Masinate ohutus. Põhimõisted, konstrueerimise üldpõhimõtted. Osa 2: Tehnilised põhimõtted ja nõuded

Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 292-2:1999 sisaldab Euroopa standardi EN 292-2:1991 + A1:1995 ingliskeelset teksti.	This Estonian standard EVS-EN 292-2:1999 consists of the English text of the European standard EN 292-2:1991 + A1:1995.
Standard on kinnitatud Eesti Standardikeskuse 01.11.1999 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 01.11.1999 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
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English version

Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications

Sécurité des machines - Notions fondamentales, principes généraux de conception - Partie 2: Principes techniques et spécifications

Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze - Teil 2: Technische Leitsätze und Spezifikationen

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CEN

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Foreword

This standard has been prepared by CEN/TC 114/WG 1 "Basic concepts".

Part 1 of this standard deals with "Basic terminology, methodology" (see clause 0 "Introduction" for more detailed explanations).

NOTE : At several places EN 292-2 refers to specific clauses of EN 60 204-1:1985 "Electrical equipment of industrial machines, Part 1 - General requirements".

It is important to note that this electrical standard has undergone a major revision and that a draft prEN 60 204-1 "Safety of machinery - Electrical equipment of machines, Part 1 - General requirements" should be submitted to the Unique Acceptance Procedure (UAP) in 1991. It is therefore likely that, by the time EN 292 is in use, there will be a new version of EN 60 204-1 available which should be used.

To avoid confusion in the interim period, the table below indicates the subclauses of EN 292-2 which refer to EN 60 204-1:1985 (column 1) and the corresponding subclauses of EN 60 204-1:1985 (column 2) and prEN 60 204-1:1991 (column 3).

Table 1

EN 292-2, § :	EN 60 204-1:1985, § :	prEN 60 204-1:1991, § :
3.4	5.1.2.3	6.4
3.7.11	5.4 to 5.8, 6, 7, 8	7.5 and 8 to 13
3.9	5.1 5.2 5.3	6 7.2 7.3
5.4	3.1	18
5.5.1.c)	3.2	19
6.1.1	5.6.1	9.2.5.4 and 10.7
6.2.2	5.6.2	5.3

0 Introduction

This standard has been produced to assist designers, manufacturers and other interested bodies to interpret the essential safety requirements in order to achieve conformity with European Legislation on machinery safety.

It is the first in a programme of standards produced by CEN/CENELEC u. der mandates from CEC and EFTA. This programme has been divided into several categories to avoid duplication and to develop a logic which will enable rapid production of standards and easy cross-reference between standards.

The hierarchy of standards is as follows :

a) **Type A standards** (fundamental safety standards) giving basic concepts, principles for design, and general aspects that can be applied to all machinery.

b) **Type B standards** (group safety standards) dealing with one safety aspect or one type of safety related device 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 safety related devices (e.g. two-hand controls, interlocking devices, pressure sensitive devices, guards).

c) **Type C standards** (machine safety standards) giving detailed safety requirements for a particular machine or group of machines.

The primary purpose of EN 292 is to provide designers, manufacturers, etc. with an overall framework and guidance to enable them to produce machines that are safe for their intended use. It also provides a strategy for standard makers producing type C standards, in conjunction with ENV .. ... "Terminology" and EN 414 "Rules for the drafting and presentation of safety standards". In addition, this strategy is also a useful guide for designers and manufacturers of machines when no C standard exists ; it can also assist designers to use the type B standards to best advantage and to prepare the construction file.

The programme of standards is continuously evolving and some clauses of EN 292 are now the subject of type A or B standards being prepared. Where such a type A or B standard exists, a reference to this standard will be added to the relevant clause heading of EN 292. It **is intended that, where another type A or a type B standard covering a specific clause of EN 292 exists, it takes precedence over EN 292.**

NOTE : In particular, any definition of term(s) given in other type A or in type B1 and B2 standards has precedence over the corresponding definition given in EN 292.

EN 292 consists of two parts :

- **Part 1** "Safety of machinery - Basic concepts, general principles for design - **Basic terminology, methodology**" expressing the basic overall methodology to be followed when producing safety standards for machinery, together with the basic terminology related to the philosophy underlying this work,

- **Part 2** "Safety of machinery - Basic concepts, general principles for design - **Technical principles and specifications**" giving advice on how this philosophy can be applied using available techniques.

The overall purpose of EN 292 is to provide manufacturers, designers, etc. with the strategy or framework necessary to achieve conformity with the European Legislation in the most pragmatic way. An essential element in this process is an understanding of the underlying legal framework, which is expressed in the essential safety requirements of the Machinery Directive and the equivalent EFTA agreements. Therefore, it has been decided to reprint annex I of the Directive 89/392/EEC as an annex to EN 292-2.

It is intended to revise EN 292 at an early date to take account of subsequent standards and legislation.

1 Scope

This European standard defines technical principles and specifications to help designers and manufacturers in achieving safety in the design of machinery (see 3.1 in EN 292-1) for professional and non-professional purposes. It may also be used for other technical products having similar hazards.

Parts 1 and 2 should be used together when considering the solution to a specific problem. They can be used independently of other documents, or as a basis for the preparation of other type A standards or type B and C standards.

EN 292-2 in conjunction with part 1 would also assist in a preliminary assessment of machines with regard to their safety, where there is no relevant type C standard available.

It is recommended that this standard is incorporated in training courses or in manuals to convey technical principles and specifications to designers, etc.

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 349 [1]	Safety of machinery - Minimum distances to avoid crushing of parts of the human body
EN 418 [2]	Safety of machinery - Emergency stop equipment - Functional aspects
EN.. ... [3]	Safety of machinery - Guards (fixed, movable.)
EN.. ... [4]	Safety of machinery - Two-hand control device
EN.. ... [5]	Safety of machinery - Pressure sensitive safety devices - Mats and floors

1) Draft standard submitted to CEN/CENELEC inquiry in 1991.
2) Draft standard submitted to CEN/CENELEC inquiry in 1991.
3) Draft standard prepared by CEN/TC 114/WG 11.
4) Draft standard prepared by CEN/TC 114-CLC/TC44X/JWG7.
5) Draft standard prepared by CEN/TC 114-CLC/TC44X/JWG8.

EN.. ... [6] Safety of machinery - Interlocking devices with and without guard locking - General principles and specifications for design

EN.. ... [7] Safety of machinery - Principles for the design of safety related control systems

EN.. ... [8] Safety of machinery - Safety requirements for fluid power systems and components - Hydraulics

EN.. ... [9] Safety of machinery - Safety requirements for fluid power systems and components - Pneumatics

EN.. ... [10] Safety of machinery - Electrosensitive protective devices
Part 1 : General requirements

EN.. ... [11] Safety of machinery - Ergonomic design principles
Part 1 : Terminology and general principles
Part 2 : Interaction between machinery design and work tasks

EN.. ... [12] Safety of machinery - Ergonomic requirements and data for the design of displays and control actuators
Part 1 : Human interaction with displays and control actuators
Part 2 : Displays
Part 3 : Control actuators

EN 50 020:1977/A1:1979/A2:1985 Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"

EN 60 204-1:1985[13] Electrical equipment of industrial machines
Part 1 : General requirements

ISO 447:1984 Machine tools - Direction of operation of controls

3 Risk reduction by design

Risk reduction by design consists in following actions, used separately or combined :

- **avoiding or reducing** as many of the **hazards** as possible by suitable choice of design features (see 3.1 to 3.9), and

- **limiting persons exposure to hazards** by reducing the need for operator intervention in danger zones (see 3.10 to 3.12).

3.1 Avoiding sharp edges and corners, protruding parts, etc.

In so far as their purpose allows, accessible parts of the machinery shall have no sharp edges, no sharp angles, no rough surfaces, no protruding parts likely to cause injury, and no openings which may "trap" parts of the body or clothing. In particular, sheet metal edges shall be deburred, flanged or trimmed, open ends of tubes which may cause a "trap" shall be capped, etc.

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6) Draft standard prepared by CEN/TC 114/WG 10.
7) Draft standard prepared by CEN/TC 114-CLC/TC44X/JWG6.
8) Draft standard prepared by CEN/TC 114/WG 12.
9) Draft standard prepared by CEN/TC 114/WG 12.
10) Draft standard prepared by CLC/TC 44X/WG 2.
11) Draft standard prepared by CEN/TC 122/WG 2.
12) Draft standard prepared by CEN/TC 122/WG 6.
13) See Foreword.