

SVENSK STANDARD

SS-EN 547-1+A1:2008

Fastställt/Approved: 2008-10-03

Publicerad/Published: 2008-11-03

Utgåva/Edition: 1

Språk/Language: engelska/English

ICS: 13.110; 13.180; 14.040

Maskinsäkerhet – Kroppsmått – Del 1: Principer för bestämning av storlek på öppningar avsedda för inträde med hela kroppen

Safety of machinery – Human body measurements – Part 1: Principles for determining the dimensions required for openings for whole body access into machinery

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-67418>

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 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, 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 547-1:1996+A1:2008 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 547-1:1996+A1:2008.

Denna standard ersätter SS-EN 547-1, utgåva 1.

The European Standard EN 547-1:1996+A1:2008 has the status of a Swedish Standard. This document contains the official English version of EN 547-1:1996+A1:2008.

This standard supersedes the Swedish Standard SS-EN 547-1, 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 Internet: www.sis.se

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 547-1:1996+A1

September 2008

ICS 13.110; 13.180

Supersedes EN 547-1:1996

English Version

**Safety of machinery - Human body measurements - Part 1:
Principles for determining the dimensions required for openings
for whole body access into machinery**

Sécurité des machines - Mesures du corps humain - Partie
1: Principes de détermination des dimensions requises
pour les ouvertures destinées au passage de l'ensemble du
corps dans les machines

Sicherheit von Maschinen - Körpermaße des Menschen -
Teil 1: Grundlagen zur Bestimmung von Abmessungen für
Ganzkör per Zugänge an Maschinenarbeitsplätzen

This European Standard was approved by CEN on 15 November 1996 and includes Amendment 1 approved by CEN on 14 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

Contents	Page
Foreword.....	3
Introduction	4
1 Scope	4
2 Normative references	4
3 General requirements.....	4
4 Passage openings	5
Annex A (normative) Application of the measurements in practice.....	10
A.0 Introduction	10
A.1 Principles for determining additional space.....	10
A.2 Additional space requirements for openings	11
A.2.1 Opening for horizontal forward movement in upright posture (see 4.1)	11
A.2.2 Opening for horizontal sideways movement over short distances in upright posture (see 4.2).....	11
A.2.3 Vertical movement through a duct, using a ladder (see 4.3)	11
A.2.4 Manhole through which rapid active movement needs to be possible (see 4.4).....	12
A.2.5 Opening for entry in kneeling posture (see 4.5).....	12
Annex B (informative) Notations for dimensions and anthropometric body measurements	13
Annex ZA (informative)  Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC, amended by 98/79/EC 	15
Annex ZB (informative)  Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC 	16
Bibliography.....	17

Foreword

This document (EN 547-1:1996+A1:2008) has been prepared 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.

This document includes Amendment 1, approved by CEN on 2008-08-14.

This document supersedes EN 547-1:1996.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 and A1.

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

A1 For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. A1

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 United Kingdom.

SS-EN 547-1+A1:2008 (E)

Introduction

This European Standard is one of several ergonomics standards for the safety of machinery. EN 614-1 "Safety of machinery – Ergonomic design principles – Part 1: Terminology and general principles" describes the principles designers should adopt in order to take account of ergonomic factors.

This European Standard describes how these principles should be applied to the design of openings which will allow whole body access. This standard has been prepared to be a harmonized standard in the sense of the Machinery Directive and associated EFTA regulations.

1 Scope

This European Standard specifies the dimensions of openings for whole body access as applied to machinery as defined in EN 292-1. It provides the dimensions to which the values given in EN 547-3 are applicable. Values for additional space requirements are given in annex A. This European Standard has been prepared primarily for non-mobile machinery, there may be additional specific requirements for mobile machinery.

Dimensions for passages are based on the values for either the 95th or the 99th percentile of the expected user population. Values for the 99th percentile apply to emergency egress routes.

The anthropometric data given in EN 547-3 originate from static measurements of nude persons and do not take into account body movements, clothing, equipment, machinery operating conditions or environmental conditions.

This European Standard shows how to combine the anthropometric data with suitable allowances to take these factors into account.

Situations where people are to be prevented from reaching a hazard are dealt with in EN 294.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1, *Safety of Machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.*

EN 294, *Safety of Machinery - Safety distances to prevent danger zones being reached by the upper limbs.*

EN 547-3, *Safety of Machinery – Human body measurements – Part 3: Anthropometric data.*

EN 614-1, *Safety of Machinery - Ergonomic design principles – Part 1: Terminology and general principles.*

3 General requirements

This European Standard specifies the relevant dimensions of openings with respect to different body positions.

In arriving at values for these dimensions, in addition to the basic anthropometric data it is necessary to add allowances to permit unhindered and safe entry and working, taking into account aspects specific to the operator and to the operating conditions.

In this respect the following criteria are of particular significance:

- a) Ease of passage of a person is influenced by:
- The type of clothing, e.g. light or heavy clothing;
 - Whether tools are being carried, e.g. for maintenance or repair purposes;
 - Whether additional equipment such as personal protective equipment (including protective clothing), or portable lighting, is being carried or worn;
 - The demands of the task, e.g. posture, nature and speed of movement, lines of sight, application of force;
 - Frequency and duration of task;
 - Length of passage, e.g. through a relatively thin wall (wall of a vessel) where there is space for movement at the exit or through a channel type passage;
 - amount of space available to allow for the dynamic nature of movement to escape from danger;
 - the position and size of supports for the body, e.g. foot support, hand holds;
- b) environmental conditions (e.g. darkness, heat, noise, moisture);
- c) level of risk during the task

The allowances to be made for these items will depend on the particular machinery concerned and its application.

Annex A gives the application on how to apply this European standard in practice.

Annex B gives information on the use of notations for dimensions and anthropometric measurements.

4 Passage openings

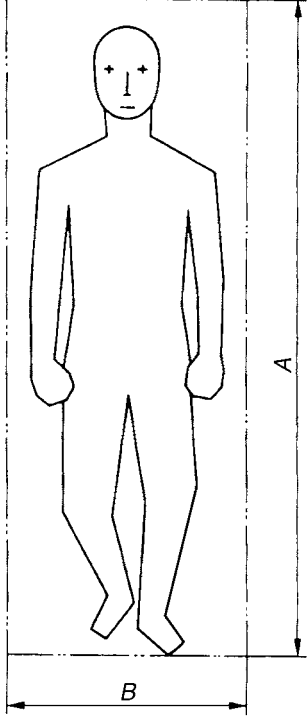
A passage opening is an opening which allows the movement or the entry of a person's entire body, to enable the person to carry out measures such as operating of control actuators, monitoring of work processes and inspection of work results.

This European Standard specifies minimum, not optimum, dimensions for openings. Wherever possible from the safety point of view the dimensions should be increased.

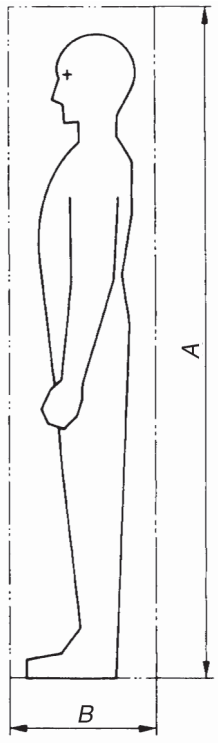
Furthermore, passage openings should be sufficiently large to allow rapid egress in the event of danger.

The allowances x and y in sub-clauses 4.1 to 4.5 are given in annex A. The values for a_1 , h_1 etc. are given in EN 547-3.

SS-EN 547-1+A1:2008 (E)

No		Notations	Explanation of measurement
4.1	<p>Opening for horizontal forward movement in upright posture</p> 	<p>A B</p> <p>h_1 a_1</p> <p>x y</p>	<p>$A = h_1 (P95^{1}) \text{ or } P99^{1}) + x$</p> <p>$B = a_1 (P95 \text{ or } P99) + y$</p> <p>Opening height Opening width</p> <p>Body height Elbow-to-elbow breadth</p> <p>Height allowance Width allowance</p>
4.2	<p>Opening for horizontal sideways movement over short distances in upright posture</p>	<p>A B</p> <p>h_1 b_1</p> <p>x y</p>	<p>Not applicable for emergency egress routes</p> <p>$A = h_1 (P95) + x$</p> <p>$B = b_1 (P95) + y$</p> <p>Opening height Opening width</p> <p>Body height Body depth</p> <p>Height allowance Width allowance</p>

1) P95: 95th percentile of the expected user population
P99: 99th percentile of the expected user population

			
<p>4.3</p>	<p>Vertical movement through a duct, using a ladder</p>	<p>A B C</p> <p>c_1 c_2</p> <p>x</p> <p>D a_1 y</p>	<p>$A = c_1 (P95 \text{ or } P99) + x$ $B = 0,74 \times c_2 (P95)$ $C = A + B$</p> <p>Opening width²⁾ Clearance for foot Duct width</p> <p>Thigh length Foot length</p> <p>Width allowance</p> <p>$D = a_1 (P95 \text{ or } P99) + y$</p> <p>Opening breadth Elbow-to-elbow breadth Breadth allowance</p>

2) Opening width A does not take account of the need for fall protection