

Second edition
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Ergonomics — 3-D scanning methodologies for internationally compatible anthropometric databases —

Part 2:

Evaluation protocol of surface shape and repeatability of relative landmark positions

*Ergonomie — Méthodologies d'exploration tridimensionnelles
pour les bases de données anthropométriques compatibles au plan
international —*

*Partie 2: Protocole d'évaluation de la forme extérieure et de la
répétabilité des positions relatives de repères*



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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 document 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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This document was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 3, *Anthropometry and biomechanics*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 122, *Ergonomics*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 20685-2:2015), which has been technically revised.

The main changes are as follows:

- landmark names in [Table 1](#) and [Table B.2](#) and subclause numbers in [Table 1](#) harmonized with those in ISO 7250-1:2017;
- standard deviation of radial distances deleted from [Clause 3](#);
- calculation of quality parameter for the repeatability of landmark positions, [Annex B](#) and [Annex D](#) revised.

A list of all parts in the ISO 20685 series can be found on the ISO website.

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.

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Introduction

Anthropometric measures are key to many International Standards. These measures can be gathered using a variety of instruments. An instrument with relatively new application to anthropometry is a three-dimensional (3-D) scanner. 3-D scanners generate a 3-D point cloud of the outside of the human body that can be used in a number of situations, including clothing and automotive design, engineering and medical applications. Recently, digital human models have been created from a 3-D point cloud and used for various applications related to technological design process. Quality control of scan-extracted anthropometric data is important since required quality can differ according to applications.

There are a number of different fundamental technologies that underlie commercially available systems. These include stereophotogrammetry, ultrasound and light (laser light, white light and infrared). Furthermore, the software that is available to process data from the scan varies in its methods. Additionally, methods to extract landmark positions differ between commercially available systems. In some systems, anthropometrists decide landmark locations and paste marker stickers, and scanner systems calculate locations of marker stickers and identify their names. In other systems, landmark positions are automatically calculated from the surface shape data. The quality of landmark locations has a significant effect on the quality of scan-extracted 1-D measurements, as well as digital human models created based on these landmarks.

As a result of differences in fundamental technology, hardware and software, the quality of body surface shape and landmark locations from several different systems can be different for the same individual. Since 3-D scanning can be used to gather these data, it was important to develop an International Standard that allows users of such systems, as well as users of scan-extracted measurements, to judge whether the 3-D system is adequate for these needs.

The intent of this document is to ensure the quality control process of body scanners, especially that of surface shape and locations of landmarks as specified by ISO 7250-1.

This document is not intended to be used for an acceptance test.