
Digital fitting — Service process —
Part 1:
Ready-to-wear clothing online and
offline

Habillage virtuel — Processus de service —

Partie 1: Habillement prêt-à-porter en ligne et hors ligne

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Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
3.1 General terms.....	1
3.2 Terms relating to users of distribution channels.....	2
3.3 Terms relating to equipment for distribution channels.....	3
4 Service process.....	3
4.1 General.....	3
4.2 Platform service provider - Preparation phase.....	4
4.3 Distribution channel visit.....	4
4.4 Creation or retrieval of a virtual human body.....	4
4.4.1 General.....	4
4.4.2 Creation of a virtual human body.....	4
4.4.3 Retrieval of a virtual human body.....	5
4.5 Selection of ready-to-wear clothing item for digital fitting or size recommendation.....	5
4.6 Evaluation of the digital fitting result or size recommendation.....	6
4.6.1 Evaluation of the digital fitting result.....	6
4.6.2 Customer's purchase decision by digital fitting or size recommendation.....	7
4.7 Digital fitting item change.....	7
4.8 Purchase decision.....	7
Bibliography.....	8

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).

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 (see 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.

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 133, *Clothing sizing systems - size designation, size measurement methods and digital fittings*.

A list of all parts in the ISO/TS 3736 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.

Introduction

The activation of online commerce, the utilization of personal media devices and new IT developments has rapidly expanded the ubiquitous fashion market. Fashion shopping can be characterized by the act of consumers buying clothing online and offline without actually trying on the products. In offline markets, technologies such as virtual mirrors and touch screen monitors help enable this process.

While the growth of the fashion market is welcomed by both consumers and the industry, it also has a major issue: the number of consumer exchanges and returns due to size and fit problems in the ready-to-wear fashion industry.

Solving this problem will be very helpful to the fashion market as consumers purchasing has increased extensively via online and offline platforms. To solve the problem of sizing, the ready-to-wear market needs online and offline digital fitting service standards using virtual human body and virtual garments for commercial application.

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Digital fitting — Service process —

Part 1:

Ready-to-wear clothing online and offline

1 Scope

This document describes an online and offline service process applicable to the distribution of ready-to-wear clothing using a virtual human body, virtual garments and fitting.

This document provides guidance to service providers, including online and offline retailers and 3D shopping platform developers to set up a service process for the distribution of ready-to-wear clothing using a virtual human body, virtual garments and fitting.

This document does not specify software functions, algorithms, and commercialization related to the simulation.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1 General terms

3.1.1

virtual human body

virtual human model for digital fitting of clothing sizing systems in the apparel industry, including information such as size, shape, cross section, body texture and skeletal structure

Note 1 to entry: Also called “fashion avatar”. In computing, an avatar is the graphical representation of the user or the user’s alter ego or character.

Note 2 to entry: The virtual human body is classified into two key types: virtual clone (or virtual shape, see ISO 18825-1:2016, 2.1.1.2.1) and virtual twin (or virtual size, see ISO 18825-1:2016, 2.1.1.2.2).

[SOURCE: ISO 18825-1: 2016, 2.1.1.2, modified — “of clothing sizing systems” added to the definition.]

3.1.2

virtual garment

three-dimensional clothing in digital form that exists in virtual space

[SOURCE: ISO 18163:2016, 2.1.3, modified — Note to entry deleted.]

3.1.3

digital fitting

qualitative and/or quantitative evaluation of overall and/or specific simulation of garment fit through the analysis of the garment balance, gap between body and garment (which includes cross sections), heat map, surface wrinkles, etc.

Note 1 to entry: Digital fitting may be used for many different areas of application of virtual garments such as product development, marketing, etc.

[SOURCE: ISO 18163:2016, 2.1.5]

3.1.4

virtual garment simulation

creation and drape simulation of a virtual garment for a virtual human body using a virtual garment pattern, virtual sewing and bounding volume

[SOURCE: ISO 18163:2016, 2.1.4, modified — Note to entry deleted.]

3.1.5

ready-to-wear clothing shopping service using a virtual human body

process of a purchase decision without actually fitting the ready-to-wear garment in person but by *digital fitting* (3.1.3) a *virtual garment* (3.1.2) on a *virtual human body* (3.1.1)

Note 1 to entry: It is a service process that provides an experience that enhance customer satisfaction by shortening the existing purchasing process through digital fitting and forecast the fit.

Note 2 to entry: In the traditional ready-to-wear clothing purchasing process, a consumer visits an offline distribution channel in person, tries on ready-to-wear clothing of the intended size, and makes a purchase decision, or in the case of an online distribution channel, tries on delivered ready-to-wear clothing and then makes a purchase decision.

3.1.5.1

offline distribution channel

physical platform (place of distribution) that can provide *ready-to-wear clothing shopping services using a virtual human body* (3.1.5)

Note 1 to entry: Physical platforms such as a retail outlets should have a device that allows customers to select or input a design or size of clothing in real time, and to carry-out a digital fitting and a virtual garment simulation.

3.1.5.2

online distribution channel

online platform that can provide *ready-to-wear clothing shopping services using a virtual human body* (3.1.5)

Note 1 to entry: Online platforms, such as the internet, mobile, digital and virtual shopping, should have a function that allows customers to select or input the design or size of clothing in real time, and to carry-out a digital fitting and virtual garment simulation.

3.2 Terms relating to users of distribution channels

3.2.1

platform service provider

organization with an *online distribution channel* (3.1.5.2) or *offline distribution channel* (3.1.5.1) and a database that can provide *ready-to-wear clothing shopping services using a virtual human body* (3.1.5)

Note 1 to entry: A platform that has a traditional clothing shopping system as well as a system that can show a digital fitting using a virtual human body and virtual garment. The platform is also able to save and manage the virtual human body and virtual garment.

Note 2 to entry: Virtual garments include details such as item features and size measurement data. The virtual human body to be used for virtual garment simulation includes data capable of creating a virtual twin.

3.2.2

customer

user of the *online distribution channel* (3.1.5.2) or *offline distribution channel* (3.1.5.1) for ready-to-wear clothing shopping service using the virtual human body (3.1.5)

3.3 Terms relating to equipment for distribution channels

3.3.1

measurement equipment

device used for capturing three-dimensional body scan or body measurements for creating a *virtual human body* (3.1.1)

Note 1 to entry: A three-dimensional body scanner or a smart tape measure can be used.

Note 2 to entry: It is optional in ready-to-wear shopping service.

3.3.2

display device

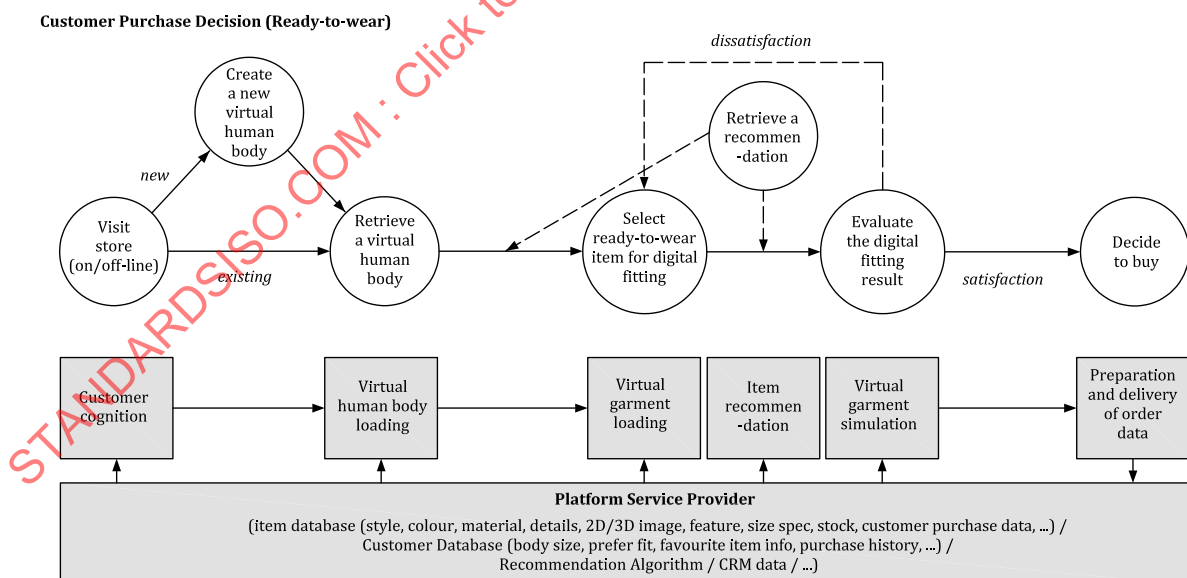
equipment that visually shows the design or fit using a *digital fitting* (3.1.3) and *virtual garment simulation* (3.1.4).

Note 1 to entry: Smart/magic/virtual mirror, tablet, mobile phone, personal computer are some visual equipments used.

4 Service process

4.1 General

Figure 1 illustrates the processes of ready-to-wear clothing shopping services using a virtual human body. The details of the service process are described in 4.2 to 4.8.



Key

----- optional

Figure 1 — Process of ready-to-wear clothing shopping services using a virtual human body

4.2 Platform service provider - Preparation phase

Platform service providers create the customer-specific or representative virtual human body into the database as a preparation phase for service delivery of ready-to-wear clothing online or offline. The database also includes characteristics, dimensions, and functions of clothing, and optionally includes virtual garment(s).

4.3 Distribution channel visit

Customers visit an offline or online distribution channel that provides the ready-to-wear clothing shopping service.

4.4 Creation or retrieval of a virtual human body

4.4.1 General

Customers create their own virtual human body model using measurement equipment, retrieve their previously saved model, or select a representative model similar to their own body.

4.4.2 Creation of a virtual human body

4.4.2.1 General

Customers create a new virtual human body if they visit an offline or online distribution channel for the first time, if they have not saved their virtual human body on the platform or want to update their current body changes.

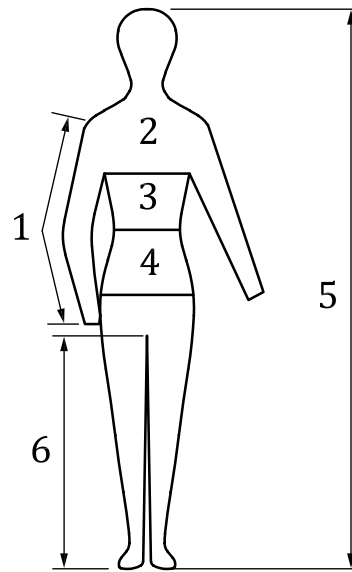
The virtual human body created by one of the following three methods is saved on the platform.

4.4.2.2 Creation of a virtual human body through measurement equipment (Virtual clone)

Customers create a virtual clone by scanning their bodies with measurement equipment installed in an offline distribution channel or in another specific space.

4.4.2.3 Creation of a virtual human body through body dimension input (Virtual twin)

The creation of a virtual twin requires representative body dimensions, such as height, weight, bust girth, chest girth, waist girth, hip girth and inside leg height taken either as physical measurements according to ISO 8559-1 or as automatic measurements using a measurement equipment. As body shape is not an essential consideration in a ready-to-wear size system, platform service providers can require customers' body shape information optionally. Platform service providers should enter the relevant body dimensions required for the ready-to-wear clothing shopping service using a virtual human body. A virtual human body is created by input of body dimension data or by adjusting the body measurement in the dimension input window of an existing virtual twin. See [Figure 2](#).

**Key**

- 1 arm length
- 2 bust girth
- 3 waist girth
- 4 hip girth
- 5 height
- 6 inside leg height

Figure 2 — Example of body dimensions to input

4.4.2.4 Creation of a virtual human body by selecting and modifying a representative virtual human body type

Customers select one from the database of various representative virtual human body types registered without either going through the measurement equipment or by input of body dimensions and modifying the shape and/or body dimensions of the selected virtual human body.

4.4.3 Retrieval of a virtual human body

Customers retrieve the virtual human body saved on the platforms database. The retrieved virtual human body provides various information, such as three-dimensional body shape, body size, and cross sections.

4.5 Selection of ready-to-wear clothing item for digital fitting or size recommendation

Customers choose a ready-to-wear clothing item they want to try on virtually, or a ready-to-wear clothing item for which they want to receive a recommendation on the clothing size.

Platform service providers recommend the ready-to-wear clothing size to the customer and display the result of virtual garment simulation or digital fitting of the item selected by the customer on the display device.

NOTE 1 In offline or online distribution channels, customers can directly search for an item that they want to virtually try on or for which they want to receive a recommendation on the ready-to-wear clothing size. Alternatively, they can choose items from a recommended list in the customer's account or from a catalogue on the service providers' platform.

NOTE 2 Customers retrieve virtual garment data by selecting directly from a digital catalogue or by inserting the barcode of the product tag, QR code (two-dimensional version of the barcode, typically made up of black and white pixel patterns), RFID (a form of wireless communication that incorporates the use of electromagnetic to uniquely identify an object).

NOTE 3 The order of the steps given in 4.4 and 4.5 can vary in accordance with customer requirements.

4.6 Evaluation of the digital fitting result or size recommendation

4.6.1 Evaluation of the digital fitting result

Virtual garments are draped onto the virtual human body selected on the platform by the customer. The digital fitting provided by the platform service provider calculates the fit (e.g. gap, garment pressure and strain) during the virtual garment simulation and displays the result in the display device.

Platform service providers recommend new items and clothing sizes that are appropriate for each customer based on previous selections, depending on the level of technology.

NOTE 1 Digital fitting by virtual garment simulation selectively analyses the garment balance, the gap between body and garment, cross-sectional diagrams, deformation of the garment, clothing pressure, and surface wrinkles in accordance with platform performance and displays the analysis in outline and colour map. Accordingly, it can qualitatively or quantitatively evaluate the whole garment and fitting of a specific area.

NOTE 2 Platform service providers provide a guide for customers to easily understand the digital fitting result.

NOTE 3 See Figure 3 and Figure 4 for results of a digital fittings according to virtual garment simulation.



Figure 3 — Example of digital fitting result (cross sectional analysis) through virtual garment simulation