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**Performance evaluation protocol for  
digital fitting systems —**

**Part 2:  
Virtual garment**

*Protocole d'évaluation de la performance des systèmes d'habillement  
virtuel —*

**iTeh STANDARD PREVIEW**  
*Partie 2: Vêtement 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](http://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](http://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](http://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 20947 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](http://www.iso.org/members.html).

## Introduction

The use of the digital fitting system, employed to evaluate the suitability of real garments on real human body with the use of virtual garments on a virtual human body in cyberspace, is growing in popularity. The system eliminates the need for physical garment production with fabric in product evaluation. Using computer-generated virtual garment pattern, virtual garment is created and tested on either a virtual human body or a virtual fit mannequin (fit form). The technology is expected to improve garment fit and increase productivity. It benefits not only those engaged in garment design but also consumers at the time of garment purchase, with better fit and wider choice of sizes in mass-produced products. Such system is useful for designers, manufacturers, educationalists because the system helps to improve the fit of garments and productivity.

Digital fitting technology is still developing, and there is a wide range of differences in the specification and performance between digital fitting systems. This makes it difficult for users to select an appropriate system for their purposes.

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# Performance evaluation protocol for digital fitting systems —

## Part 2: Virtual garment

### 1 Scope

This document specifies a method for describing the functions and the method for evaluating the performance of the virtual garment pattern cutting and clothing simulation modules of digital fitting systems. This document is applicable to fashion designers and pattern technologists (makers) for generating virtual garment patterns, and testing them on a virtual fit mannequin (fit form).

### 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 terminological databases for use in standardization at the following addresses:

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

#### 3.1 General

##### 3.1.1

##### **digital fitting system**

simulation of a virtual garment pattern or virtual garment over a *virtual fit mannequin (fit form)* (3.1.2) providing qualitative and/or quantitative evaluation of the fit through analysis of the distribution of, among other things, surface strain, gap between body and garment, tension map, cross section, surface wrinkles, garment balance

##### 3.1.2

##### **virtual fit mannequin (fit form)**

model used for draping and examining silhouette and fit of a garment in a virtual space used for digital fitting

##### 3.1.3

##### **virtual garment**

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

##### 3.1.4

##### **virtual garment pattern**

shapes consisting of straight lines and closed curves that mark the area of a digitized pattern used on the *virtual garment* (3.1.3)

Note 1 to entry: Each pattern consists of a contoured and multiple internal lines, which are used to express seams, internal openings, fold lines, and other garment characteristics.

**3.1.5 clothing simulation**

creation and drape simulation of a virtual garment on the virtual human body using a *virtual garment pattern* (3.1.4), virtual sewing and bounding volume

**3.1.6 material properties**

physical properties of material, including tensile modulus, bending rigidity, shear resistance, thickness, weight

Note 1 to entry: These can be simulated for virtual fabrics using cloth simulation models.

Note 2 to entry: See [Annex C](#).

**3.1.7 sewing information**

information necessary to construct a virtual garment from virtual garment patterns, including seam lines, specific points on a virtual garment pattern such as positions of snaps, hooks, and buttons, notch marks, grain line, and layer information

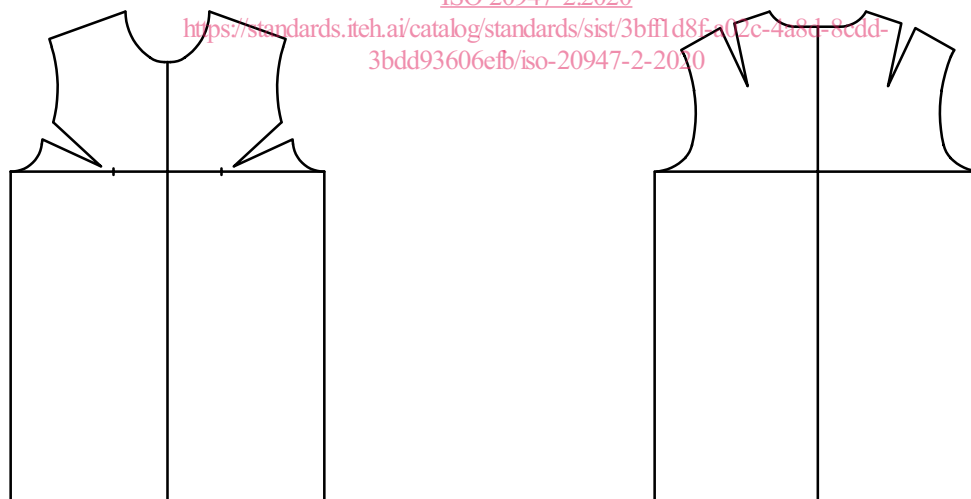
**3.2 Lines on virtual pattern and their lengths**

**3.2.1 Upper pattern**

**3.2.1.1 hem line**

line at the hem of front bodice or back bodice

Note 1 to entry: See [Figure 1](#). Length of the front hem line, length of back hem line, and total length are measured.



a) Front hem line of front bodice

b) Back hem line of back bodice

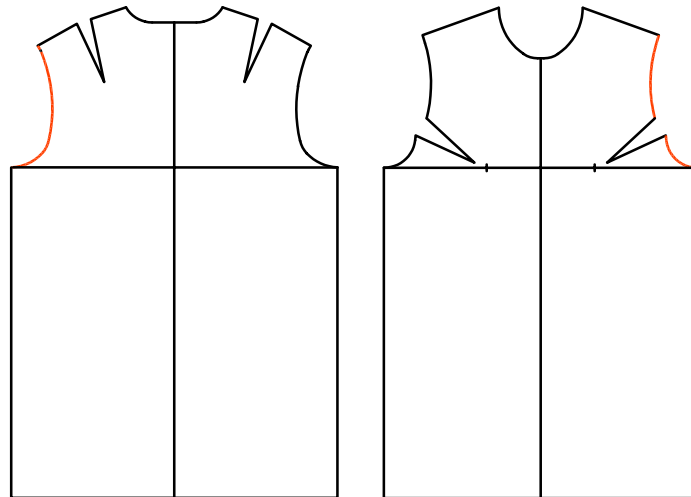
**Figure 1 — Hem line**

**3.2.1.2 armhole line**

line at the left and right armhole of front bodice or back bodice

Note 1 to entry: See [Figure 2](#). Length of armhole lines, and total length of armhole lines of front bodice and back bodice are measured.





**a) Left armhole line of front bodice or back bodice**



**b) Right armhole line of front bodice or back bodice**

**Figure 2 — Armhole line**

### 3.2.1.3

#### **sleeve width line**

straight line connecting the two ends of a line sewing front bodice and back bodice (left or right)

Note 1 to entry: See [Figure 3](#). Length of right or left sleeve width line is measured.

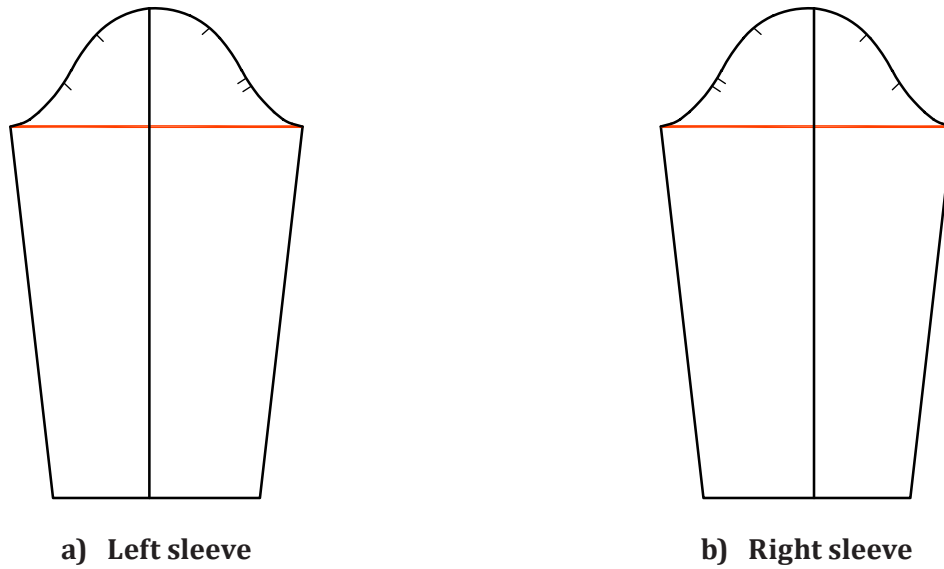


Figure 3 — Sleeve width line

**3.2.1.4 sleeve length line**

straight line passing the top of the line sewing front bodice and back bodice and perpendicular to sleeve width line (bicep line) (left or right)

Note 1 to entry: See [Figure 4](#). Length is measured from the top of the sleeve crown seam line to sleeve hem line of the right or left sleeve.

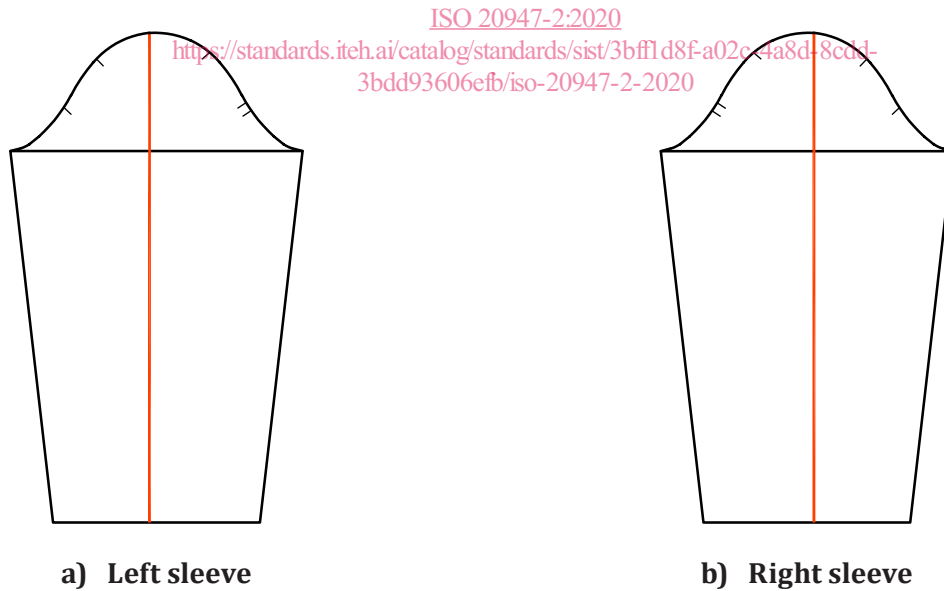


Figure 4 — Sleeve length line

**3.2.1.5 underarm seam line**

lines connecting the edge of line sewing front bodice and back bodice and edge of sleeve hem line along which a sleeve is stitched to make a tube (left or right)

Note 1 to entry: See [Figure 5](#). Length is measured from the edge of line sewing front bodice and back bodice to the edge of sleeve hem line of the right or left sleeve. Either line of the left or right sleeve is measured because they are the same length.

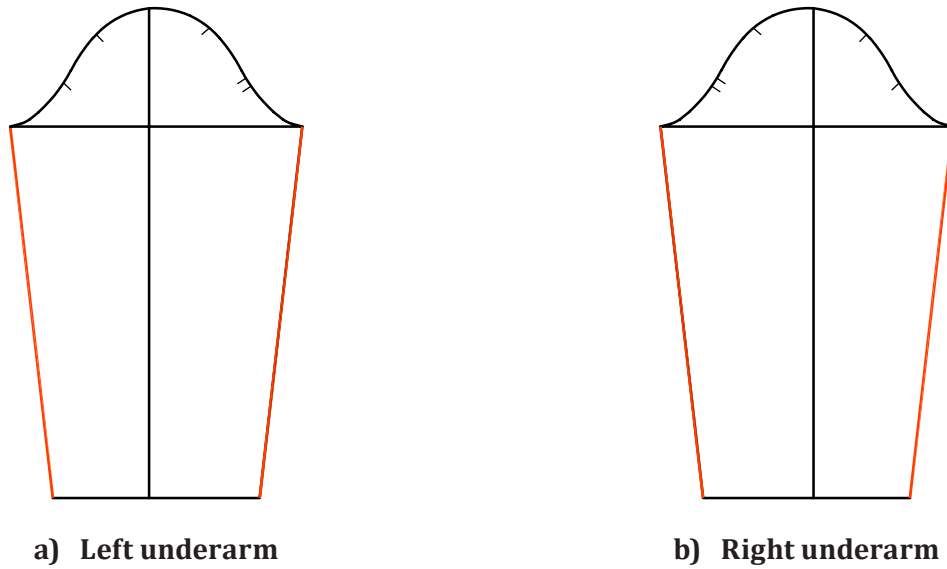


Figure 5 — Underarm seam line

**3.2.1.6  
sleeve hem line**

line at the lower edge of the sleeve pattern indicating the hem (left or right)

Note 1 to entry: See [Figure 6](#). Length is measured for the right or left sleeve hem line.

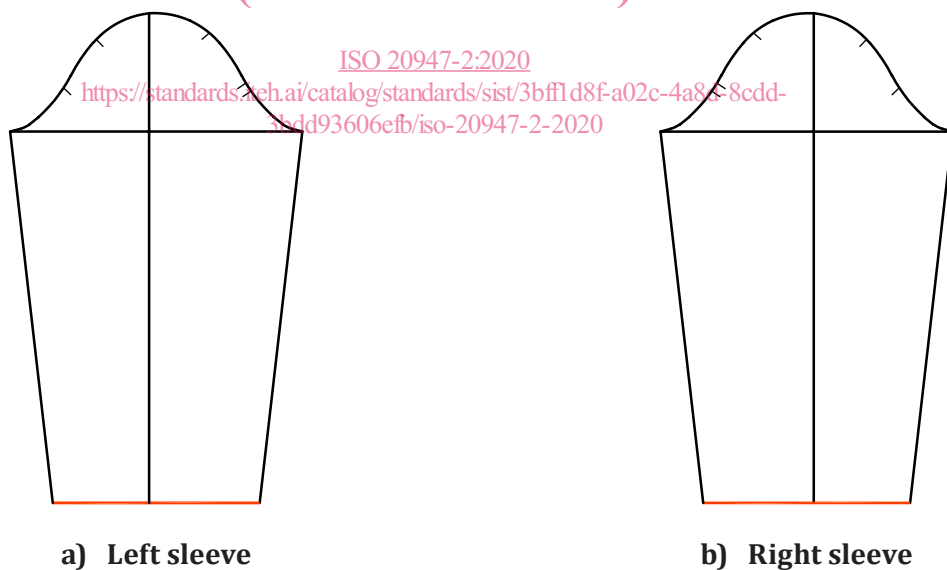


Figure 6 — Sleeve hem line

**3.2.2 Upper pattern and one-piece dress**

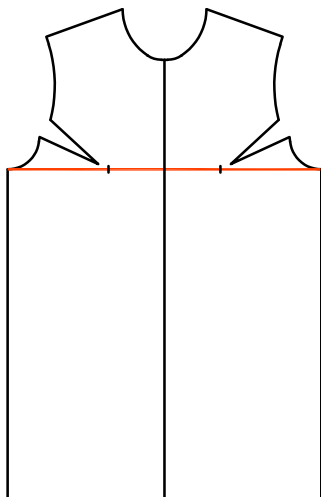
**3.2.2.1  
bust line**

straight line passing the level of the breast point of the pattern and

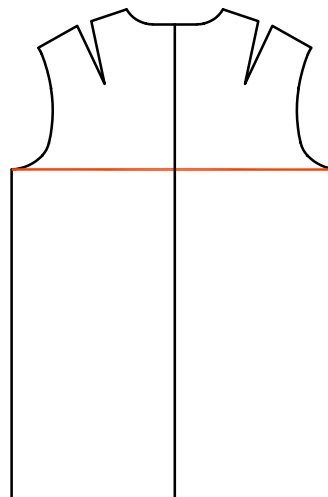
- perpendicular to the front centre line of the front bodice from the left side line to the right side line (front bust line), or

- perpendicular to the back centre line of the back bodice from the left side line to the right side line (back bust line)

Note 1 to entry: Upper pattern, see [Figure 7](#), one-piece dress, see [Figure 8](#). Length of the front bust line, length of back bust line, and total length are measured.

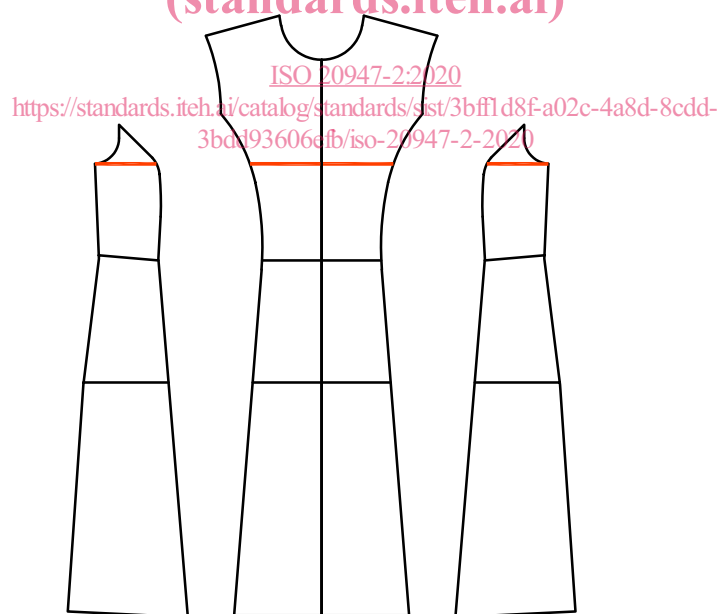


a) Front bust line of front bodice



b) Back bust line of back bodice

**Figure 7 — Bust line (upper pattern)**  
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a) Front bust line of front bodice