



SLOVENSKI STANDARD
SIST EN 294:1997

01-december-1997

JUfbcghlfcYj !JUfbcglbYfUnXU^Z_]dfYdfY i Yc XcgY[bYj Ufb] cVa c]^n
n[cfb^a]i X]

Safety of machinery - Safety distance to prevent danger zones being reached by the upper limbs

Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefahrstellen mit den oberen Gliedmaßen

Sécurité des machines - Distances de sécurité pour empêcher l'atteinte des zones dangereuses par les membres supérieurs

STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/d5ddc90b-326a-499a-a81b-b8e47fb1f56c/sist-en-294-1997>

Ta slovenski standard je istoveten z: EN 294:1992

ICS:

13.110 Varnost strojev Safety of machinery

SIST EN 294:1997 **sl**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 294:1997

<https://standards.iteh.ai/catalog/standards/sist/d5ddc90b-326a-499a-a81b-b8e47fb1f56c/sist-en-294-1997>

EUROPEAN STANDARD

EN 294:1992

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 1992

UDC 614.8:331.456:62.06-783.61

Descriptors: Safety of machinery, accident prevention, hazardous areas, distance, safety, dimensions

English version

Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs

Sécurité des machines - Distances de sécurité pour empêcher l'atteinte des zones dangereuses par les membres supérieurs

Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefahrstellen mit den oberen Gliedmaßen

This European Standard was approved by CEN on 1992-06-19. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword	3
0 Introduction	4
1 Scope	5
2 Normative references	5
3 Definitions	5
3.1 Protective structure	5
3.2 Safety distance	5
4 Values for safety distances	6
4.1 General	6
4.2 Reaching upwards	6
4.3 Reaching over protective structures	6
4.4 Reaching round	10
4.5 Reaching through openings	12
5 Effect of additional protective structures on safety distances	14

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 294:1997

<https://standards.iteh.ai/catalog/standards/sist/d5ddc90b-326a-499a-a81b-b8e47fb1f56c/sist-en-294-1997>



Foreword

At its constituent meeting in June 1985 Technical Committee CEN/TC 114 "Safety of machinery" decided to set up WG 2 "Safety distances", Secretariat: DIN.

Based upon several national documents, especially CEN/TC 114 N 12 (French Standard NF E 09-010), N 13 (German Standard DIN 31 001 Part 1) and N 23 (Finnish general recommendations for machines) and upon available reliable surveys of anthropometric data the group has prepared a draft proposal and submitted it in July 1988 to the Technical Committee.

The proposal takes into account machinery for occupational and private purposes. It contains two sets of figures for reaching upwards and reaching down/reaching over distances. The latter led to several comments and a long discussion at the 3rd CEN/TC 114 meeting in November 1988 whether the two sets are needed and how they should be used for differing levels of safety.

At the request of CEN/TC 114 delegates the group formulated a relevant covering statement at its 8th meeting on December 6/7, 1988. Thus it was authorized to pass the document including the statement to CEN/CS for the inquiry procedure.

At its 4th plenary meeting CEN/TC 114 authorized WG 2 to revise prEN 294 with regard to the comments received and to pass the modified version in the three official languages to CEN/CS for formal vote.

National standards identical to this European Standard shall be published at the latest by 1992-12-31 and conflicting national standards shall be withdrawn at the latest by 1992-12-31.

According to the common CEN/CENELEC Rules, being part of the Internal Regulations of CEN, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 294:1997

<https://standards.iteh.ai/catalog/standards/sist/d5ddc90b-326a-499a-a81b-b8e47fb1f56c/sist-en-294-1997>

0 Introduction

This standard has been prepared to be a harmonized standard in the sense of the Machinery Directive and associated EFTA regulations.

According to EN 292-1 in general machinery is said to be safe if it is probable that the machinery can continue to be operated, adjusted, maintained, dismantled and disposed of under the conditions of its intended use¹⁾ without causing injury or damaging human health. Ways of achieving this include

- risk reduction by design
- safeguarding measures
- information for use (signals, signs, instructions)
- personal protective equipment
- safety measures taken by the users (safe working procedures, organisational means with respect to safety).

Means and measures to achieve safety have to reflect the balance between

- the benefit of reduced risk
- the loss of other benefits needed to achieve this.

The balance should provide an adequate level of safety for the particular risk.

One method of eliminating or reducing risks caused by machinery is to make use of safety distances preventing danger zones from being reached by the upper limbs.

In specifying safety distances a number of aspects have to be taken into consideration, such as

- reach situations occurring when machinery is being used,
- reliable surveys of anthropometric data, taking into account ethnic groups likely to be found in European countries,
- bio-mechanical facts, such as compression and stretching of parts of the body and limits of joint rotation,
- technical and practical aspects.

If these aspects are further developed the current state of the art, reflected in this standard, may be improved.

¹⁾ Definition of the term "Intended use" see EN 292-1

1 Scope

This standard establishes values for safety distances to prevent danger zones being reached by the upper limbs of persons of 3 years of age and above. The distances apply when adequate safety can be achieved by distances alone.

NOTE: These safety distances will not provide sufficient protection against certain hazards, for example radiation and emission of substances. For such hazards additional or other measures need to be taken.

The safety distances protect those persons who try to reach danger zones without additional aid and under the conditions specified for the different reaching situations.

This standard need not be applied to machinery which is covered by certain electrical standards in which specific testing procedures are laid down, e. g. using the test finger.

For certain applications there are justifiable reasons to deviate from these safety distances. Standards dealing with these applications shall indicate how an adequate level of safety can be achieved.

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

3 Definitions

For the purpose of this standard the following definitions apply in addition to the definitions given in EN 292-1.

3.1 Protective structure

A physical obstruction, e.g. guard, part of a machine, which restricts the movement of the body and/or a part of it.

3.2 Safety distance

The minimum distance a protective structure shall be placed from a danger zone.

4 Values for safety distances

4.1 General

4.1.1 Assumptions

The safety distances have been derived by making the following assumptions:

- The protective structures and any openings in them retain their shape and position.
- Safety distances are measured from the surface restricting the body or the relevant part of the body.
- That persons may force parts of the body over protective structures or through openings in an attempt to reach the danger zone.
- The reference plane is a level at which persons would normally stand, but need not necessarily be the floor, e. g. a working platform could be the reference plane.
- No aids such as chairs or ladders are used to change the reference plane.
- No aids such as rods or tools are used to extend the natural reach of the upper limbs.

4.1.2 Risk assessment

Selection of the appropriate safety distances for reaching upwards (see 4.2) or reaching over protective structures (see 4.3) shall be dependent on a risk assessment (for risk assessment see EN 292-1). The risk assessment shall be based on the probability of occurrence of an injury and the foreseeable severity of risk assessment is dependent is essential to achieve the appropriate selection from this standard.

Example 1:

Where there is a low risk from a friction or abrasion hazard, table 1 shall at least be used (see 4.3.2.1).

Example 2:

Where there is a high risk from an entanglement hazard, table 2 shall be used (see 4.3.2.2).

4.2 Reaching upwards (see figure 1)

4.2.1 If there is a low risk from the danger zone then the height of the danger zone h shall be 2500 mm or more.

4.2.2 If there is a high risk (see 4.1.2) from the danger zone, then

- either the height of the danger zone h shall be 2700 mm or more,
- or other safety measures shall be used.

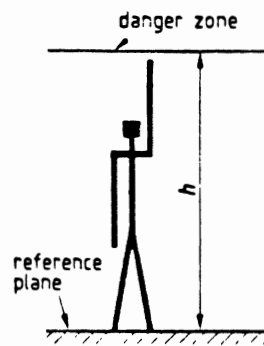


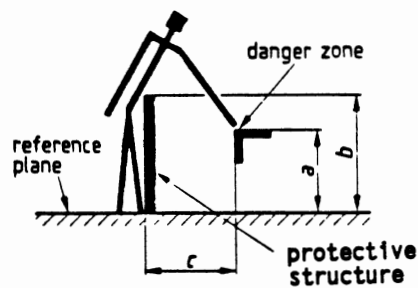
Figure 1

4.3 Reaching over protective structures

4.3.1 Symbols

The following symbols are used (see figure 2):

- a Height of danger zone
- b Height of protective structure
- c Horizontal distance to danger zone



iTeh STANDARD PREVIEW
Figure 2
(standards.iteh.ai)

SIST EN 294:1997

<https://standards.iteh.ai/catalog/standards/sist/d5ddc90b-326a-499a-a81b-b8e47fb1f56c/sist-en-294-1997>