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Clothing — Digital fittings —

Part 2: Vocabulary and terminology used for attributes of the virtual human body

Habillement — Bien-aller virtuel —

Partie 2: Vocabulaire et terminologie utilisés pour les caractéristiques du corps humain virtuel

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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 on 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.

The committee responsible for this document is ISO/TC 133, *Clothing sizing systems – size designation, size measurement methods and digital fittings*.

ISO 18825 consists of the following parts, under the general title *Clothing — Digital fittings:*

— *Part 1: Vocabulary and terminology used for the virtual human body*

— *Part 2: Vocabulary and terminology used for attributes of the virtual human body*

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Introduction

The virtual human body in the virtual garment system is intended to reproduce the actual shape and size of the human body with known reliability. It is also intended to have attributes applicable to making and wearing clothes. Among these attributes it is essential that the definitions of virtual body landmarks and virtual body dimensions are consistent with those defined for actual humans.

The virtual human body is not defined based on human anatomy. However, since the virtual human body needs to have body dimensions very close to those of the actual human body, virtual body landmarks are closely associated with anatomical landmarks defined on the human body

Definitions and the procedure of body measurement were prescribed in ISO 8559. In addition to this, virtual body dimensions of the virtual human body need to be defined in the three-dimensional virtual space because the surface of the virtual human body cannot be touched in reality. And virtual body landmarks of the virtual human body are detected from x, y, z axes using a visual detective method on the screen. Therefore, virtual body dimensions and virtual body landmarks of the virtual human body need to be modified and defined for use in three-dimensional virtual space while maintaining similarity to existing anthropometric body dimensions.

When a virtual human body of the same size is made with each different virtual garment system, the results of the virtual human body size and shape, etc. are different., not only because the current virtual garment systems have different size changing algorithms, but also because they use different definitions of body dimensions of the virtual human body. This confuses users on the terms related to the body dimensions of the virtual human body, and online sales using unstandardized virtual garment systems could lead to more errors in clothing size. This can be solved by standardizing terms and definitions of body dimensions of the virtual human body and suggesting essential body dimensions of the virtual human body.

This part of ISO 18825 is the second in a series of standards that deal with the virtual human body. The purpose of this series of International Standards is to improve online communication and reliability of fashion products sold online and in-store through visual confirmation of size, shape, fit, and design by standardizing the terms related to the virtual garment system.

Following ISO 18825-1 which deals with composition and attributes of the virtual human body, this part of ISO 18825 defines terms necessary to describe virtual human body, and thus supports online and in-store consumers, fashion designers, product developers, technologists, manufacturers and retailers who have an interest in the style and fit of clothes. Developers of the virtual garment system should use the same terms described in this part of ISO 18825.

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Clothing — Digital fittings —

Part 2: Vocabulary and terminology used for attributes of the virtual human body

1 Scope

This part of ISO 18825 defines the terms used to describe the virtual human body which is used in virtual garment systems. Specifically, virtual body landmarks and virtual body dimensions are described.

This part of ISO 18825 mainly deals with vocabulary and terminology of essential virtual body dimensions of the virtual torso, arm, leg, head, face, hands and bones and joints of virtual human body.

Since there are many body landmarks on the head and hand, landmarks on these parts are defined separately from those on other parts of the body.

This part of ISO 18825 is intended for developers of virtual garment systems. Although this part of ISO 18825 does not aim at users of virtual human body in online communication, the improved reliability of virtual human body will benefit them.

2 Terms and definitions relating to the virtual torso, arms and legs

2.1 Virtual body landmark

Note See Figure 2.

2.1.1
virtual top head point
highest point of the head on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.2
virtual neck point
middle point of the front neck between the virtual top neck point and *virtual front neck-base point* (2.1.3) on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.3
virtual front neck-base point
most concave point under the front neck on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

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2.1.4
virtual side neck-base point
intersection point of the concave contour line at the neck-base passing through the shoulder ridge line with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.5
virtual back neck-base point
most posterior point at the back neck-base on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.6
virtual shoulder point
most lateral point of the shoulder ridge line passing through the cross section covering the middle plane of the torso and arm with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.7
virtual axillia point
lowest point under the axillary passing through the cross section between the torso and arm with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.8
virtual front axillia point
most anterior point of upper arm at the same level as the *virtual axillia point* (2.1.7) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.9
virtual back axillia point
most postrerior point of upper arm at the same level as the *virtual axillia point* (2.1.7) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.10
virtual bust point
most anterior point of the bust with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.11
virtual underbust point
lowest point under the bust projection with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.12
virtual side waist point
most concave point of the (right) side waist when viewed from the front with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

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2.1.13
virtual back waist point
point of the back waist on the midsagittal plane at the level of the *virtual side waist point* (2.1.12) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.14
virtual abdomen point
most anterior point of the abdomen on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.15
virtual hip point
most posterior point of the hip with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.16
virtual crotch point
lowest point of the torso on the midsagittal plane with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.17
virtual elbow point
most protruding point of the elbow

2.1.18
virtual wrist point
most concave point of the extended line of the little finger passing through the cross section between the arm and hand with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.19
virtual middle finger tip point
distal point of the middle finger with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.20
virtual gluteal fold point
most concave point on the sagittal plane passing through the *virtual hip point* (2.1.15) between hip and thigh with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.21
virtual mid-thigh point
point of the (right) side thigh when viewed from the side at the middle level between the *virtual hip point* (2.1.15) and *virtual knee point* (2.1.22) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

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2.1.22
virtual knee point
centre point of the anterior part of the knee with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.23
virtual calf point
most posterior point of the calf with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.24
virtual lower leg point
most concave point of under the front lower leg above the virtual side ankle point with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.25
virtual outside ankle point
most lateral point of the lateral malleolus with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

2.1.26
virtual landing heel point
lowest point of the posterior calcaneus with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.4.

Note 2 to entry: The virtual landing heel point can reach the floor or the top of the shoe heel.

2.2 Virtual body dimension

Note See Figure 3.

2.2.1
virtual height
vertical distance between the *virtual landing heel point* (2.1.26) and *virtual top head point* (2.1.1) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.2
virtual bust height
vertical distance between the *virtual landing heel point* (2.1.26) and *virtual bust point* (2.1.10) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

Note 2 to entry: When the value of the *virtual bust height* (2.2.2) based on the relation between parameters through data analysis of classified virtual human bodies is set in the virtual garment system, value input is not necessary. When the value of the virtual bust height can be acquired through measurement of an actual person, value input is recommended.

2.2.3
virtual waist height
vertical distance between the *virtual landing heel point* (2.1.26) and *virtual side waist point* (2.1.12) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

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Note 2 to entry: When the value of the virtual waist height based on the relation between parameters through data analysis of classified virtual human bodies is set in the virtual garment system, value input is not necessary. When the value of the virtual waist height can be acquired through measurement of an actual person, value input is recommended.

2.2.4
virtual hip height
vertical distance between the *virtual landing heel point* (2.1.26) and *virtual hip point* (2.1.15) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

Note 2 to entry: to entry When the value of the virtual hip height based on the relation between parameters through data analysis of classified virtual human bodies is set in the virtual garment system, value input is not necessary. When the value of the virtual hip height can be acquired through measurement of an actual person, value input is recommended.

2.2.5
virtual crotch height; virtual inside leg length
vertical distance between the *virtual landing heel point* (2.1.26) and virtual crotch with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.6
virtual knee height
vertical distance between the *virtual landing heel point* (2.1.26) and virtual knee point with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

Note 2 to entry: to entry When the value of the virtual knee height based on the relation between parameters through data analysis of classified virtual human bodies is set in the virtual garment system, value input is not necessary. When the value of the virtual knee height can be acquired through measurement of an actual person, value input is recommended.

2.2.7
virtual calf height
vertical distance between the *virtual landing heel point* (2.1.26) and *virtual calf point* (2.1.23) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

Note 2 to entry: When the value of the virtual calf height based on the relation between parameters through data analysis of classified virtual human bodies is set in the virtual garment system, value input is not necessary. When the value of the virtual calf height can be acquired through measurement of an actual person, value input is recommended.

2.2.8
virtual shoulder width
horizontal distance between right and left *virtual shoulder point*s (2.1.6)

Note 1 to entry: In case of using 'virtual shoulder width' which refers 'the surface length', it is marked that there has been a change in meaning.

2.2.9
virtual back waist length
surface distance between the *virtual back neck-base point* (2.1.5) and *virtual back waist point* (2.1.13) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

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2.2.10
virtual arm length
sum of the distance of the straight line between *virtual shoulder point* (2.1.6) and *virtual elbow point* (2.1.17), and the distance of the straight line between virtual elbow point and *virtual wrist point* (2.1.18) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

Note 2 to entry: to entry In case 'virtual arm length' is used to mean 'surface length', it is marked that there has been a change in meaning.

2.2.11
virtual neck girth
perpendicular girth to the neck axis passing through the *virtual neck point* (2.1.2) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.12
virtual neck-base girth
girth of the contour line passing through the *virtual front neck-base point* (2.1.3), *virtual side neck-base point* (2.1.4) and *virtual back neck-base point* (2.1.5) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.13
virtual armscye girth
girth of the contour cross section between the torso and arm passing through the *virtual shoulder points* (2.1.6) and *virtual axillia points* (2.1.7) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.14
virtual upper arm girth
maximum girth of the upper arm perpendicular to the main axis of the upper arm and passing through the *virtual axillia points* (2.1.7) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.15
virtual elbow girth
girth of the arm perpendicular to the main axis of the upper arm and passing through the *virtual elbow point* (2.1.17) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.16
virtual wrist girth
girth of the forearm perpendicular to the main axis of the forearm and passing through the *virtual wrist point* (2.1.18) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.17
virtual chest girth
horizontal girth of the torso passing through the *virtual axillia points* (2.1.7) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

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2.2.18
virtual bust girth
horizontal girth of the torso passing through the *virtual bust point* (2.1.10) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.19
virtual underbust girth
horizontal girth of the torso passing through the *virtual underbust point* (2.1.11) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.20
virtual waist girth
horizontal girth of the torso passing through the *virtual side waist point* (2.1.12) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.21
virtual abdomen girth
horizontal girth of the torso passing through the *virtual abdomen point* (2.1.14) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.22
virtual hip girth
horizontal girth of the torso passing through the *virtual hip point* (2.1.15) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.23
virtual thigh girth
horizontal girth of the leg at the level of *virtual crotch point* (2.1.16) gluteal fold point with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.24
virtual mid-thigh girth
horizontal girth of the leg at the level of *virtual mid-thigh point* (2.1.21) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.25
virtual knee girth
horizontal girth of the leg passing through the *virtual knee point* (2.1.22) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.26
virtual calf girth
horizontal girth of the leg passing through the *virtual calf point* (2.1.23) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

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2.2.27
virtual lower leg girth
smallest horizontal girth of the leg passing through the *virtual lower leg point* (2.1.24) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.2.28
virtual ankle girth
horizontal girth of the leg passing through the *virtual outside ankle point* (2.1.25) with the virtual human body in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.3.

2.3 Virtual skeletal structure — Virtual bone

2.3.1
virtual neck bone
hypothetical bone connecting the middle point between the two virtual tragion points (see 4.1.2) and the centre point of the cross section of the *virtual neck-base girth* (2.2.12) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.2
virtual upper arm bone
hypothetical bone connecting the centre point of of the cross section of the *virtual armscye girth* (2.2.13) and the centre point of the cross section of the *virtual elbow girth* (2.2.15) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.3
virtual forearm bone
hypothetical bone connecting the centre point of the cross section of the *virtual elbow girth* (2.2.15) and the centre point of the cross section of the *virtual wrist girth* (2.2.16) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.4
virtual thigh bone
hypothetical bone connecting the centre point of the cross section of the *virtual knee girth* (2.2.25) and the *virtual hip girth* (2.2.22) with a perpendicular line in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.5
virtual leg bone
hypothetical bone connecting the centre point of the cross section of the *virtual knee girth* (2.2.25) and the centre point of the cross section of the *virtual minimum leg girth* (2.2.27) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.6
virtual neck joint
uppermost point of the *virtual neck bone* (2.3.1) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

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2.3.7
virtual neck-base joint
lowest point of the *virtual neck bone* (2.3.1) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.8
virtual shoulder joint
uppermost point of the *virtual upper arm bone* (2.3.2) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.9
virtual elbow joint
point where the virtual arm bone and *virtual forearm bone* (2.3.3) meet in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.10
virtual wrist joint
lowest point where the *virtual forearm bone* (2.3.3) and virtual hand meet in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.11
virtual waist joint
centre point of the cross section of the *virtual waist girth* (see 2.2.20) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.12
virtual hip joint
uppermost point of the *virtual thigh bone* (2.3.4) in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.13
virtual knee joint
point where the *virtual thigh bone* (2.3.4) and virtual lower leg bone meet in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

2.3.14
virtual ankle joint
lowest point where the virtual lower leg bone and virtual foot meet in the virtual standing position

Note 1 to entry: See ISO 18825-1:2016, 2.2.5.

3 Expression of the virtual torso, arms and legs

3.1 Composition of the virtual torso, arms and legs

3.1.1 Virtual body region

The criteria dividing the human body in the apparel area is different from those in the anatomy area. In the apparel industry, visual appearance as the result of garment fitting is important, and basic construction lines of garment are used to divide the human body. This part of ISO 18825 follows the criteria from basic construction lines of a garment to refer to virtual body segments of the virtual human body.

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