

# SVENSK STANDARD

## SS-EN ISO 15536-1:2008

Fastställt/Approved: 2008-09-22

Publicerad/Published: 2008-10-16

Utgåva/Edition: 2

Språk/Language: engelska/English

ICS: 13.180; 14.040

---

### **Ergonomi – Datormanikiner – Del 1: Allmänna krav (ISO 15536-1:2005)**

### **Ergonomics – Computer manikins and body templates – Part 1: General requirements (ISO 15536-1:2005)**

This preview is downloaded from [www.sis.se](http://www.sis.se). Buy the entire standard via <https://www.sis.se/std-67318>

# Hitta rätt produkt och ett leveranssätt som passar dig

## Standarder

Genom att följa gällande standard både effektiviserar och säkrar du ditt arbete. Många standarder ingår dessutom ofta i paket.

## Tjänster

Abonnemang är tjänsten där vi uppdaterar dig med aktuella standarder när förändringar sker på dem du valt att abonnera på. På så sätt är du säker på att du alltid arbetar efter rätt utgåva.

e-nav är vår online-tjänst som ger dig och dina kollegor tillgång till standarder ni valt att abonnera på dygnet runt. Med e-nav kan samma standard användas av flera personer samtidigt.

## Leveranssätt

Du väljer hur du vill ha dina standarder levererade. Vi kan erbjuda dig dem på papper och som pdf.

## Andra produkter

Vi har böcker som underlättar arbetet att följa en standard. Med våra böcker får du ökad förståelse för hur standarder ska följas och vilka fördelar den ger dig i ditt arbete. Vi tar fram många egna publikationer och fungerar även som återförsäljare. Det gör att du hos oss kan hitta över 500 unika titlar. Vi har även tekniska rapporter, specifikationer och "workshop agreement".

Matriser är en översikt på standarder och handböcker som bör läsas tillsammans. De finns på [sis.se](http://sis.se) och ger dig en bra bild över hur olika produkter hör ihop.

## Standardiseringsprojekt

Du kan påverka innehållet i framtida standarder genom att delta i någon av SIS ca 400 Tekniska Kommittéer.

# Find the right product and the type of delivery that suits you

## Standards

By complying with current standards, you can make your work more efficient and ensure reliability. Also, several of the standards are often supplied in packages.

## Services

Subscription is the service that keeps you up to date with current standards when changes occur in the ones you have chosen to subscribe to. This ensures that you are always working with the right edition.

e-nav is our online service that gives you and your colleagues access to the standards you subscribe to 24 hours a day. With e-nav, the same standards can be used by several people at once.

## Type of delivery

You choose how you want your standards delivered. We can supply them both on paper and as PDF files.

## Other products

We have books that facilitate standards compliance. They make it easier to understand how compliance works and how this benefits you in your operation. We produce many publications of our own, and also act as retailers. This means that we have more than 500 unique titles for you to choose from. We also have technical reports, specifications and workshop agreements.

Matrices, listed at [sis.se](http://sis.se), provide an overview of which publications belong together.

## Standardisation project

You can influence the content of future standards by taking part in one or other of SIS's 400 or so Technical Committees.

Europastandarden EN ISO 15536-1:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 15536-1:2008.

Denna standard ersätter SS-EN ISO 15536-1:2005, utgåva 1.

The European Standard EN ISO 15536-1:2008 has the status of a Swedish Standard. This document contains the official English version of EN ISO 15536-1:2008.

This standard supersedes the Swedish Standard SS-EN ISO 15536-1:2005, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00.

Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), tel +46 8 555 520 00.

Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

SIS Förlag AB, SE 118 80 Stockholm, Sweden. Tel: +46 8 555 523 10. Fax: +46 8 555 523 11.

E-mail: [sis.sales@sis.se](mailto:sis.sales@sis.se) Internet: [www.sis.se](http://www.sis.se)



EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 15536-1**

September 2008

ICS 13.180

Supersedes EN ISO 15536-1:2005

English Version

## Ergonomics - Computer manikins and body templates - Part 1: General requirements (ISO 15536-1:2005)

Ergonomie - Mannequins informatisés et gabarits humains  
- Partie 1: Exigences générales (ISO 15536-1:2005)

Ergonomie - Computer-Manikins und  
Körperumrisschablonen - Teil 1: Allgemeine  
Anforderungen (ISO 15536-1:2005)

This European Standard was approved by CEN on 25 August 2008.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

**SS-EN ISO 15536-1:2008 (E)**

<b>Contents</b>		Page
Foreword .....		iv
Introduction .....		v
<b>1</b> <b>Scope</b> .....		<b>1</b>
<b>2</b> <b>Normative references</b> .....		<b>1</b>
<b>3</b> <b>Terms and definitions</b> .....		<b>1</b>
<b>4</b> <b>Accuracy</b> .....		<b>2</b>
<b>5</b> <b>Usability</b> .....		<b>3</b>
<b>6</b> <b>Documentation</b> .....		<b>4</b>
<b>Annex A</b> (informative) <b>Factors affecting the anthropometric accuracy of manikins and of the analyses and determinations performed using them</b> .....		<b>7</b>
<b>Annex ZA</b> (informative) <b>Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC</b> .....		<b>12</b>
<b>Annex ZB</b> (informative) <b>Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC</b> .....		<b>13</b>
<b>Bibliography</b> .....		<b>14</b>

## **Foreword**

The text of ISO 15536-1:2005 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 15536-1:2008 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 March 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 15536-1:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EC Directive(s).

For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

### **Endorsement notice**

The text of ISO 15536-1:2005 has been approved by CEN as a EN ISO 15536-1:2008 without any modification.

## SS-EN ISO 15536-1:2008 (E)

### Introduction

The structure of safety standards in the field of machinery is as follows.

- a) Type-A standards (basis standards) give basic concepts, principle for design, and general aspects that can be applied to machinery.
- b) Type-B standards (generic safety standards) dealing with one or more safety aspect(s) or one or more type(s) of safeguards that can be used across a wide range of machinery:
  - type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);
  - type-B2 standards on safeguards (e.g. two-hand controls, interlocking devices, pressure-sensitive devices, guards).
- c) Type-C standards (machinery safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This part of ISO 15536 is a type-B standard as stated in ISO 12100-1.

When provisions of a type-C standard are different from those which are stated in type-A or type-B standards, the provisions of the type-C standard take precedence over the provisions of the other standards for machines that have been designed and built according to the provisions of the type-C standard.

This part of ISO 15536 concerns requirements which are, to a great extent, independent both of the state of the art in the currently rapidly developing field of computer manikins and body templates, and of the availability of up-to-date, detailed and representative anthropometric data.

The physical characteristics of the human body are one of the starting points in the design of spaces, furniture, machines and other equipment. Computer technology is advancing rapidly and allows the construction of computer manikins to model the human body and to simulate human activities. Anthropometrically accurate manikins or body templates can be used, for example, to visualize the geometric relationship between the human body and the physical environment. Various functions of evaluation can also be integrated into the manikin and manikin system, for example, indication of reach zones, visualization of viewing fields, biomechanical calculation of required strength, and simulation of movements.

Computer manikins are intended to reduce the need for real test persons and the evaluation of physical models and prototypes. However, real persons provide not only their true physical dimensions but also their differing functional and perceptual capabilities as well as their assessment of the ease of performance, comfort and other properties of the design (see ISO 15537).

The computer manikin permits quick, easy and early identification of possible dimensional shortcomings. Critical dimensions restricting operations, such as fitting into a confined space or reaching objects can be quickly assessed in relation to extreme body measurements. The dimensioning would otherwise require tests with a large number of test persons.

In the use of manikins, several ergonomic aspects (e.g. anthropometric, postural, visual, strength-related, dynamic) are addressed in one and the same test situation. As a universal design tool, the manikin is particularly useful for entirely novel designs, when no recommendations on the dimensions exist and no reference situations for full-scale evaluation are available. In the design process, the use of computer modelling with a manikin facilitates information exchange and collaboration between different specialists and users.



When used appropriately, computer manikins accelerate the entire design process and reduce the costs of designing. The ergonomic design process is presented as a whole in EN 614-1.

The use of computer manikins does not ensure appropriate design solutions automatically, and they can even be misused. The designer may use them inappropriately, for example, by permitting awkward postures, or by providing too little space for movements. It is possible that he or she is not aware of the inherent limitations of computer manikins, either in anthropometric, postural or biomechanical respects. As the complexity of the manikin systems increases, the links to the data on these human characteristics can also become difficult or impossible to trace.

The manikins and manikin systems available so far vary with respect to the functions and features they afford, as well as to their accuracy and usability. At the present developmental stage, the most sophisticated manikin systems may require powerful hardware and specially trained users, and they may be unavailable to many designers. The most simple ones may be easy to use but are of restricted value for designing. The systems may also differently emphasise such components as anthropometric accuracy, biomechanical capabilities, graphical visualisation, geometric design, simulation and animation. The choice of manikin and the associated design system is, to a great extent, a trade-off between these different features.

Broad experience of the field and a high level of care are necessary when choosing and using the manikin system, and for controlling the effects of other external parameters, however sophisticated the manikin system may be.



# Ergonomics — Computer manikins and body templates —

## Part 1: General requirements

**IMPORTANT** — The application of this part of ISO 15536 should be verified by practical tests with real persons.

### 1 Scope

This part of ISO 15536 establishes the general requirements for the design and development of computer manikins, body templates and manikin systems. It addresses their anthropometric and biomechanical properties, taking into account their usability and restrictions for structural complexity and functional versatility, and is also intended as a guide for the selection of manikins and manikin systems and for the evaluation of their accuracy and usability for the specified use. It specifies the documentation of the characteristics of manikins and manikin systems and their intended use, for the guidance of their users. It provides means for ensuring that computer manikins and body templates for the design of work space are appropriately accurate and reliable in their anthropometric and biomechanical aspects. It aims to ensure that users of manikins are able to choose an appropriate manikin system for particular design tasks and use it in an appropriate way. It sets requirements only on the static accuracy of the manikin, but provides recommendations on the other factors that can influence the accuracy of the analyses and determinations performed using them.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7250, *Basic human body measurements for technological design*

ISO 9241-11, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 11: Guidance on usability*

ISO 12100-1, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100-1 and the following apply.

#### 3.1

##### **computer manikin**

two-dimensional (2D) or three-dimensional (3D) graphical computer representation of the human body based on anthropometric measurements, link and joint structure, and movement characteristics