
Road vehicles — Temperature measurement in anthropomorphic test devices — Definition of the temperature sensor locations

Véhicules routiers — Mesure de la température dans les dispositifs d'essai anthropomorphes — Définitions des positions des capteurs de température





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Published in Switzerland

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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 (see www.iso.org/directives).

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For an explanation of 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 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*.

This second edition cancels and replaces the first edition (ISO/TR 27957:2008), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the addition of [Annexes D](#) to [G](#) to include temperature positions for multiple devices.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document proposes the number and the arrangement of the temperature measuring points in anthropomorphic test devices (ATDs). The proposal is based on several studies and is intended to ensure that the temperature of the ATD is in accordance with the temperature corridor prescribed by the applied test procedure.

The temperature sensitivity of ATD components has long been recognized. All ATDs used for testing in accordance with current test procedures have prescribed temperature ranges for certification and testing. However, the procedure for verifying ATD temperature can vary from one testing facility to another. To improve the comparability of test data between laboratories, it is considered necessary to define a single practice for the measurement of ATD temperature.

Road vehicles — Temperature measurement in anthropomorphic test devices — Definition of the temperature sensor locations

1 Scope

This document defines the number and the arrangement of temperature measuring points for anthropomorphic test devices in order to ensure that the temperature of the ATD is in accordance with the temperature corridor prescribed by the applied test procedure.

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6487 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Equipment for temperature measurement and data logging

The temperature measurement sensor is mounted with no modifications of dummy structure and performance. The temperature measurement sensor is thermally coupled to the surface according to the figures

5 Arrangement of temperature sensors in anthropomorphic test devices

The locations represent the temperature sensitive parts of the dummies whose readings are consulted for the assessment of the risk of injury. The choice of the sensor locations is feasible and crash-proof.

The sensor locations are chosen in accordance with anthropomorphic test device manufacturer recommendations that are derived from tests conducted during the design process. When such recommendations are not available, the sensor locations are chosen in accordance with other available temperature studies.

The number and the exact locations of the temperature sensors for the different types of anthropomorphic test devices are indicated in [Annexes A to G](#), each annex corresponding to a particular type of anthropomorphic test device or anthropomorphic test device family.

Annex A (informative)

Hybrid-III

A.1 General

This annex defines the sensor locations for anthropomorphic test devices of the Hybrid-III family.

A.2 Temperature sensor locations

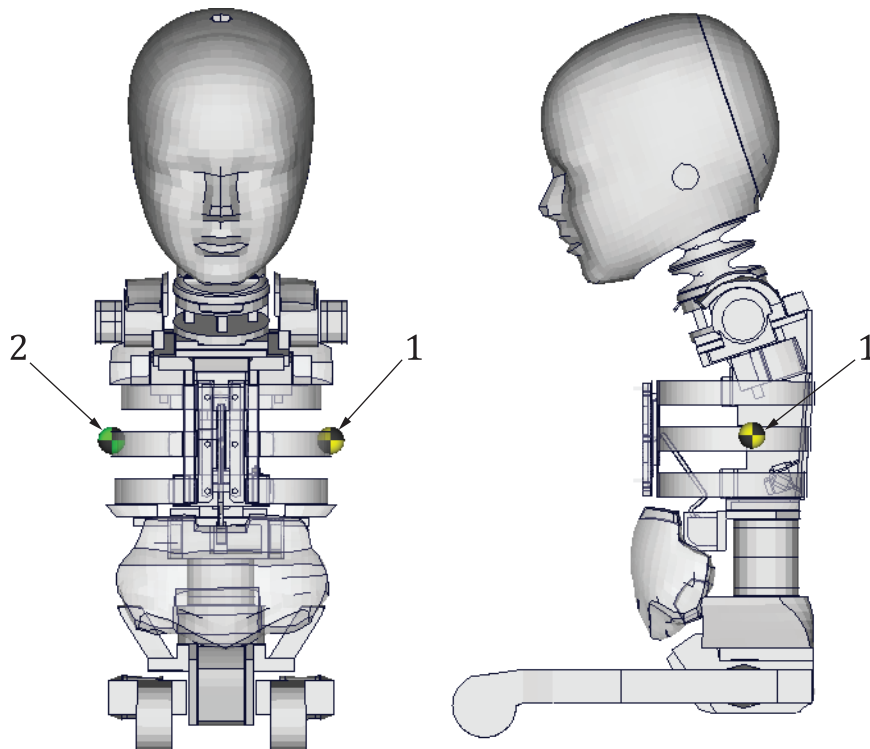
The Hybrid III family is equipped with one temperature sensor. The sensor is attached to the inner surface of the 3rd rib (left or right side), except for the HIII 3 years old (YO) child, where the sensor is attached to the inner side of 2nd (central) rib of the anthropomorphic test device. The sensor is mounted on the damping material.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures A.1](#) to [A.10](#) show the measuring points for anthropomorphic test devices of the Hybrid-III family.

A.2.1 Hybrid-III 3 YO



Key

- 1 2nd rib, left side (option 1)
- 2 2nd rib, right side (option 2)

Figure A.1 — Measuring point for the Hybrid-III 3 YO, view front and left side

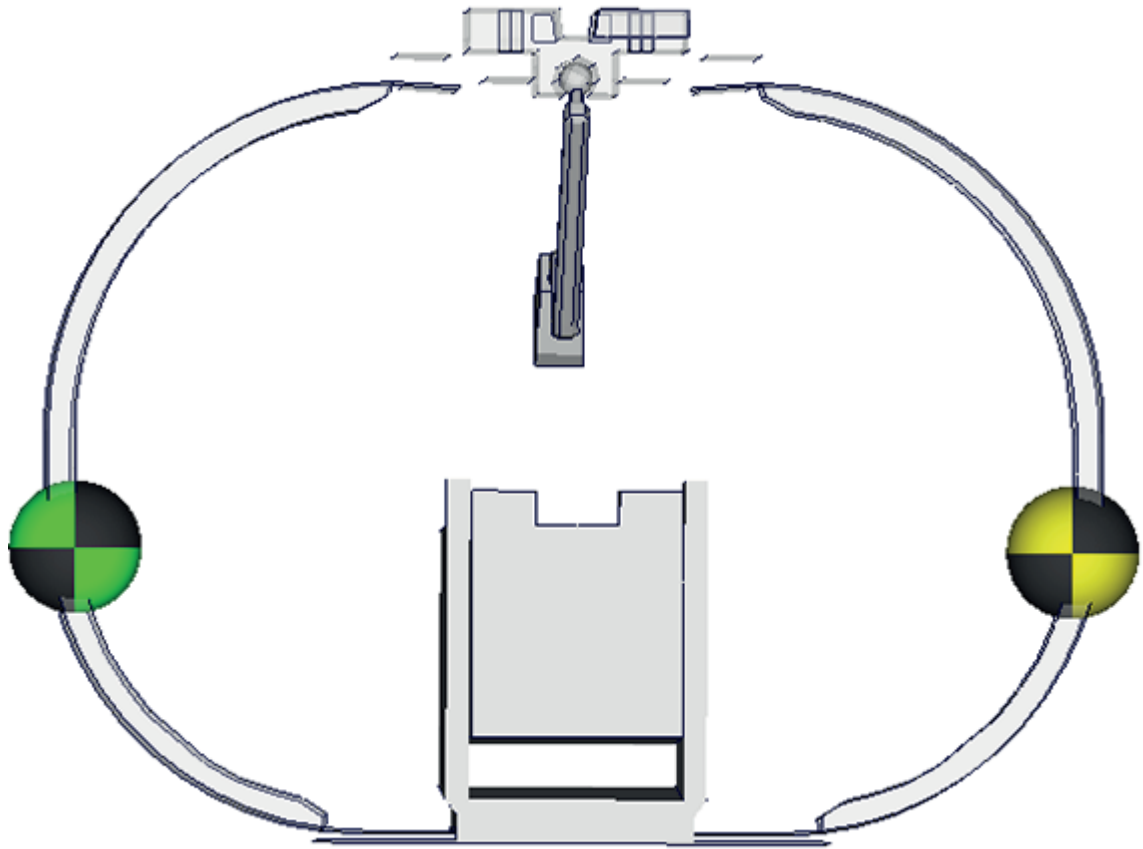
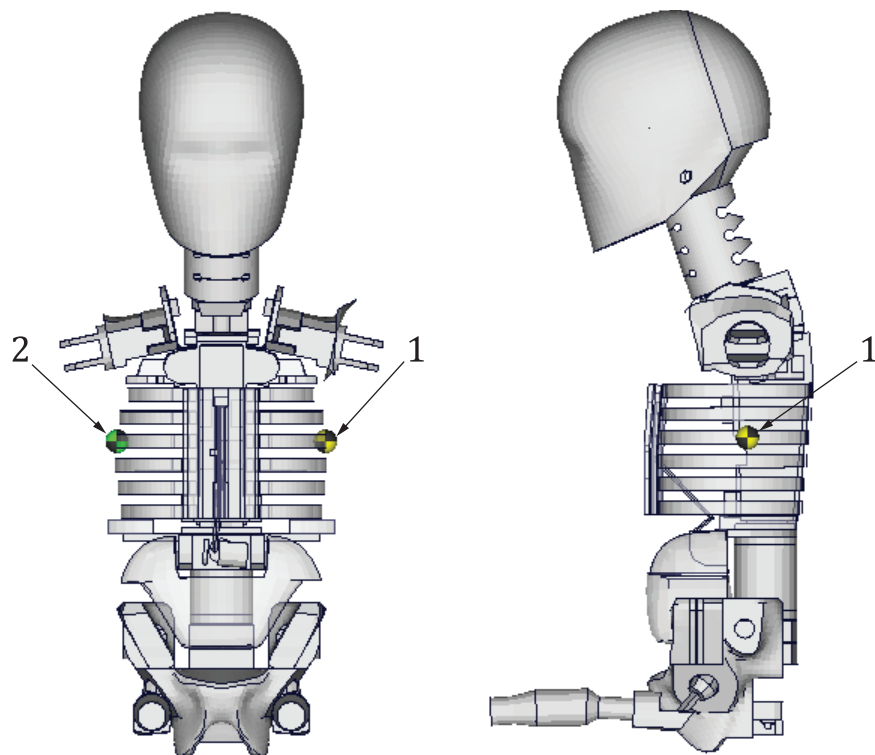


Figure A.2 — Measuring point for the Hybrid-III 3 YO, details view of locations on the central rib

A.2.2 Hybrid-III 6 YO



Key

- 1 3rd rib, left side (option 1)
- 2 3rd rib, right side (option 2)

Figure A.3 — Measuring point for the Hybrid-III 6 YO, view front and left side

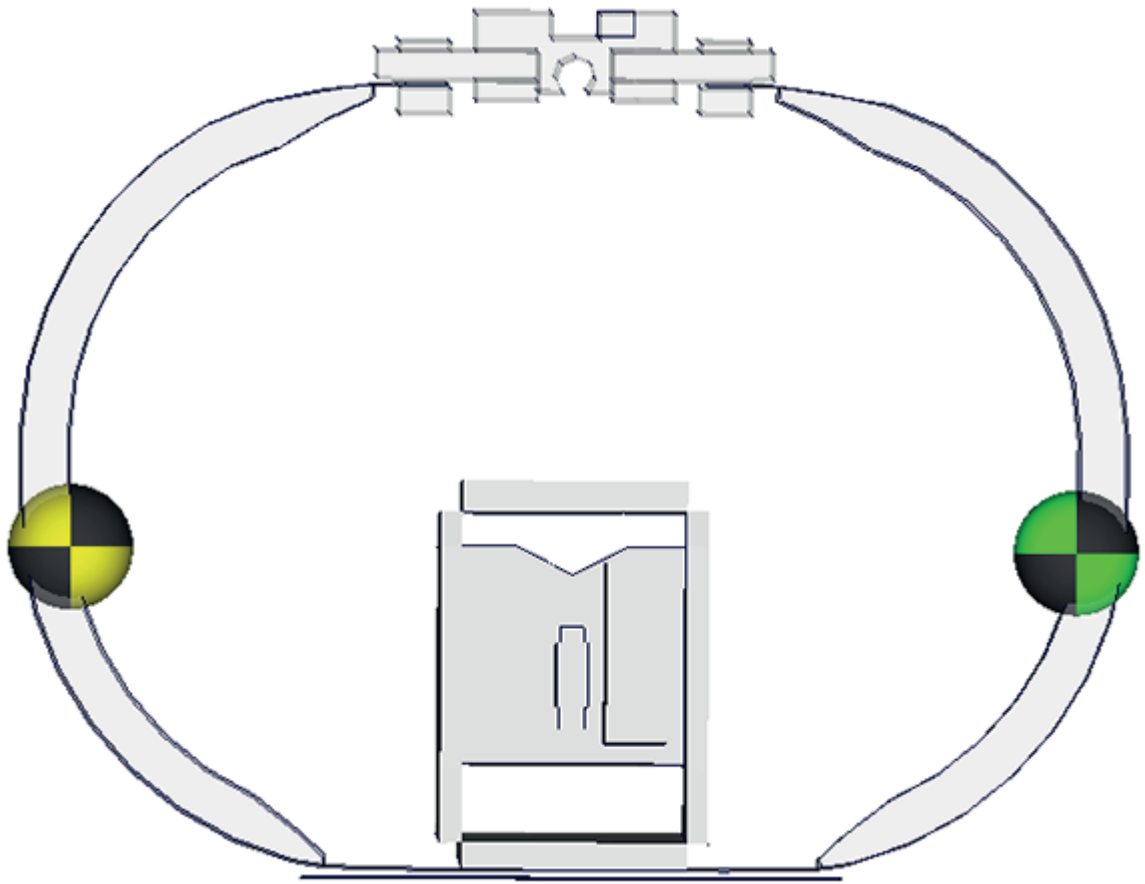
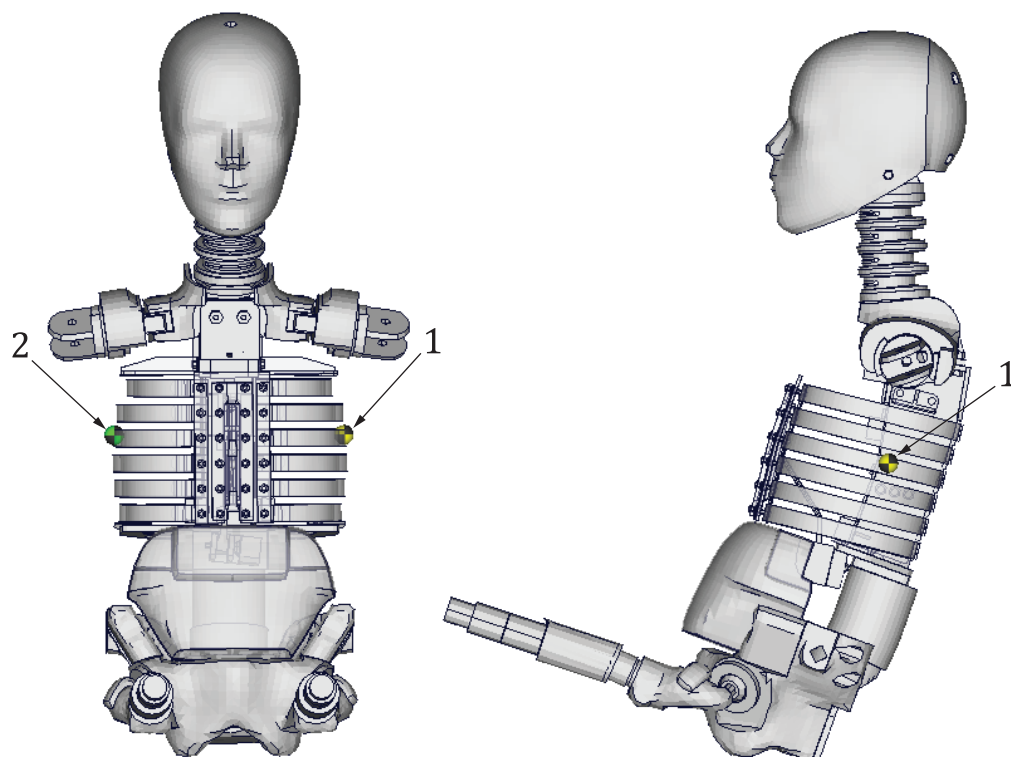


Figure A.4 — Measuring point for the Hybrid-III 6 YO, details view of locations on the 3rd rib

A.2.3 Hybrid-III 10 YO

The Hybrid-III 10 YO has the same sensor position as the Hybrid-III 6 YO.

A.2.4 Hybrid-III 5th female



Key

- 1 3rd rib, left side (option 1)
- 2 3rd rib, right side (option 2)

Figure A.5 — Measuring point for the Hybrid-III 5th percentile, view front and left side

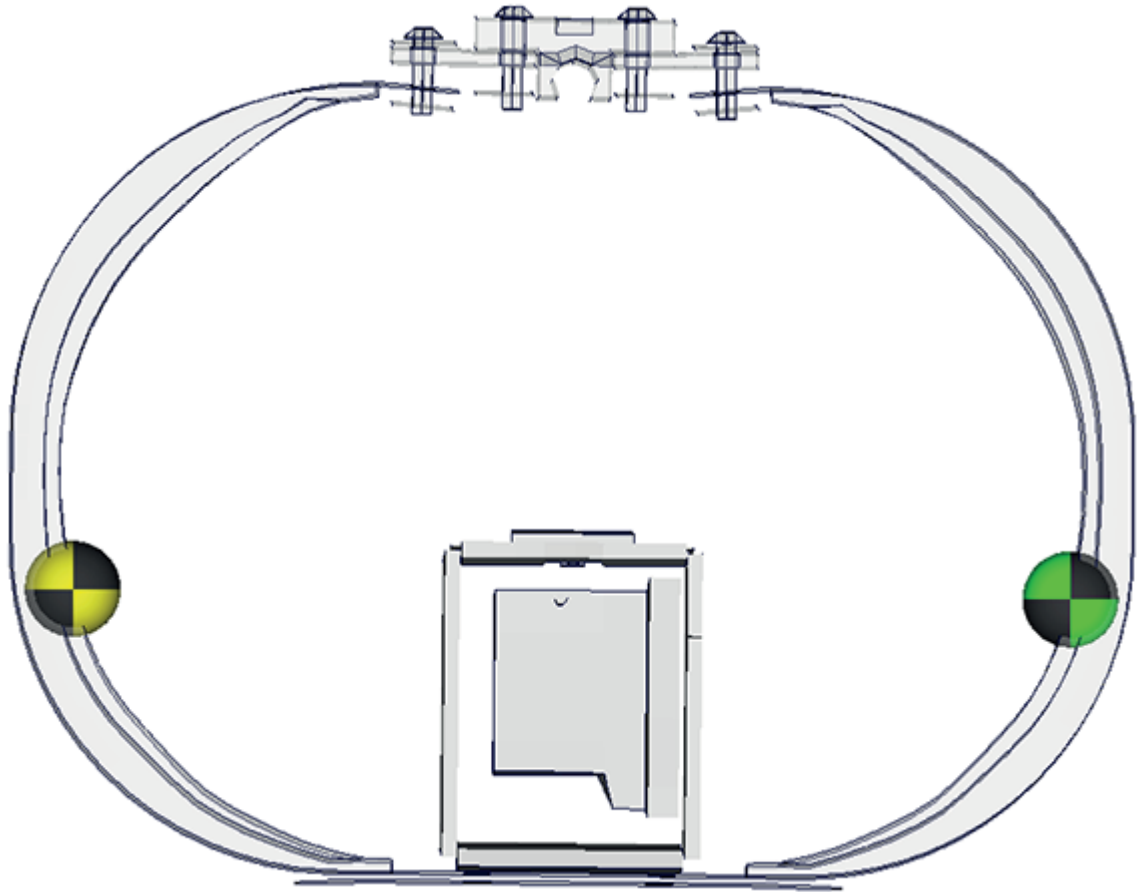
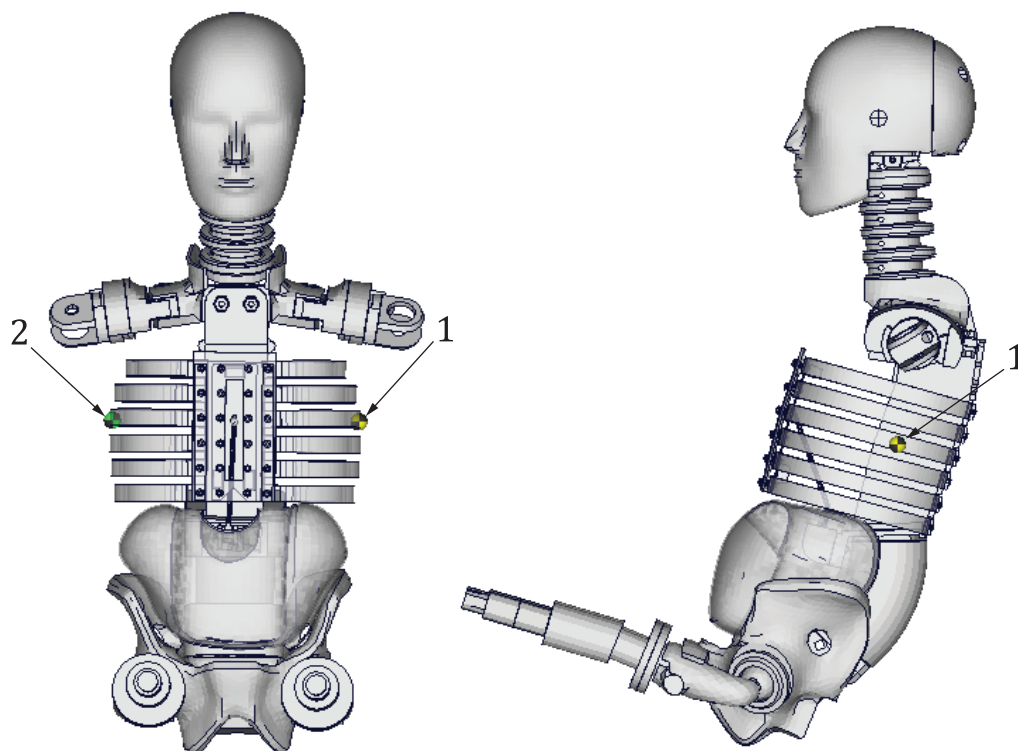


Figure A.6 — Measuring point for the Hybrid-III 5th, details view of locations on the 3rd rib

A.2.5 Hybrid-III 50th male



Key

- 1 3rd rib, left side (option 1)
- 2 3rd rib, right side (option 2)

Figure A.7 — Measuring point for the Hybrid-III 50th percentile, view front and left side

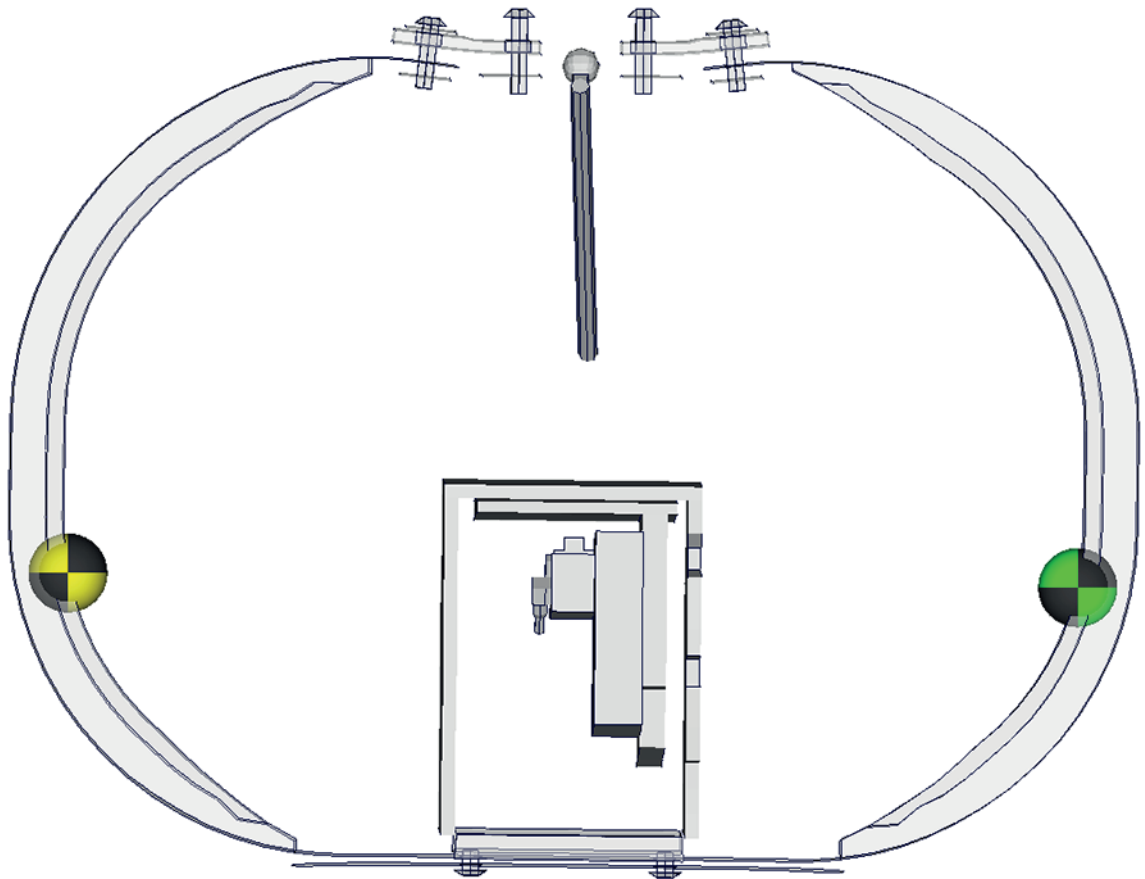
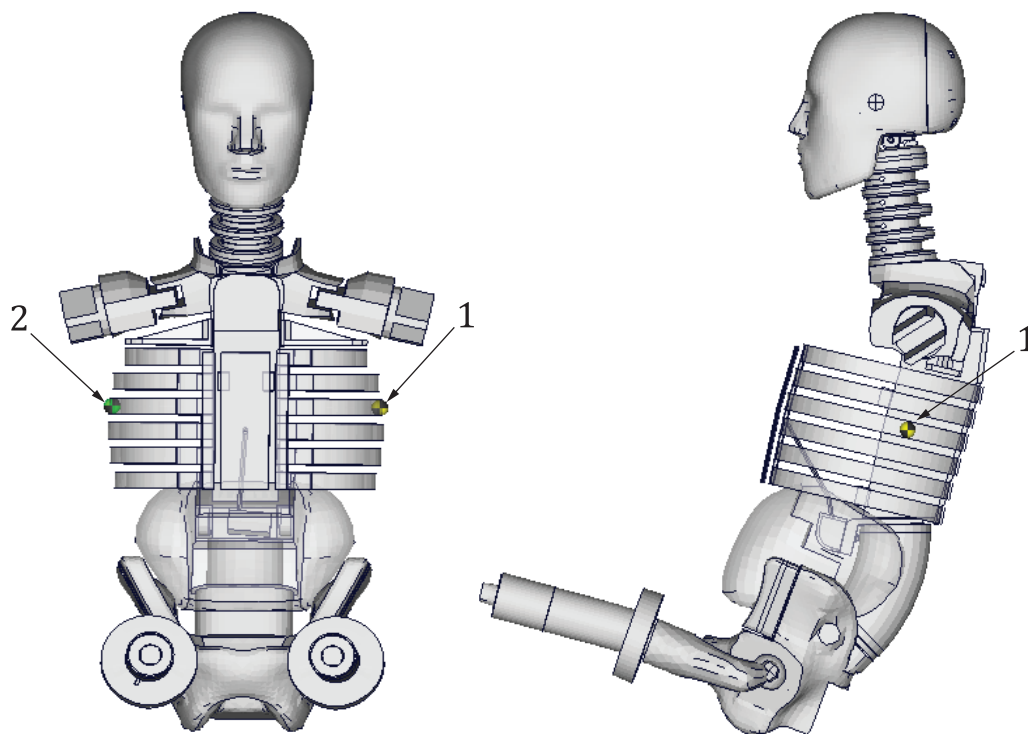


Figure A.8 — Measuring point for the Hybrid-III 50th, details view of locations on the 3rd rib

A.2.6 Hybrid-III 95th male



Key

- 1 3rd rib, left side (option 1)
- 2 3rd rib, right side (option 2)

Figure A.9 — Measuring point for the Hybrid-III 95th, view front and left side

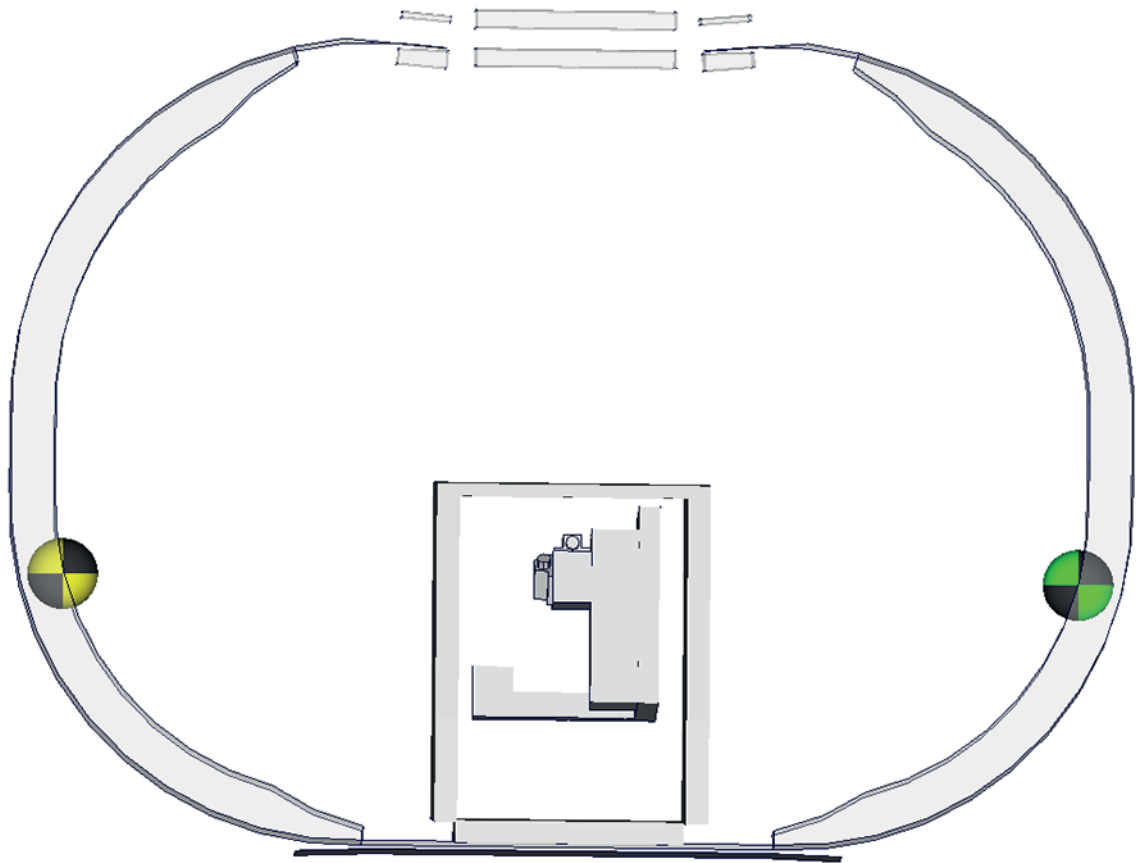


Figure A.10 — Measuring point for the Hybrid-III 95th, details view of locations on the 3rd rib

Annex B (informative)

SID-IIs

B.1 General

This annex defines the sensor locations for all build levels of the anthropomorphic test device SID-IIs.

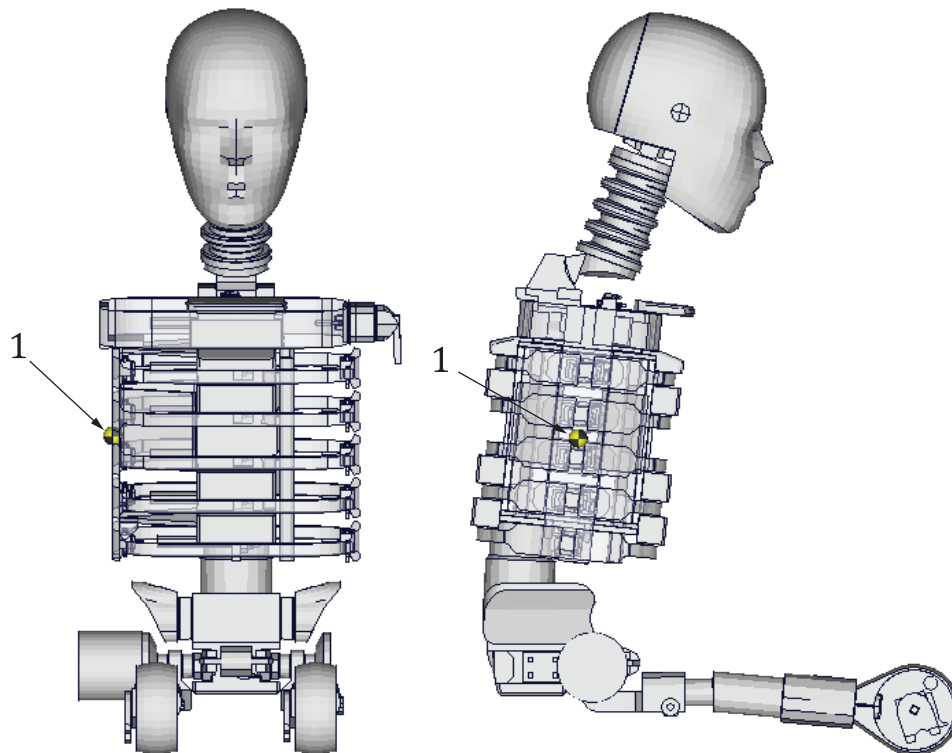
B.2 Temperature sensor locations

The SID-IIs is equipped with a temperature sensor attached at the inner surface on the non-struck side of the anthropomorphic test device.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures B.1](#) to [B.2](#) show the measuring points for anthropomorphic test devices of the SID-IIs.



Key

- 1 between 2nd and 3rd thorax rib non-struck side

Figure B.1 — Measuring point for the SID-IIs with left-side-instrumentation view front and right side

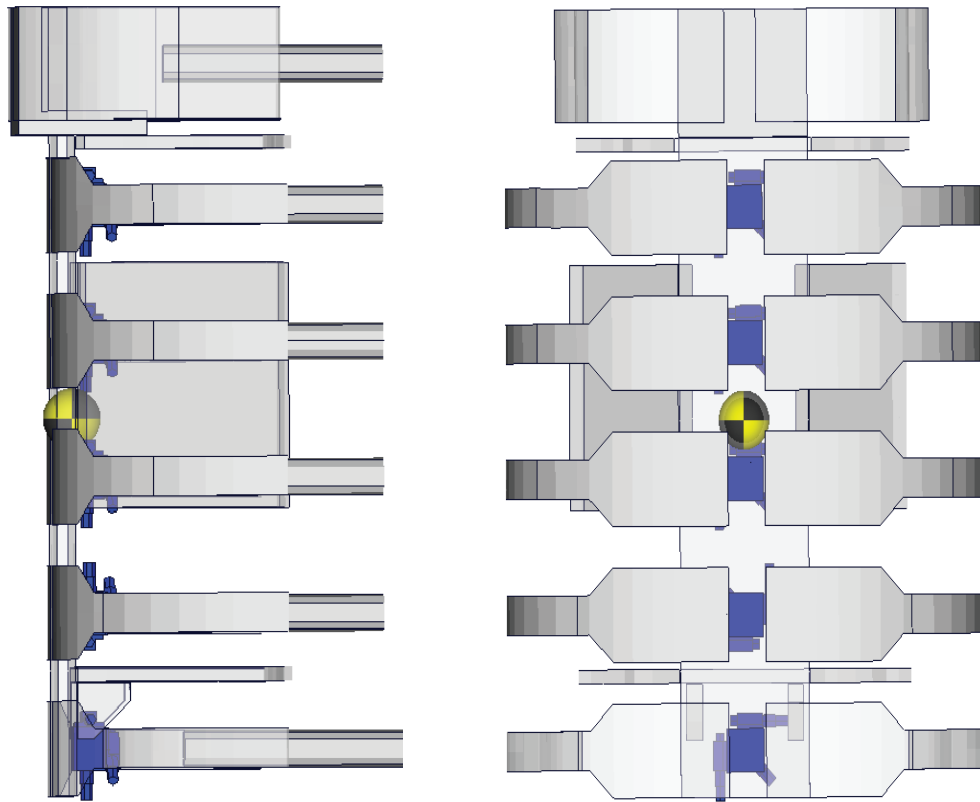


Figure B.2 — Measuring point for the SID IIs, details view from front and right side of locations on the sensor between 2nd and 3rd thorax rib

Annex C (informative)

ES-2 and ES-2re

C.1 General

This annex defines the sensor locations for the anthropomorphic test devices ES-2 and ES-2re.

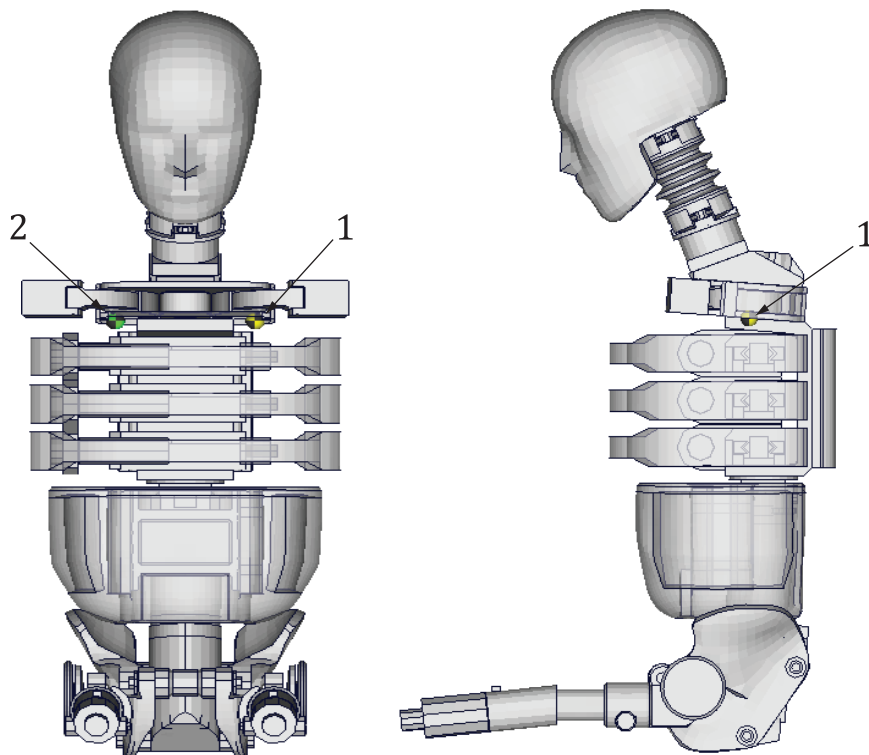
C.2 Temperature sensor locations

The ES-2 is equipped with a temperature sensor attached to the lower surface of the clavicle box of the anthropomorphic test device.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures C.1](#) to [C.2](#) shows the measuring points for anthropomorphic test devices of the ES-2 and ES-2re.



Key

- 1 clavicle box, left side (option 1)
- 2 clavicle box, right side (option 2)

Figure C.1 — Measuring point for the ES-2 and ES-2re, view front and left side

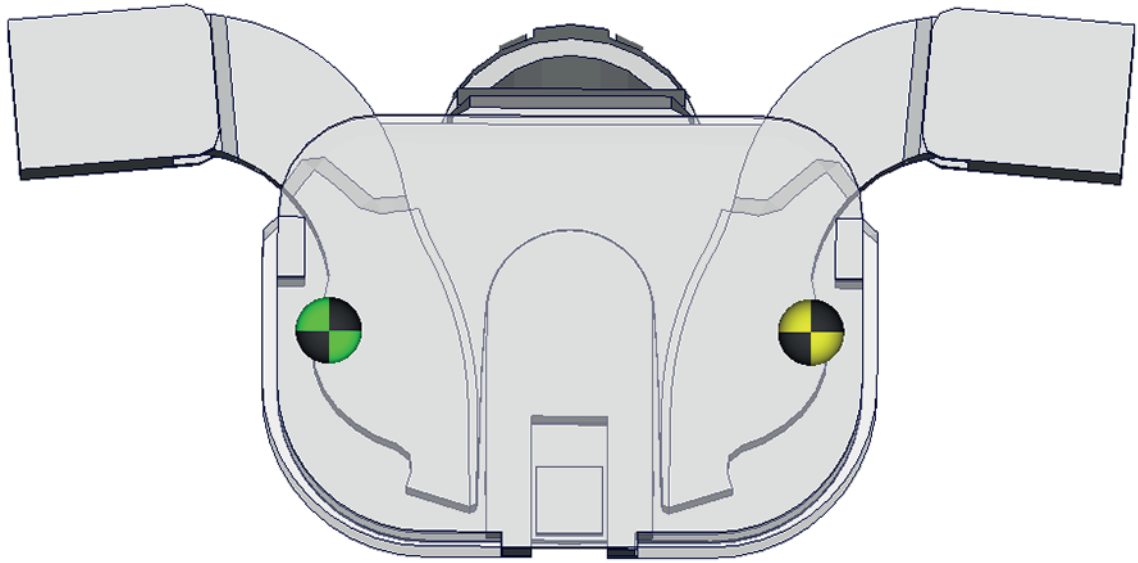


Figure C.2 — Measuring point for the ES-2 and ES-2re, details view of locations on the clavicle box

Annex D (informative)

WorldSID 5th + 50th

D.1 General

This annex defines the sensor locations for the anthropomorphic test devices WorldSID 5th and 50th.

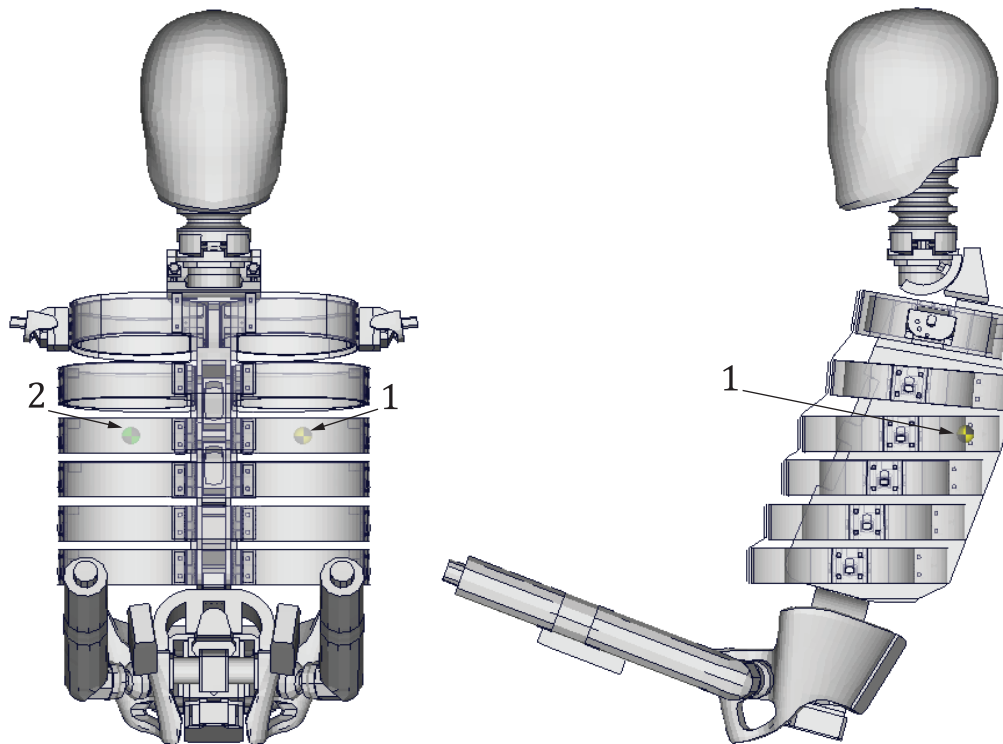
D.2 Temperature sensor locations

The WorldSID is equipped with a temperature sensor attached at the inner surface of the 2nd thorax rib (left or right side) on the non-struck side of the anthropomorphic test device. The sensor is mounted on the damping material.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures D.1](#) to [D.2](#) show the measuring points for anthropomorphic test devices of the WorldSID.



Key

- 1 2nd thorax rib, left side (option 1)
- 2 2nd thorax rib, right side (option 2)

Figure D.1 — Measuring point for the WorldSID, view front and left side

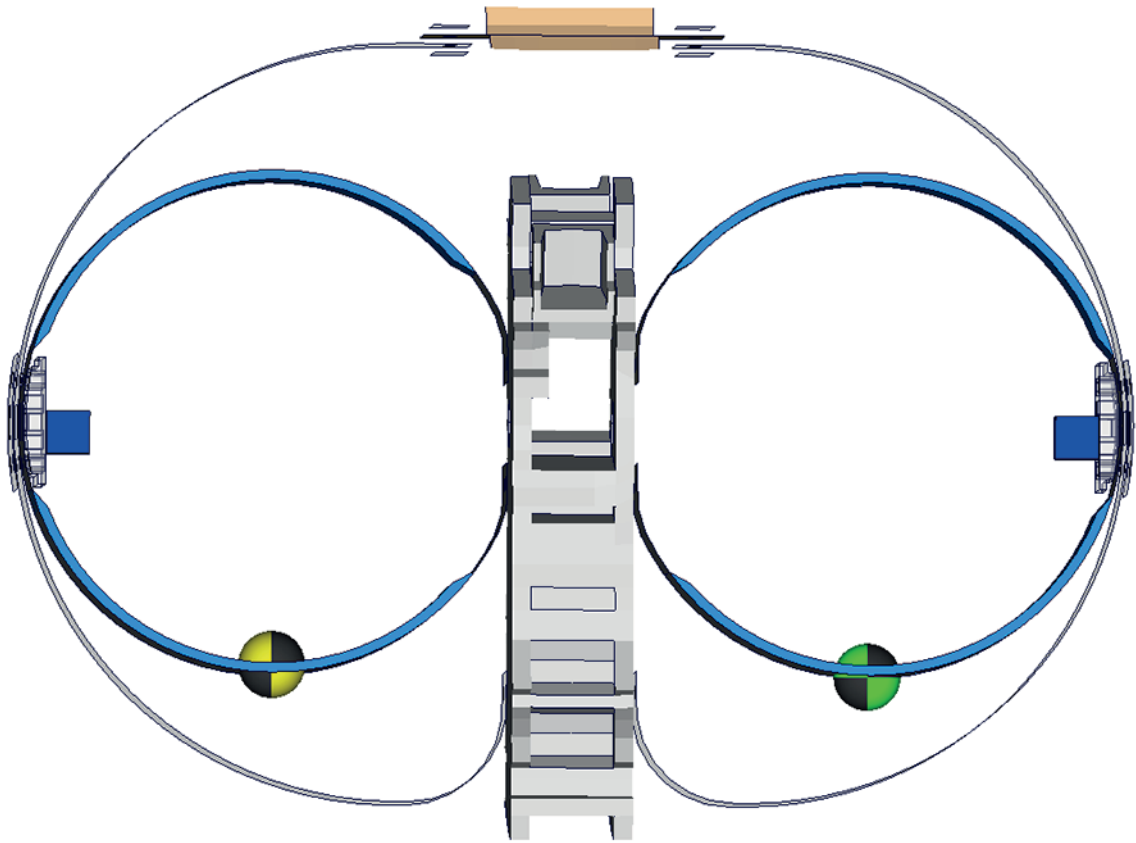


Figure D.2 — Measuring point for the WorldSID, details view of locations on the thorax rib 2

For the WorldSID 5th the sensor is placed 50 mm from the opening along the inside curve.

For the WorldSID 50th the sensor is placed 85 mm from the opening along the inside curve.

Annex E (informative)

THOR-M 50th + 5th

E.1 General

This annex defines the sensor locations for the anthropomorphic test devices THOR-M 50th and 50th.

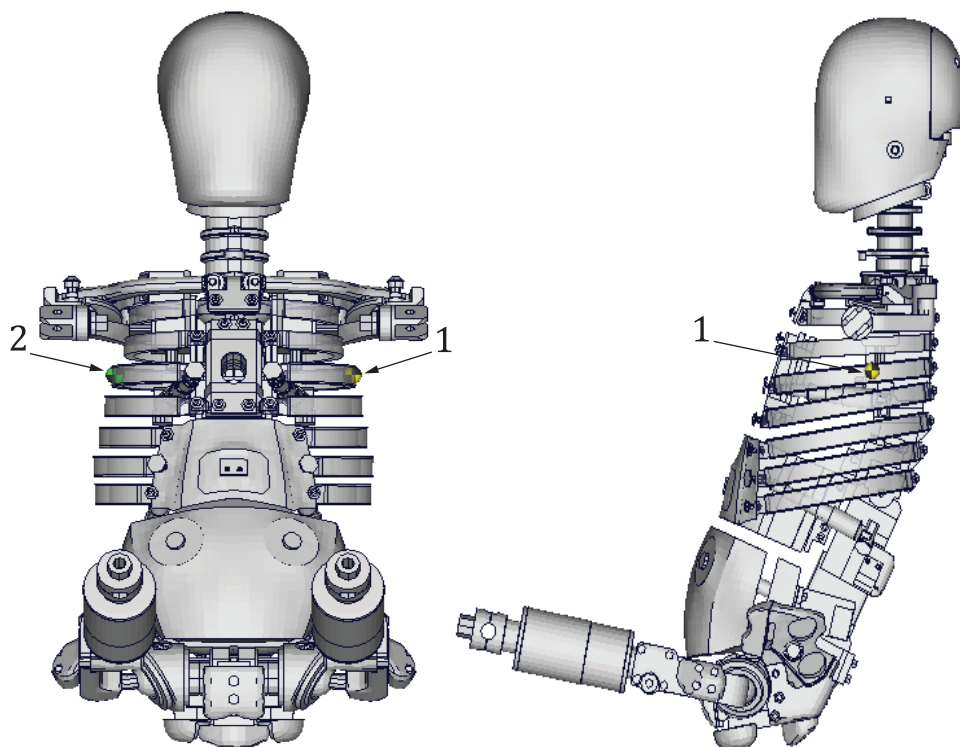
E.2 Temperature sensor locations

The THOR is equipped with a temperature sensor attached to the inner surface of the 3rd thorax rib (left or right side) of the anthropomorphic test device. The sensor is mounted on the damping material.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures E.1](#) to [E.2](#) show the measuring points for anthropomorphic test devices of the THOR.



Key

- 1 3rd rib, left side (option 1)
- 2 3rd rib, right side (option 2)

Figure E.1 — Measuring point for the THOR-M, view front and left side

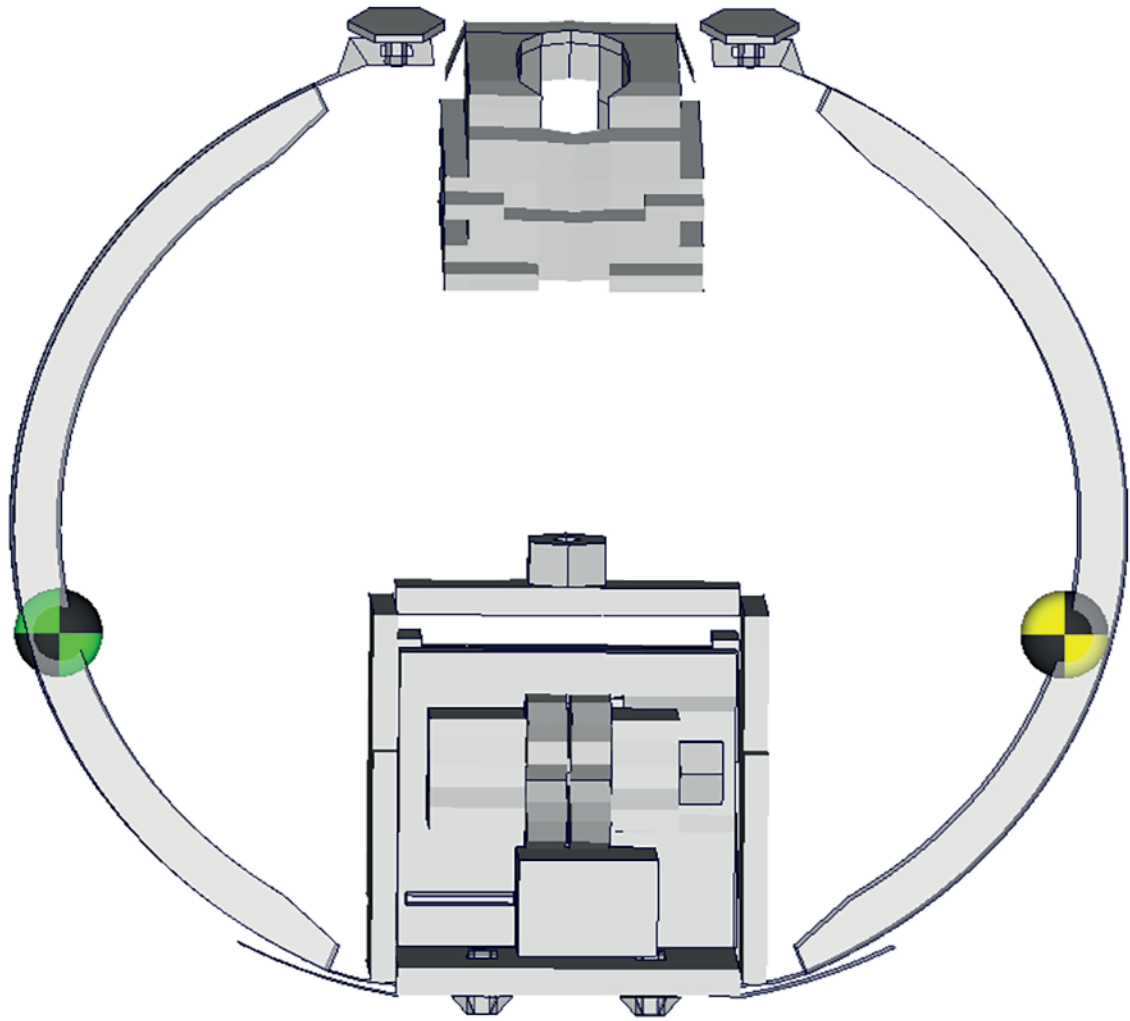


Figure E.2 — Measuring point for the THOR-M, details view of locations on the rib 3

Annex F (informative)

Q-Children

F.1 General

This annex defines the sensor locations for the anthropomorphic test devices Q-children.

F.2 Temperature sensor locations

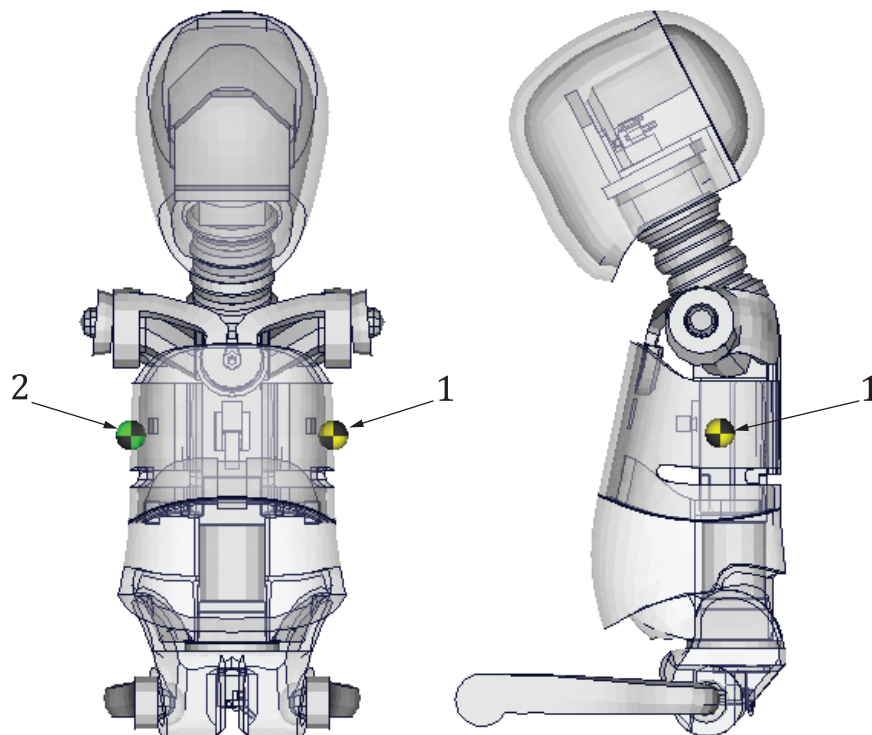
The Q-children is equipped with one temperature sensor. The sensor is attached to the inner surface of the rib cage (left or right side) of the anthropomorphic test device. In the case of a side impact, the sensor is on the non-struck side of the anthropomorphic test device.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures F.1](#) to [F.8](#) show the measuring points for anthropomorphic test devices of the Q-children.

F.2.1 Q1.5



Key

- 1 thorax left side (option 1)
- 2 thorax right side (option 2)

Figure F.1 — Measuring point for the Q1.5, view front and left side

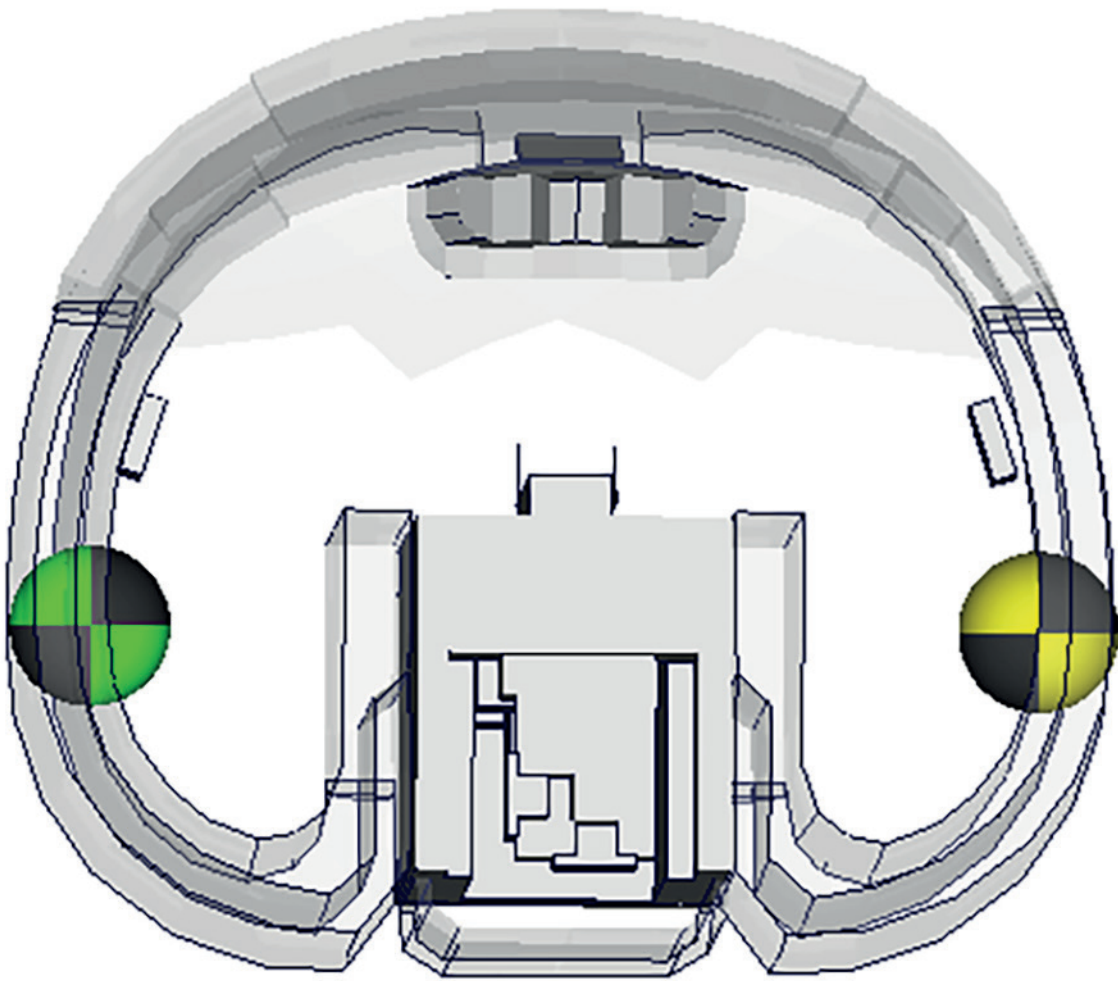
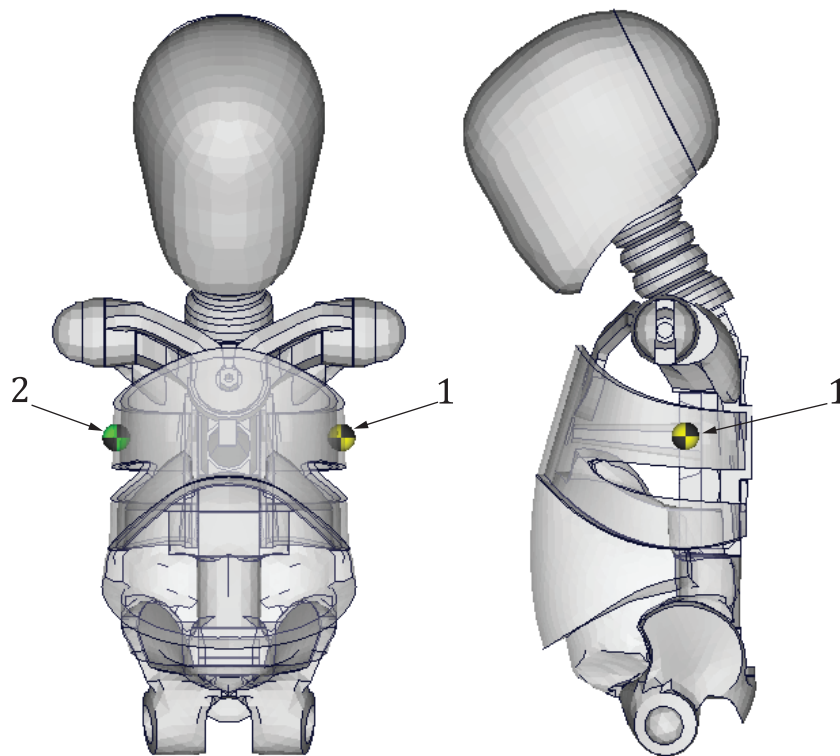


Figure F.2 — Measuring point for the Q1.5, details view of locations on rib cage

F.2.2 Q3 and Q3s



Key

- 1 thorax left side (option 1)
- 2 thorax right side (option 2)

Figure F.3 — Measuring point for the Q3 and Q3s, view front and left side

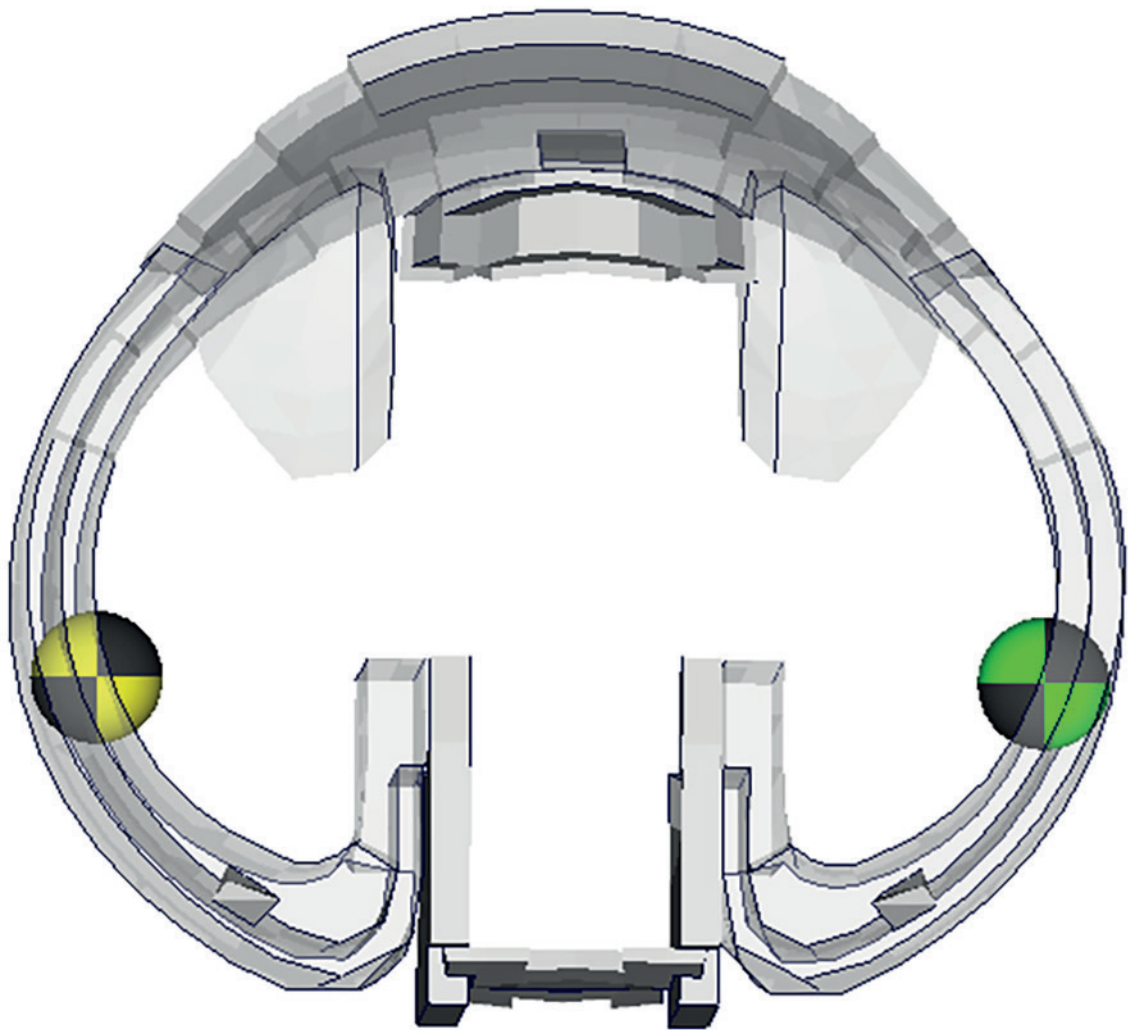
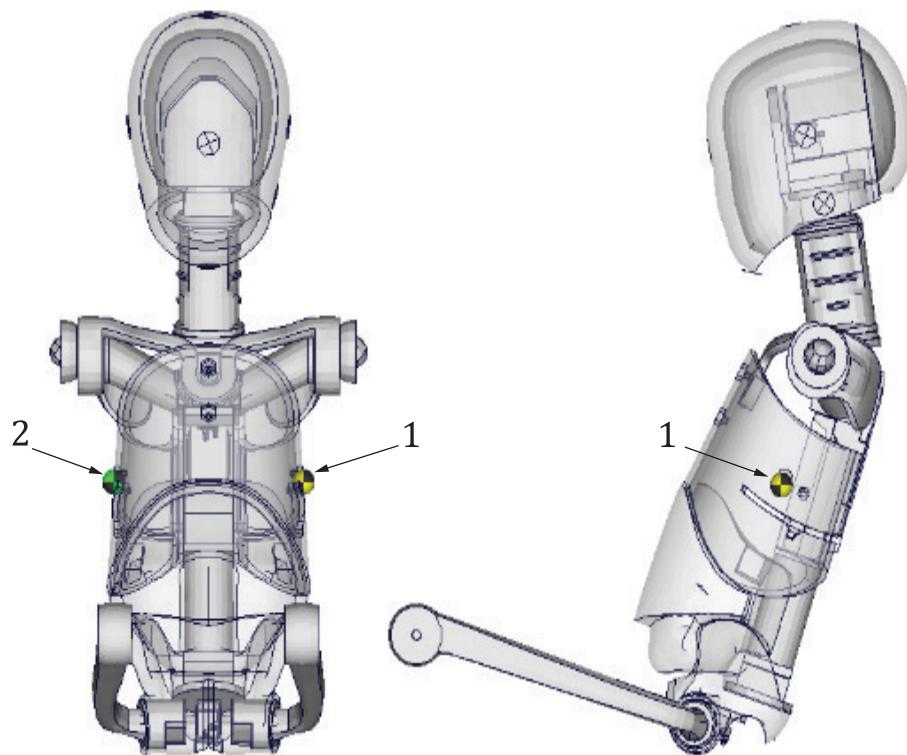


Figure F.4 — Measuring point for the Q3 and Q3s, details view of locations on rib cage

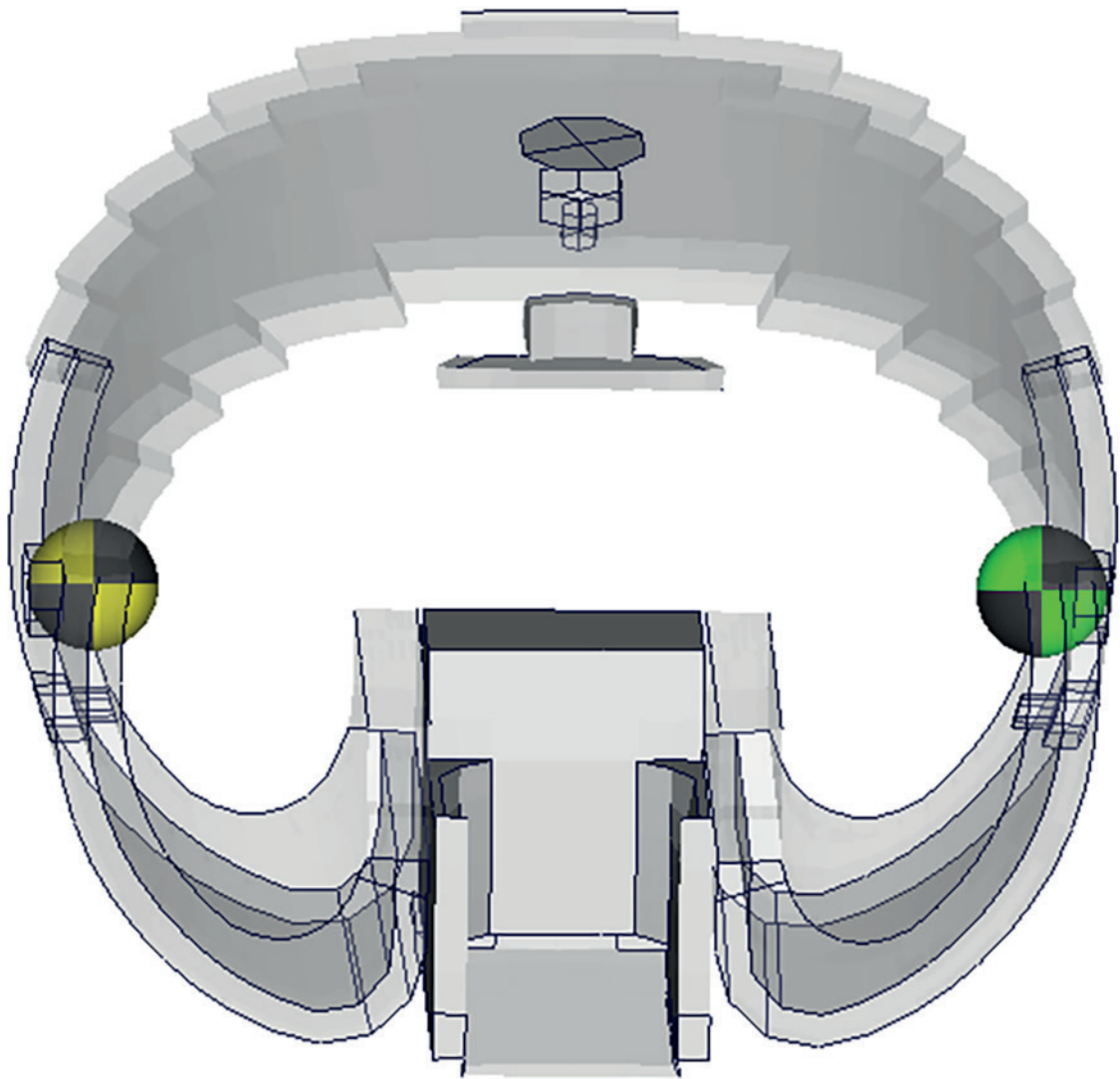
F.2.3 Q6



Key

- 1 thorax left side (option 1)
- 2 thorax right side (option 2)

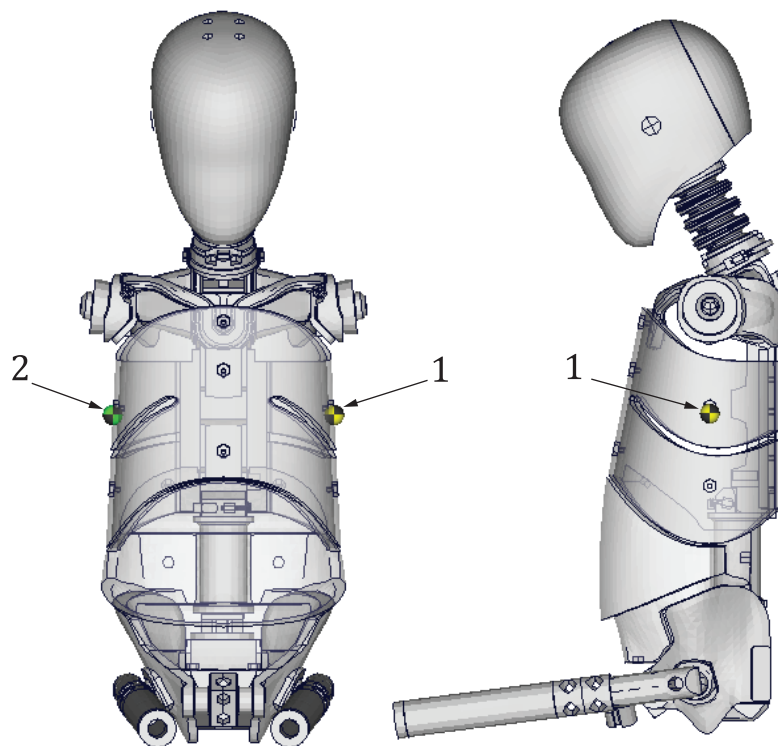
Figure F.5 — Measuring point for the Q6, view front and left side

**Key**

- 1 thorax left side (option 1)
- 2 thorax right side (option 2)

Figure F.6 — Measuring point for the Q6, details view of locations on rib cage

F.2.4 Q10



Key

- 1 thorax left side (option 1)
- 2 thorax right side (option 2)

Figure F.7 — Measuring point for the Q10, view front and left side

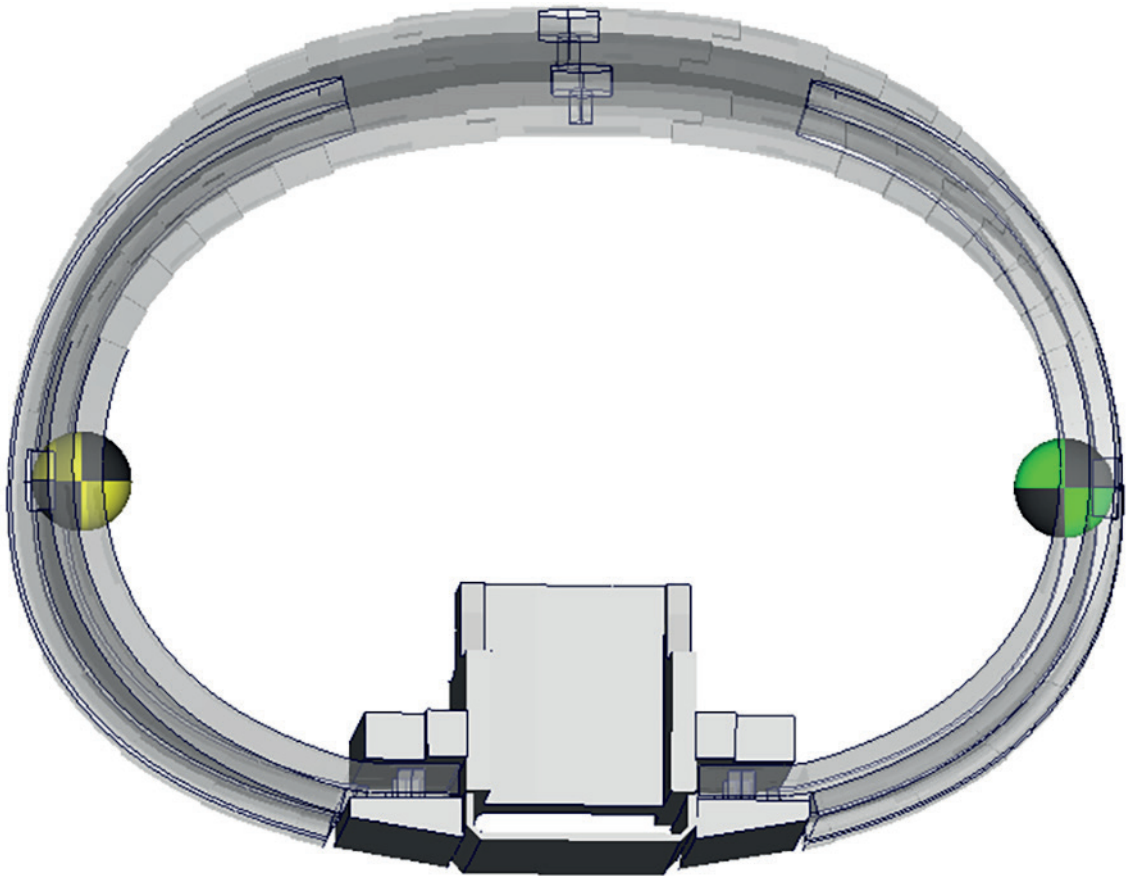


Figure F.8 — Measuring point for the Q10, details view of locations on rib cage

Annex G (informative)

BioRID

G.1 General

This annex defines the sensor locations for the anthropomorphic test devices BioRID.

G.2 Temperature sensor locations

The BioRID is equipped with one temperature sensor. The sensor is attached to the spine (left or right side) of the anthropomorphic test device.

Different options for the position of the temperature sensor are marked with different labels.

The tolerance of this position is a circle with a 25 mm radius.

[Figures G.1](#) to [G.2](#) show the measuring points for anthropomorphic test devices of the BioRID.

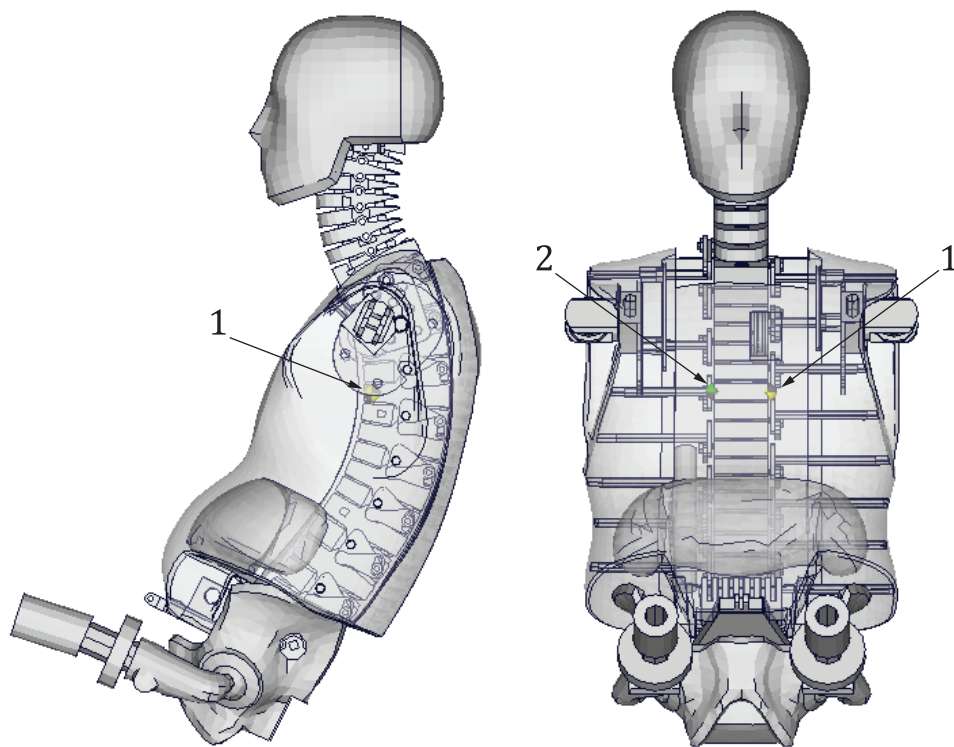


Figure G.1 — Measuring point for the BioRID, view front and left side

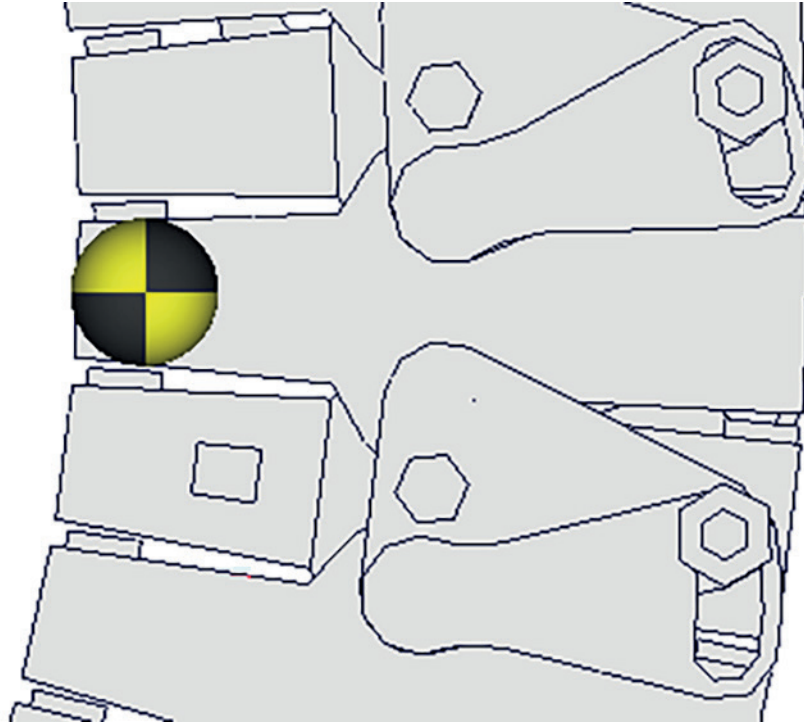


Figure G.2 — Measuring point for the BioRID, details view of locations on spine T7

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