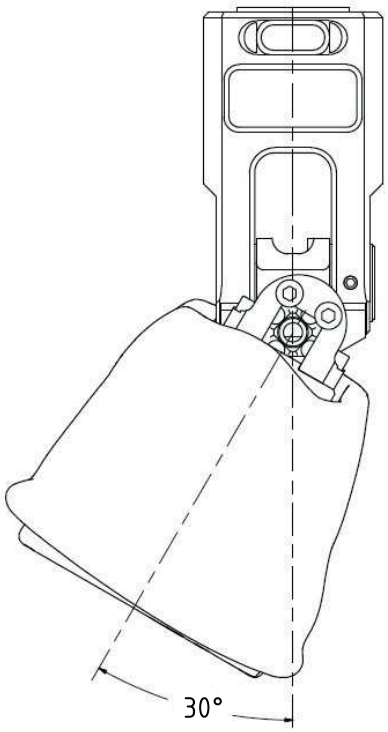

Figure 8 — Ankle inversion and eversion

4.3.4 Pelvis flesh

A modified pelvis flesh was approved by the WorldSID Task Group in 2014. The modified pelvis flesh allows instrumentation cabling from the legs to be routed inside the pelvis flesh. The left side of Figure 9 shows the new design while the right side of the figure shows the old design.

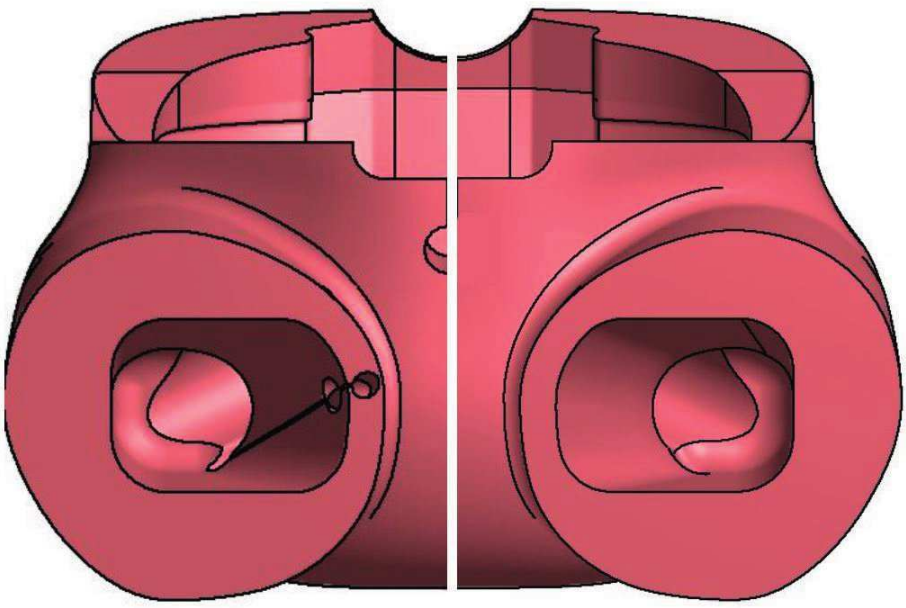

Figure 9 — New and old pelvis flesh designs

4.3.5 Neck ring

A modified neck ring was incorporated into the neck shroud assembly (WS50-24017) in 2015. The modified ring improves the interface between the ring and the neck shroud.

4.4 Mechanical assembly

The positioning of the thorax/abdomen foam pad (W50-35024) can influence test results. The user should ensure that the padding is installed such that the padding centreline is aligned with the most lateral position of the ribs.

5 Sensors

Permissible WorldSID sensors are listed in ISO 15830-3. Changes to the sensor list include the following.

— Remove the ankle angular displacement potentiometer.

— Angular rate sensors with a full scale range of 8 000°/s may be used.

— One, two, or three degree of freedom deflection sensors may be used. This would include, for example, what other ISO documents refer to as 2D IR-TRACCs.

6 Positioning of the WorldSID

For installing the WorldSID in vehicles, the official WorldSID seating position is defined in ISO 17949. When implementing ISO 17949, it should be noted that the half arms should be positioned using the "middle" arm detent (the first detent downward of the most upward detent). This detent creates a 32° differential between the rib angle sensor and the arm angle.

7 Certification

Over the last several years, the WorldSID certification testing has been reviewed. As a result of this review and update, the ISO WorldSID Task Group has agreed to 1) delete the thorax impact with arm from the certification requirements and 2) modify some requirements for the remaining certification tests. The current certification specifications are shown in Tables 3 to 10.

Table 3 — Certification specifications — Head drop — Frontal

Head drop — Frontal	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Resultant acceleration (G)	205 to 255
Peak lateral acceleration (G)	<15
Unimode (%)	<10

Table 4 — Certification specifications — Neck pendulum test — Lateral

Neck pendulum test — Lateral	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Pendulum velocity (m/s)	3,4 ± 0,1
Pendulum velocity change (m/s)	
NOTE T = 0 s at initial pendulum contact with the honeycomb.	

Table 4 *(continued)*

Neck pendulum test — Lateral	
4 ms	0,77 to 1,04
8 ms	1,60 to 1,90
12 ms	2,43 to 3,29
Maximum angular displacement of the headform relative to the pendulum, Beta (°)	50 to 61
Decay time of Beta to 0° (ms)	58 to 72
Peak moment at occipital condyle (Nm)	55 to 68
Peak moment decay time to 0 Nm (ms)	71 to 87
Peak forward potentiometer angular displacement (°)	32 to 39
Time of peak forward potentiometer angular displacement (ms)	56 to 68
Peak rearward potentiometer angular displacement, θ_f (°)	30 to 37
Time of peak rearward potentiometer angular displacement, θ_r (ms)	56 to 68
NOTE T = 0 s at initial pendulum contact with the honeycomb.	

Table 5 — Certification specifications — Shoulder

Shoulder	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Velocity (m/s)	4,3 ± 0,1
Peak pendulum force (kN)	2,60 to 3,30
Peak shoulder rib deflection (mm)	33 to 45

Table 6 — Certification specifications — Thorax without arm

Thorax without arm	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Velocity (m/s)	4,3 ± 0,1
Peak pendulum force (kN)	3,2 to 3,8
Peak thorax rib 1 deflection (mm)	33 to 43
Peak thorax rib 2 deflection (mm)	35 to 43
Peak thorax rib 3 deflection (mm)	32 to 40
Peak T4 acceleration along y-axis (G)	14 to 20
Peak T12 acceleration along y-axis (G)	14 to 22

Table 7 — Certification specifications — Head drop — Lateral

Head drop — Lateral	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Resultant acceleration (G)	104 to 123
Peak frontal acceleration (G)	<15
Unimode (%)	<10

Table 8 — Certification specifications — Abdomen

Abdomen	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Velocity (m/s)	4,3 ± 0,1
Peak pendulum force (kN)	2,7 to 3,1
Peak abdomen rib 1 deflection (mm)	33 to 40
Peak abdomen rib 2 deflection (mm)	30 to 36
Peak T12 acceleration along y-axis (G)	15 to 20

Table 9 — Certification specifications — Pelvis

Pelvis	
Temperature (°C)	20,6 to 22,2
Humidity (%)	10 to 70
Velocity (m/s)	6,7 ± 0,1
Peak pendulum force (kN)	6,8 to 8,2
Peak pelvis acceleration (G)	37 to 47
Peak T12 acceleration along y-axis (G)	10 to 14
Pubic forces	Monitor

Table 10 — Certification specifications — Filter class

Filter class	SAE J211-1 **filter**
Head drop test	
Acceleration Ax, Ay, Az	CFC 1000
Neck pendulum test	
Pendulum acceleration	CFC 60
Angular displacement	
θ_F	CFC 1000
θ_R	CFC 1000
θ_H	CFC 1000
Moment Mx	CFC 600
Force Fy	CFC 1000
Shoulder test	
Pendulum acceleration	CFC 180
Shoulder rib deflection	CFC 600
Thorax without arm	
Pendulum acceleration	CFC 180
Thorax rib 1, 2 and 3 deflection	CFC 600
T4 acceleration	CFC 180
T12 acceleration	CFC 180
Abdomen test	
Pendulum acceleration	CFC 180
Abdomen rib 1 and 2 deflection	CFC 600
T12 acceleration	CFC 180

Table 10 *(continued)*

Filter class	SAE J211-1 **filter**
Pelvis test	
Pendulum acceleration	CFC 180
Pelvis acceleration	CFC 180
T12 acceleration	CFC 180
Pubic forces	CFC 1000

8 Whole body dimensions

In addition to checking dimensions on individual components and body segment assemblies, experience with dummies has shown that the measurement of whole body dimensions is a good way to identify dummy damage, component fractures, misassembly or other problems not obvious when looking at individual parts or sub-assemblies. With a dummy seated in a WorldSID impact seat (seat pan angle 21,6° to horizontal and 93° between the seat pan and seat back) with the thorax angle at 0°, the whole body measurements shown in Figures 10 and 11 shall meet the specifications shown in Table 11.

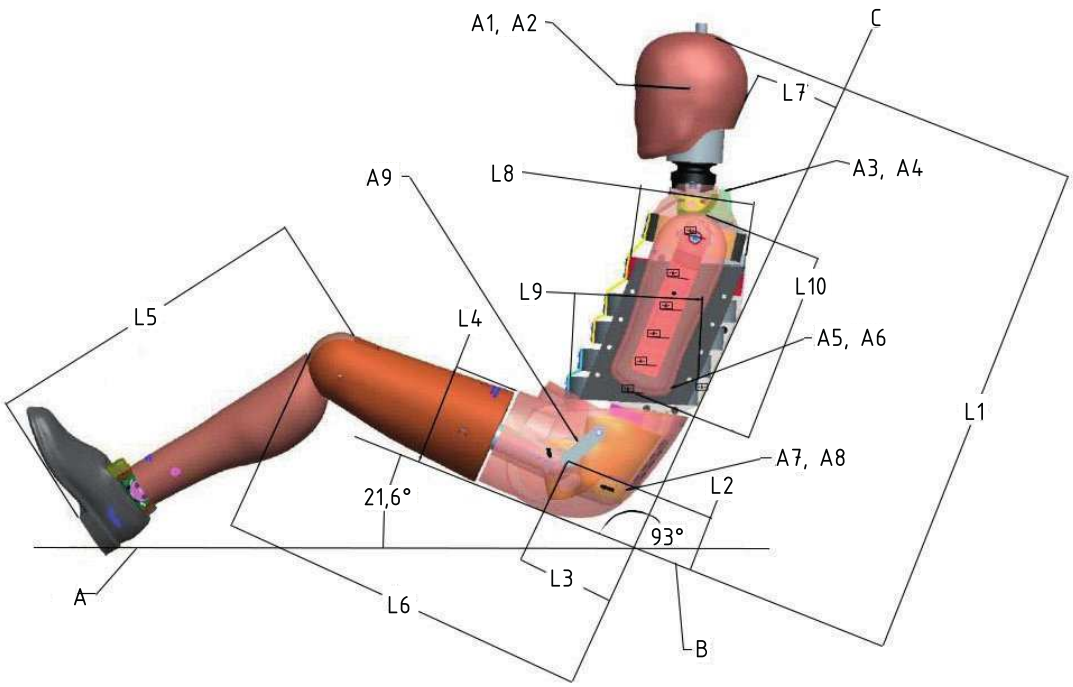

Figure 10 — Whole body dimensions — Side view

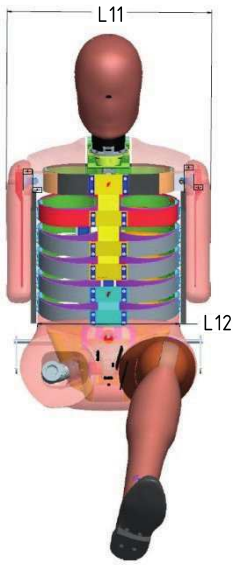

Figure 11 — Whole body dimensions — Front view

Table 11 — Whole body dimensional specifications

Linear parameter	**Symbol**	**Specification based on data** mm
Seated height	L1	869 ± 30
Hip pivot height	L2-Left	79 ± 15
Hip pivot height	L2-Right	79 ± 15
Hip pivot to back line	L3-Left	175 ± 28
Hip pivot to back line	L3-Right	175 ± 28
Thigh clearance-left	L4-Left	176 ± 29
Thigh clearance-right	L4-Right	176 ± 29
Knee to shoe height-left	L5-Left	588 ± 30
Knee to shoe height-right	L5-Right	588 ± 30
Knee to back line-left	L6-Left	670 ± 30
Knee to back line-right	L6-Right	670 ± 30
Head back to seat back line	L7	147 ± 22
Upper thoracic rib depth-left	L8-Left	208 ± 30
Upper thoracic rib depth-right	L8-Right	208 ± 30
Lower abdominal rib depth-left	L9-Left	228 ± 30
Lower abdominal rib depth-right	L9-Right	228 ± 30
Half arm length-left[a]	L10-Left	330 ± 30
Half arm length-right[a]	L10-Right	330 ± 30
Width across arms	L11	468 ± 30
Waist width	L12	324 ± 30

[a] If equipped with half arms.

9 WorldSID design revision dates

During the last 10 years, the WorldSID has undergone several design changes of varying degrees. Some of the early changes were extensive and some of the more recent changes have been minor in nature, not changing biofidelity. A history of the changes for WorldSID is found in Table 12. A list of drawings which are new or revised for the change dates are found in Tables 13, 14, 15, 16, and 17.

Table 12 — Summary of WorldSID 50th change dates

Dates	Parts which changed	Biofidelity change
2003	Original design	Yes
May 15, 2004	ISO 15830 First Draft	
June 6, 2004	Major changes including: neck, torso, ribs, battery assembly, pelvis and instrumentation	Yes
May 15, 2005	Changes to: lower neck bracket and spacer, pelvis instrumentation, shoulder clevis, spine box plates	No
August 2005	ISO 15830 First Edition	
November 1, 2008	Changes to: battery container/cover, IR-TRACC system, torso, ribs, shoulder clevis, shoes	No
April 2013	Changes to: jacket, ankle, lift bracket and 2D IR-TRACC is made standard	No
May 2013	ISO 15830 Second Edition	
May 2015	Changes to: the neck ring/shroud, removal of jacket arm sleeves, modification of arm detents and arm bone, cable channel in pelvis, provision in head core for ARS mounting	No

Table 13 — New/revised parts incorporated June 6, 2004

Item	Part number	Qty	Description
1	W50–20009	1	Lower neck bracket
2	W50–30000	1	Torso-shoulder/thorax/abdomen, WorldSID
3	W50–31010	1	Upper bracket weldment spin box, WorldSID
4	W50–32000	2	Rib, shoulder
5	W50–32010	2	Rib, doubler, shoulder
6	W50–32161	2	Rib, damping
7	W50–32162	2	Shoulder rib bent, WorldSID
8	W50–32171	2	Shoulder rib mounting bracket, WorldSID
9	W50–32172	10	Thorax and abdominal rib accelerometer mounting bracket, WorldSID
10	W50–32179	6	Screw, rib, IR-TRACC mount
11	W50–32180	4	Clamp, damping
12	W50–35023–1	1	Shoulder pad, left, WorldSID
13	W50–35023–2	1	Shoulder pad, right, WorldSID
14	W50–37012	1	Battery structural replacement
15	W50–38000	1	Battery assembly
16	W50–41018	1	Lumbar spine, rubber
17	W50–41020	4	Bushing lumbar spine, top
18	W50–42010	1	Pelvis bone, left
19	W50–42011	1	Pelvis bone, right
20	W50–42016	1	SI LC interface, left
21	W50–42017	1	SI LC interface, right

Table 13 *(continued)*

Item	Part number	Qty	Description
22	W50–42510	2	Pubic buffer, moulded
23	W50–74307	6	G5 structural replacement
24	W50–75801	1	Ground cable, head to thorax
25	W50–75802	1	Ground cable, torso to sacrum
26	W50–75803	1	Ground cable, sacrum to pubic
27	W50–75804	1	Ground cable, sacrum to upper leg
28	W50–75805	1	Ground cable, upper leg to lower leg
29	W50–75806	1	Ground cable, torso to external ground
30	IF-363	6	IR-TRACC specification sheet
31	6002055	8	Cable tie, hook and loop, 11 inch
32	W50–31010	1	Upper bracket weldment spin box, WorldSID
33	W50–31011	1	Shoulder mounting plate
34	W50–42030	1	Instrumentation bracket pelvis

Table 14 — New/revised parts incorporated May 15, 2005

Item	Part number	Qty	Description	Rev	Replaces
1	W50–20101	1	Lower neck bracket	A	W50–20009
2	W50–20102	1	Upper neck bracket	A	W50–20010
3	W50–20103	2	Neck spacer	A	New
4	W50–42040	1	Pelvis instrumentation bracket	A	W50–42030
5	W50–41042	1	Pelvis docking station	D	NA
6	W50–41043	1	Docking station cover	A	New
7	W50–31020	1	Left side plate	F	NA
8	W50–31030	1	Right side plate	D	NA
9	W50–61117	2	Shoulder clevis assembly	A	New

Table 15 — New/revised parts incorporated November 1, 2008

Item	Part number	Qty	Description	Rev	Replaces
1	W50–37013	1	Mounting bracket, battery	A	W50–37011
2	W50–37014	2	Spine ballast stand off	A	W50–37012
3	W50–37015	1	Mounting bracket, G5-WSID thorax	A	New
4	W50–43001	1	Battery container	A	W50–33101
5	W50–43002	1	Battery cover	A	W5–3323
6	556–5125–2	1	Structural replacement, cover	A	New
7	Remove	NA	DAS cover	→	W50–41041
8	Remove	NA	Pelvis docking station	→	W50–41042
9	Remove	NA	Docking station cover	→	W50–41043
10	W50–31050	6	Ball joint assembly IR-TRACC	B	Rev A
11	W50–31051	1	Ball shaft assembly	B	Rev A
12	W50–31055	1	Ball shaft IR-TRACC	C	Rev B
13	W50–30000	1	Ball retainer IR-TRACC	D	Rev C
14	W50–40000	1	Torso assembly	L	Rev K
15	W50–32150–2	6	Pelvis assembly	J	Rev H

Table 15 *(continued)*

Item	Part number	Qty	Description	Rev	Replaces
16	W50–321552	4	Thorax rib assy, inner band	A	W50–32150–1
17	W50–32160–2	2	Abdomen rib assy, inner band	A	W50–32155–1
18	W50–61125	2	Shoulder rib assy, inner band	A	W50–32160–1
19	W50–61130	2	Shoulder clevis	C	W50–61125
20	W50–61130	2	Shoulder clevis assy	C	W50–61117
21	W50–61135	2	Clevis insert	A	New
3	W50–55003	2	Sole plate	F	Rev C
4	W50–55004	1	Shoe, left	C	B
5	W50–55005	1	Shoe, right	C	B
9	84895A32	2	Ball-spring plunger, arm		
10	W50–71130S	1	Sacro-iliac load cell		W50–71130

Table 16 — New/revised parts incorporated April 2014

Item	Part number	Qty	Description	Rev	Replaces	Date
1	W50–00000	2	Final assembly WorldSID	H	Rev G	3/26/2013
2	W50–30000 SH 1 and 2 1	1	Torso-shoulder/thorax/abdomen, T/C	N	Rev M	3/26/2013
3	IF-367-R2	5	IR-TRACC assy, 2D rib (REF)*	B	IF-363	3/26/2013
4	F-368-R2	1	IR-TRACC assy, 2D shoulder (REF)*	B	IF-363	3/26/2013
5	W50–42005	2	Hip joint socket	C		3/26/2013
6	W50–50000-DN	1	Leg assembly, right	A	Rev N/C	3/26/2013
7	W50–50001-DN	1	Leg assembly, left	A	Rev N/C	3/26/2013
8	W50–54055-DN	1	Lower leg, right WorldSID	C	Rev B	3/26/2013
9	W50–54056-DN	1	Lower leg, left WorldSID	C	Rev B	3/26/2013
10	W50–57000	2	Ankle assembly harmonized	B	W50–54054	3/26/2013
11	W50–62000	2	2 Half arm assembly	E	Rev D	3/26/2013
12	W50–80100	1	WorldSID suit, 50th	D	Rev C	3/26/2013
13	W50–84100	1	Lifting bracket assy	B	Rev A	3/26/2013
14	71130S4-XXX	1	Sacro-iliac load cell	D	W50–71130	3/26/2013

Table 17 — New/revised parts incorporated May 2015

Item	Part number	Qty	Description	Rev	Replaces	Date
1	W50–80101	1	WorldSID suit, sleeveless 50th	A	W50–80100	2015
2	W50–24017	1	Neck shroud asm	A	W50–24013	2015
3	W50–42019–1	1	Pelvis flesh, WSID 50th	B	W50–42019	2014
4	W50–63111	1	Shoulder clevis assy, right	A	W50–61130	2015
5	W50–63112	1	Shoulder clevis assy, left	A	W50–61130	2015
6	W50–63100	2	Half arm, moulded assy	A	W50–62000	2015

10 Temperature measurement

WorldSID temperature measurements shall be made per procedures specified in ISO/TR 27957.

Bibliography

[1] ISO 15830-1, *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy — Part 1: Terminology and rationale*

[2] ISO 15830-4, *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side impact dummy — Part 4: User's manual*

ISO 15830-2:2013, *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy — Part 2: Mechanical subsystems*

ISO 15830-3, *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy — Part 3: Electronic subsystems*

ISO 17949, *Impact test procedures for road vehicles — Seating and positioning procedures for anthropomorphic test devices — Procedure for the WorldSID 5Oth percentile male side-impact dummy in front outboard seating positions*

SAE J211-1, *Instrumentation for impact test — Part 1: Electronic instrumentation*

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