TECHNICAL SPECIFICATION

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Digital fitting — Service process —

Part 2: Customized clothing online and offline

Habillage virtuel — Processus de service —

Partie 2: Habillement personnalisé en ligne et hors ligne

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Contents

Page

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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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 common practice of mass production and uniform consumption is changing and consumers' need for personalized goods and services such as customized clothing is growing and becoming a trend. New online technologies that use three-dimensional software, devices and automated production systems that support customization has played a major role in the expansion of the customized fashion market.

In the ubiquitous ready-to-wear fashion market, digital fitting technology can reduce exchanges and returns because the technology helps consumers choose a size among the existing sizes and provide recommendations that best fits their bodies.

In the ubiquitous customization fashion market, digital fitting technology is used in the process of pattern design, fit simulation, ordering and production, therefore it is more complicated than its application in the ready-to-wear market. Customization can be divided into two large categories, design-customization and size-customization (see 3.1), which requires more information from the customers.

In the ready-to-wear market a product already exists but in the customization market, there is no actual product, thus, digital fitting technologies, which enable visualization of the apparel, are essential before the production.

The customer provides the size and shape information using the virtual human body including information for the design and style required. The service provider takes this information and designs a pattern and virtual garment. The customer then tries on the virtual garment on their virtual human body and if satisfied, orders the product, which leads to production.

This document explains the details of this process.

Digital fitting — Service process —

Part 2: Customized clothing online and offline

1 Scope

This document describes a service process applicable to the distribution of customized clothing using a virtual human body, virtual garment 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 customized clothing using a virtual human body, virtual garment 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
customized clothing
garment produced after the order and production that meets the customers' required design (style, colour, material, and detail) and/or body shape and size information

3.1.5.1
design-customized clothing
garment that *customers* (3.2.2) can order by selecting design elements (e.g. style, colour, material, and details) in accordance with their preference

Note 1 to entry: It does not take into account the customer's body size or shape and the size of the clothing is the same as the ready-to-wear clothing size.

Note 2 to entry: to entry. See Figure 1.

Figure 1 — Example of a design-customized clothing (dress)

3.1.5.2
size-customized clothing
personalized service that modifies existing patterns or creates new patterns based on the size and shape of the customers' body

Note 1 to entry: It can include the function of design-customized clothing. Together, design and size customization corresponds to a Made-to-Measure (MTM) that selects and combines several body shapes and design elements.

Note 2 to entry: See Figure 2.

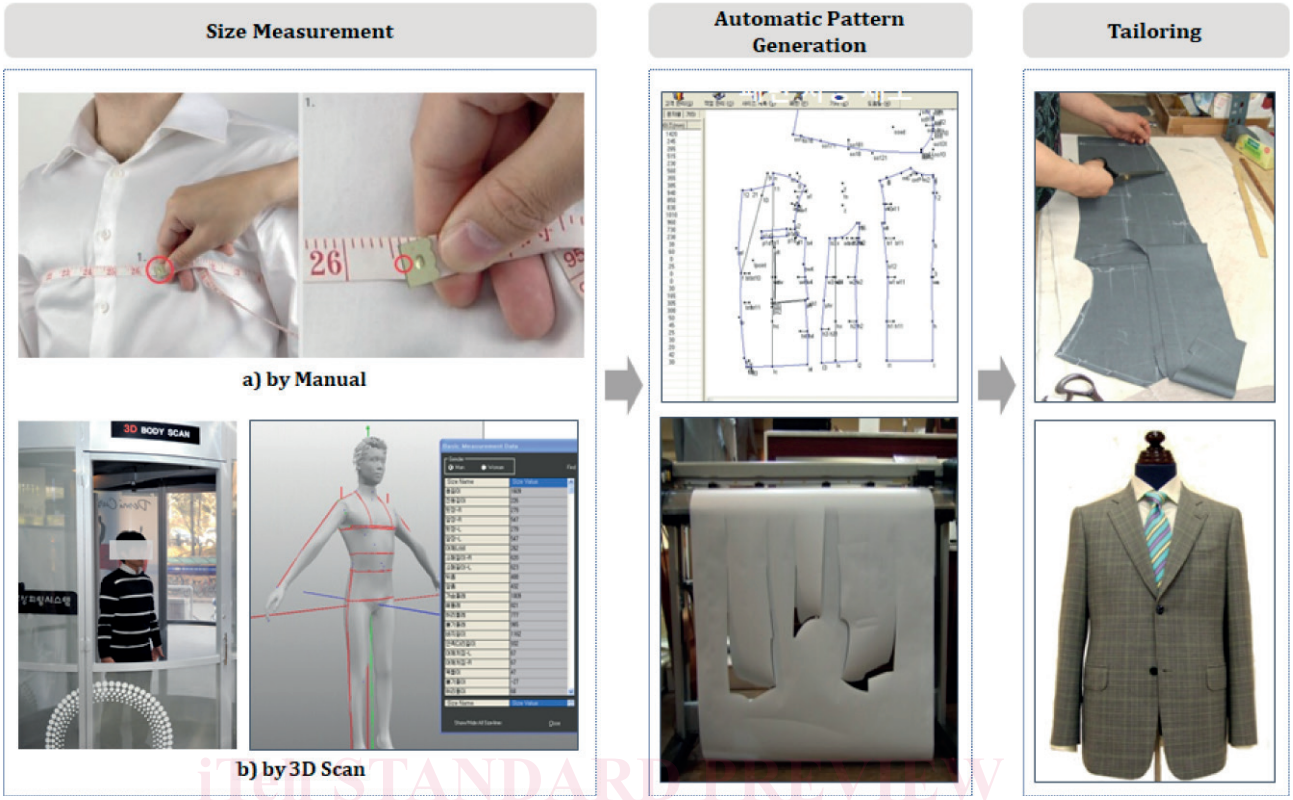

Figure 2 — Example of a size-customized jacket

3.1.6
customized clothing shopping service using a virtual human body
process of a purchase decision without actually fitting on customized clothing in person but by a *virtual garment* (3.1.2) on a *virtual human body* (3.1.1) and checking *digital fitting* (3.1.3)

Note 1 to entry: A customized clothing shopping service using a virtual human body shortens the purchasing process, since it allows a customer to easily change designs or sizes and confirm the fit of customized clothing. It is a new distribution channel using IT technology, which allows for almost zero waste by personalized interaction between the buyer and the producer.

3.1.6.1
offline distribution channel
physical platform (place of distribution) that can provide *customized clothing shopping services using a virtual human body* (3.1.6)

Note 1 to entry: Physical platform 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.

3.1.6.2
online distribution channel
online platform that can provide *customized clothing shopping services using a virtual human body* (3.1.6)

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* (3.1.6.2) or *offline distribution channel* (3.1.6.1) and a database that can provide *customized clothing shopping services using a virtual human body* (3.1.6)

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.

Note 3 to entry: The platform for customized clothing shopping service is able to save and manage the elements for generating a virtual customized clothing sample (virtual fabric and a virtual garment pattern, see ISO 18163:2016, 2.1.1) and customized clothing property data (item, colour, material, detail, fit, and detailed size). In the case of a design-customized clothing shopping platform, it is able to change and apply the design elements of virtual customized clothing (style, colour, material, and detail). Shopping platforms of size-customized clothing are able to change and apply the size and pattern details of virtual customized clothing.

Note 4 to entry: The platform is able to save and manage database of customized clothing suppliers (e.g. raw material supplier, digital textile printing supplier, and sewing factory) and customized clothing designers for virtual garment simulation, ordering and production.

3.2.2
customer
user of the *online distribution channel* (3.1.6.2) or *offline distribution channel* (3.1.6.1) for *customized clothing shopping service using the virtual human body* (3.1.6)

Note 1 to entry: Customers provide the body dimension information required by the platform service provider in case of size-customized clothing.

3.2.3
expert of customized clothing shopping service
human or artificial intelligence (AI) system that helps customers with customized clothing shopping service with knowledge of *customized clothing* (3.1.5) and with their experience as a customized clothing designer and/or patternmaker

Note 1 to entry: Experts of a platform service provider such as platform administrators and merchandisers have the understanding of virtual garment simulation and digital fitting and can coordinate the process of the customized clothing shopping service using the virtual human body

3.3 Terms relating to equipment for distribution channels

3.3.1
measurement equipment
device used for capturing three-dimensional body scans 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 an essential equipment in customized shopping service.

3.3.2
display device
equipment that visually shows the design or fit using a *digital fitting* (3.1.1) and *virtual garment simulation* (3.1.4).

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

4 Service process

4.1 General

Figure 3 illustrates the processes of customized clothing shopping services using a virtual human body. The details of the service process are described in 4.2 to 4.9,

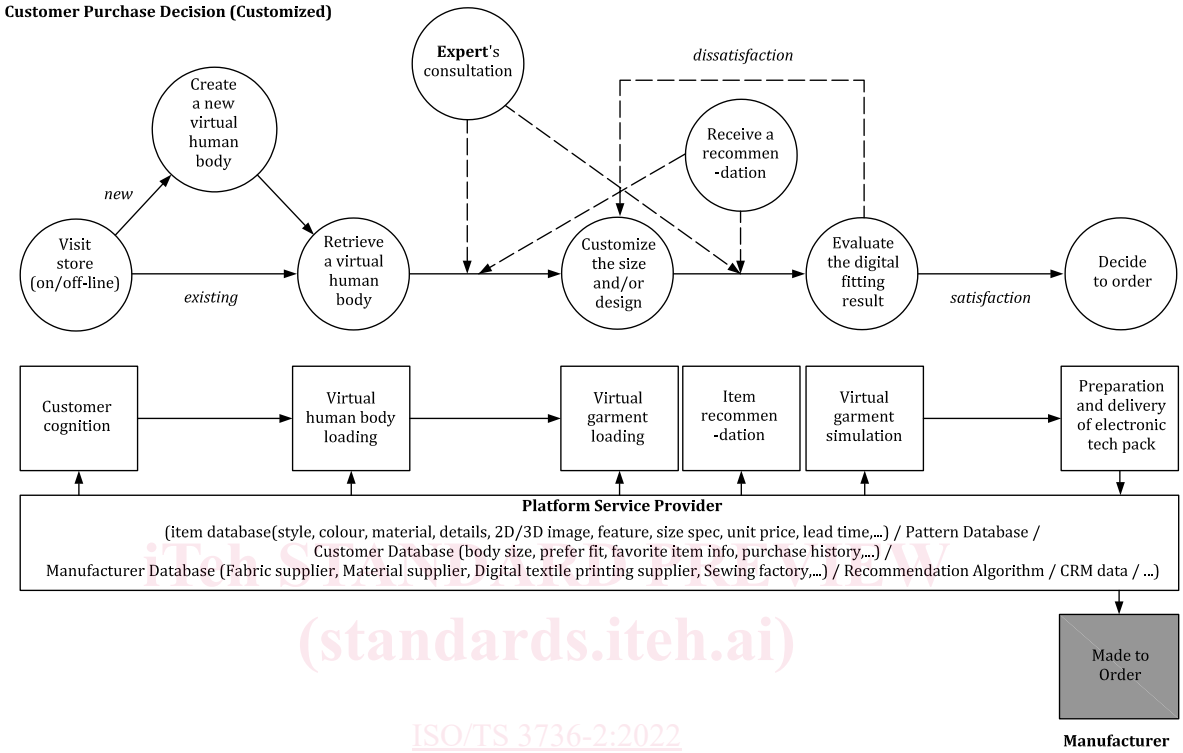

Figure 3 — Process of customized clothing shopping service using virtual human body

4.2 Platform service provider - Preparation phase

Platform service providers create a database as a preparation phase for service delivery of customized clothing online or offline. The database includes the customer-specific or representative virtual human body. It includes characteristics, dimensions and functions of clothing, but also property that can be customized (e.g. item, colour, material, detail, fitting display, detailed size and customizable area). Information for ordering and production of customized clothing includes raw material suppliers, digital textile printing suppliers and sewing factories. In addition, customized clothing designers, raw material costs, labour cost and time are included in the database.

4.3 Distribution channel visit

Customers visit an offline or online distribution channel that provides the customized clothing shopping service.

4.4 Creation or retrieval of a virtual human body

4.4.1 General

Customers create their own virtual human body, retrieve one they created and saved previously, or use a representative model similar to their own body to verify the fit of the desired customized clothing. The process of creating or retrieving a virtual human body is the same as the process described in ISO/TS 3736-1. However, essential processes and optional processes vary depending on design-