

SVENSK STANDARD

SS-ISO 15830-3:2013



Fastställt/Approved: 2013-05-23
Publicerad/Published: 2013-05-28
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 43.020

Vägfordon – WorldSID sidokollisionsdocka, konstruktion och kravspecifikation för 50 percentil man – Del 3: Elektroniska delsystem (ISO 15830-3:2013, IDT)

Road vehicles – Design and performance specifications for the WorldSID 50th percentile male side-impact dummy – Part 3: Electronic subsystems (ISO 15830-3:2013, IDT)

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-90880>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Den internationella standarden ISO 15830-3:2013 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 15830-3:2013.

Denna standard ersätter SS-ISO 15830-3:2005, utgåva 1.

The International Standard ISO 15830-3:2013 has the status of a Swedish Standard. This document contains the official version of ISO 15830-3:2013.

This standard supersedes the Swedish Standard SS-ISO 15830-3:2005, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Fordonssäkerhet, SIS/TK 237.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Electrical subsystems requirements	1
4.1 Permissible sensors.....	1
4.2 Permissible internal data acquisition system (DAS).....	7
5 Methods	8
5.1 Calculation of IR-TRACC distances from the IR-TRACC voltage outputs.....	8
Annex A (normative) Load cell characteristics	9
Annex B (informative) Conventions for exemplar permissible load cells and angular displacement sensors	14
Annex C (informative) Conventions for permissible accelerometers	21
Annex D (normative) Information regarding sensor output polarities	23
Bibliography	41

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. 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. 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.

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*.

This second edition cancels and replaces the first edition (ISO 15830-1:2005) which has been technically revised. Technical amendments have been incorporated throughout all four parts, resulting from extensive experience with the International Standard and design changes.

ISO 15830 consists of the following parts, under the general title *Road vehicles — Design and performance specifications for the WorldSID 50th percentile male side-impact dummy*:

- *Part 1: Terminology and rationale*
- *Part 2: Mechanical subsystems*
- *Part 3: Electronic subsystems*
- *Part 4: User's manual*

Introduction

This second edition of ISO 15830 has been prepared on the basis of the existing design, specifications, and performance of the WorldSID 50th percentile adult male side-impact dummy. 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/TC22/SC12 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 regards to potential regulatory, consumer information, or research and development use of ISO 15830, users will need to identify which of the permissive (i.e. optional) sensors and other elements defined in this part of ISO 15830 will be required for their tests.

WorldSID drawings in electronic format are being made available. Details are given in ISO 15830-2:2013, [Annex B](#).

In order to apply ISO 15830 properly, it is important that all four parts be used together.

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

Part 3: Electronic subsystems

1 Scope

This part of ISO 15830 specifies requirements for electronic components of the WorldSID 50th percentile side-impact dummy, a standardized anthropomorphic dummy for side-impact testing of road vehicles. It is applicable to impact tests involving

- passenger vehicles of category M₁ and goods vehicles of category N₁,
- impacts to the side of the vehicle structure,
- impact tests involving the use of an anthropometric dummy as a human surrogate for the purpose of evaluating compliance with vehicle safety standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6487, *Road vehicles — Measurement techniques in impact tests — Instrumentation*

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

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

SAE J2570:2001, *Performance specifications for anthropomorphic test device transducers*

SAE J1733, *Sign convention for vehicle crash testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15830-1 apply.

4 Electrical subsystems requirements

4.1 Permissible sensors

4.1.1 General

NOTE All sensors are specified as “permissible” (i.e. optional) because the decision to use or not to use a given sensor is to be left to the individual relevant regulatory authorities, consumer information organisations, and research or test laboratories. In this way, a given regulation (or laboratory protocol) can indicate which of the permissible sensors described in this part of ISO 15830 must be used in a given test. It should also be noted that different connector configurations may be found in different WorldSID assemblies.

The following sensors may be installed in the dummy. If installed, they shall comply with the specifications given in [Table 1](#). If these sensors are not installed, then structural or mass replacements shall be installed in the dummy.

4.1.2 Locations and specifications

Table 1 — Permissible WorldSID sensor locations and specifications

Body region	Sensor	Sensor specification	Mounting specification	Maximum number of channels
Head	Linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.1	3
Head	Rotational accelerometer	4.1.3.3	ISO 15830-2:2013, 4.1	3
Head	Tilt sensor (about x and y axes)	4.1.3.4	ISO 15830-2:2013, 4.1	2
Head	Upper neck load cell	4.1.3.5	ISO 15830-2:2013, 4.1	6
Neck	Lower neck load cell	4.1.3.5	ISO 15830-2:2013, 4.2	6
Neck	T1 linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.2	3
Shoulder	Rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Shoulder	IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Shoulder	Load cell (F_x, F_y, F_z)	4.1.3.7	ISO 15830-2:2013, 4.3	3
Full arm	Upper arm load cell	4.1.3.8	ISO 15830-2:2013, 4.4	6
Full arm	Lower arm load cell	4.1.3.8	ISO 15830-2:2013, 4.4	6
Full arm	Elbow load cell (M_x, M_y)	4.1.3.9	ISO 15830-2:2013, 4.4	2
Full arm	Elbow angular displacement	4.1.3.10	ISO 15830-2:2013, 4.4	1
Full arm	Elbow linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.4	3
Full arm	Wrist linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.4	3
Thorax	Upper rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Thorax	Middle rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Thorax	Lower rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Thorax	Upper rib IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Thorax	Middle rib IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Thorax	Lower rib IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Spine	T4 linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Spine	T12 linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Spine	Rotational accelerometer (about x- and z-axes)	4.1.3.3	ISO 15830-2:2013, 4.3	2
Spine	Tilt sensor (about x- and y-axes)	4.1.3.4	ISO 15830-2:2013, 4.3	2
Abdomen	Upper rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Abdomen	Lower rib linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.3	3
Abdomen	Upper rib IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Abdomen	Lower rib IR-TRACC	4.1.3.6	ISO 15830-2:2013, 4.3	1
Lumbar spine/ pelvis	Lumbar load cell	4.1.3.11	ISO 15830-2:2013, 4.6	6
Lumbar spine/ pelvis	Pelvis linear accelerometer	4.1.3.2	ISO 15830-2:2013, 4.6	3
Lumbar spine/ pelvis	Pubic load cell (F_y)	4.1.3.12	ISO 15830-2:2013, 4.6	1

Table 1 (continued)

Body region	Sensor	Sensor specification	Mounting specification	Maximum number of channels
Lumbar spine/pelvis	Sacro-iliac load cell	4.1.3.13	ISO 15830-2:2013, 4.6	12
Lumbar spine/pelvis	Tilt sensor (about x - and y -axes)	4.1.3.3	ISO 15830-2:2013, 4.6	2
Upper leg	Femoral neck load cell (F_x, F_y, F_z)	4.1.3.14	ISO 15830-2:2013, 4.7	3
Upper leg	Mid femur load cell	4.1.3.14	ISO 15830-2:2013, 4.7	6
Upper leg	Knee lateral outboard contact force load cell	4.1.3.16	ISO 15830-2:2013, 4.7	1
Upper leg	Knee lateral inboard contact force load cell	4.1.3.16	ISO 15830-2:2013, 4.7	1
Upper leg	Knee angular displacement	4.1.3.17	ISO 15830-2:2013, 4.7	1
Lower leg	Upper tibia load cell	4.1.3.15	ISO 15830-2:2013, 4.8	6
Lower leg	Lower tibia load cell	4.1.3.15	ISO 15830-2:2013, 4.8	6
Lower leg	Ankle angular displacement	4.1.3.18	ISO 15830-2:2013, 4.8	3
Spine box	Air temperature sensor	4.1.3.19	ISO 15830-2:2013, 4.3	1

4.1.3 Sensor specifications and mass

4.1.3.1 General

All load cells, accelerometers, and angular displacement transducers shall comply with SAE J2570, and load cells shall comply with the capacities and sign conventions in [Annex A](#).

Sensor sign convention shall comply with SAE J1733 and any deviations shall be noted.

4.1.3.2 Tri-axial linear accelerometers

- If measured, tri-axial linear accelerations shall be measured using Endevco accelerometer, model 7268C-2000M1¹⁾.
- Tri-axial linear accelerometer assemblies shall have a mass of $8 \text{ g} \pm 1 \text{ g}$ (not including cable).

4.1.3.3 Rotational accelerometers

- If measured, rotational accelerations shall be measured using Endevco accelerometer, model 7302BM4²⁾.
- Rotational accelerometers shall have a mass of $35 \text{ g} \pm 4 \text{ g}$ (not including cable).

4.1.3.4 Tilt-angle sensors

4.1.3.4.1 Head tilt sensor

1) Accelerometer model 7268C-2000M1 is a product supplied by Endevco Corp., San Juan Capistrano, California, USA. This information is given for the convenience of users of this part of ISO 15830 and does not constitute an endorsement by ISO of the product named. Alternative products may be used if they can be shown to lead to the same results.

2) Accelerometer model 7302BM4 is a product supplied by Endevco Corp., San Juan Capistrano, California, USA. This information is given for the convenience of users of this part of ISO 15830 and does not constitute an endorsement by ISO of the product named. Alternative products may be used if they can be shown to lead to the same results.