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NSAI Standards

Irish Standard
I.S. EN ISO 20685-2:2017

Ergonomics - 3-D scanning methodologies for internationally compatible anthropometric databases - Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions (ISO 20685-2:2015)

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I.S. EN ISO 20685-2:2017

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National Foreword

I.S. EN ISO 20685-2:2017 is the adopted Irish version of the European Document EN ISO 20685-2:2017, Ergonomics - 3-D scanning methodologies for internationally compatible anthropometric databases - Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions (ISO 20685-2:2015)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 20685-2

March 2017

ICS 13.180

English Version

Ergonomics - 3-D scanning methodologies for internationally compatible anthropometric databases - Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions (ISO 20685-2:2015)

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 (ISO 20685-2:2015)

Ergonomie - Scanverfahren für international kompatible anthropometrische Datenbanken - Teil 2: Prüfprotokoll für Körperoberflächen und Wiederholbarkeit relativer Messpunktpositionen (ISO 20685-2:2015)

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European foreword

The text of ISO 20685-2:2015 has been prepared by Technical Committee ISO/TC 159 “Ergonomics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 20685-2:2017 by Technical Committee CEN/TC 122 “Ergonomics” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

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INTERNATIONAL STANDARD

ISO 20685-2

First edition
2015-08-01

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

Reference number
ISO 20685-2:2015(E)

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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).

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The committee responsible for this document is ISO/TC 159, *Ergonomics*, Subcommittee SC 3, *Anthropometry and biomechanics*.

ISO 20685 consists of the following parts, under the general title *3-D scanning methodologies for internationally compatible anthropometric databases*:

— *Part 2: Evaluation protocol of surface shape and repeatability of relative landmark positions*

A revision of ISO 20685:2010 is under preparation; when revised, it will become

— *Part 1: Evaluation protocol for body dimensions extracted from 3-D body scans*

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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 are 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), among others. Further, the software that is available to process data from the scan varies in its methods. Additionally, methods to extract landmark positions are different between commercially available systems. In some systems, anthropometrists decide landmark locations and paste marker stickers, and scanner system calculate locations of marker stickers and identify their names, while in other systems, landmark positions are automatically calculated from the surface shape data. Quality of landmark locations have significant effects 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 part of ISO 20685 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.

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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

1 Scope

This part of ISO 20685 addresses protocols for testing of 3-D surface-scanning systems in the acquisition of human body shape data and measurements. It does not apply to instruments that measure the motion of individual landmarks.

While mainly concerned with whole-body scanners, it is also applicable to body-segment scanners (head scanners, hand scanners, foot scanners). This International Standard applies to body scanners that measure the human body in a single view. When a hand-held scanner is evaluated, it has to be noted that the human operator can contribute to the overall error. When systems are evaluated in which the subject is rotated, movement artefacts can be introduced; these can also contribute to the overall error. This part of ISO 20685 applies to the landmark positions determined by an anthropometrist. It does not apply to landmark positions automatically calculated by software from the point cloud.

The quality of surface shape of the human body and landmark positions is influenced by performance of scanner systems and humans including measurers and subjects. This part of ISO 20685 addresses the performance of scanner systems by using artefacts rather than human subjects as test objects.

Traditional instruments are required to be accurate to millimetre. Their accuracy can be verified by comparing the instrument with a scale calibrated according to an international standard of length. To verify or specify the accuracy of body scanners, a calibrated test object with known form and size is used.

The intended audience is those who use 3-D body scanners to create 3-D anthropometric databases including 3-D landmark locations, the users of these data, and scanner designers and manufacturers. This part of ISO 20685 intends to provide the basis for the agreement on the performance of body scanners between scanner users and scanner providers as well as between 3-D anthropometric database providers and data users.

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 7250-1, *Basic human body measurements for technological design — Part 1: Body measurement definitions and landmarks*

ISO 10360-8, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS) — Part 8: CMMs with optical distance sensors*

ISO 20685, *3-D scanning methodologies for internationally compatible anthropometric databases*

3 Terms and definitions

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

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