

**Masinate ohutus. Masinate kiirgusest tulenevate riskide hindamine ja vähendamine. Osa 1:  
Üldpõhimõtted KONSOLIDEERITUD TEKST**

Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 1: General principles CONSOLIDATED TEXT

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 12198-1:2000+A1:2008 sisaldab Euroopa standardi EN 12198-1:2000+A1:2008 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 27.10.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 10.09.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 12198-1:2000+A1:2008 consists of the English text of the European standard EN 12198-1:2000+A1:2008.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 27.10.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 10.09.2008.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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Võtmesõnad:

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English Version

## Safety of machinery - Assessment and reduction of risks arising from radiation emitted by machinery - Part 1: General principles

Sécurité des machines - Estimation et réduction des risques engendrés par les rayonnements émis par les machines - Partie 1: Principes généraux

Sicherheit von Maschinen - Bewertung und Verminderung des Risikos der von Maschinen emittierten Strahlung - Teil 1: Allgemeine Leitsätze

This European Standard was approved by CEN on 25 May 2000 and includes Amendment 1 approved by CEN on 27 July 2008.

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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.





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## Foreword

This document (EN 12198-1:2000+A1:2008) has been prepared by Technical Committee CEN/TC 114 "Safety of machinery", 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 2008-07-27.

This document supersedes EN 12198-1:2000.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A_1}$   $\boxed{A_1}$ .

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).

$\boxed{A_1}$  For relationship with EC Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.  $\boxed{A_1}$

This European Standard deals with the essential requirement "Radiation" (see EN 292-2, Annex A, paragraph 1.5.10).

The annexes A and B are normative, and the annex C is informative.

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.

## Introduction

Machinery supplied by electrical power or containing radiation sources may emit radiation or generate electric and/or magnetic fields. The radiation emissions and fields will vary in frequency and magnitude.

The European Machinery Directive requires precautions to avoid or reduce risks caused by the emission of radiation from a machine. Machinery must be so designed and constructed that any emission of radiation is limited to the extent necessary for its operation and that the effects on exposed persons are non-existent or reduced to non-dangerous proportions (EN 292-2:1991/A1:1995).

To assess the risk of injury caused by radiation emissions and fields from a machine it is necessary to know the type of radiation emission, the level of the emission and the intensity of this emission with respect to possible adverse health effects.

This European Standard is intended to give manufacturers and type C-standards makers advice on how to identify radiation emissions from machinery, how to decide on their magnitude and significance, how to assess the risks and what means could be used to avoid or reduce the radiation emissions from machines.

This European Standard reflects the general principles for the identification and the assessment of radiation emission by machinery. Details of the measurement of the radiation emission will be given in part 2 of this standard. Part 3 of this standard will contain details of protective measures for avoiding or reducing radiation exposure of persons by reducing emissions and requiring the provision of information.

Radiation emitted by machinery may be intended for processing or may occur unintentionally. Clause 7 of this standard requires, that the manufacturer shall assign the machine to a design radiation emission category. For undesirable radiation emission the emission level should be reduced to values corresponding to category 0.

Functional radiation emission shall be limited to the necessary degree for the operation of the machine.

The remaining emission levels shall be assessed and an emission category shall be determined. If necessary protective measures will have to be applied.

This European Standard is a standard of B1-type in a series of standards for the safety of machinery.

## 1 Scope

This standard deals with the emission of radiation from machinery. This European Standard gives advice to manufacturers for the construction of safe machinery, if no relevant C-type standard exists. This radiation emission may be **functional** for processing or may be **undesirable**.

The issues of electromagnetic compatibility are not addressed in the standard.

This European Standard is intended to give advice to C-type standardization groups, on how to identify radiation emissions or fields<sup>1</sup>, how to determine their significance and intensity, how to assess the possible risks and what means may be used to avoid or reduce radiation emissions. This advice should be elaborated in C-type standards for specific classes of machines as assessable requirements.

This standard deals with the emission of all types of electromagnetic non-ionizing radiation.

Ionizing radiation may be dealt with in other documents or in the future revisions.

This standard does not deal with the emission of laser radiation.

Radiation sources fixed to a machine which are used only for lighting are excluded from the scope of this standard.

This standard applies to machinery as defined in clause 3.1 of EN 292-1:1991.

## 2 Normative references

This European Standard is 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 292-1:1991, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology*

EN 292-2:1991 + A1:1995, *Safety of machinery - Basic concepts, general principles for design – Part 2: Technical principles and specifications (and Amendment A1:1995)*

EN 1050, *Safety of machinery - Principles for risk assessment*

EN 1070, *Safety of machinery – Terminology*

EN 50082-1, *Electromagnetic compatibility – Generic immunity standard – Part 1: Residential, commercial and light industry*

EN 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments (IEC 61000-6-2:1999)*

EN 12198-2:2002 <sup>A1</sup>, *Safety of machinery – Assessment and reduction of risks arising from radiation emitted by machinery – Part 2: Radiation emission measurement procedure*

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<sup>1</sup> In the rest of the present document, the generic term "radiation" covers either the different types of radiation emitted by a machine (i.e. optical radiation), or fields (i.e. electromagnetic and/or magnetic fields) or waves (i.e. electromagnetic waves).

EN 12198-3:2002 <sup>A1</sup>, *Safety of machinery – Assessment and reduction of risks arising from radiation emitted by machinery – Part 3: Reduction of radiation by attenuation or screening*

IEC 60050-845, *International electrotechnical vocabulary ; chapter 845: Lighting*

### 3 Definitions

For the purposes of this European Standard, the following definitions apply in addition to the definitions given in EN 1070, and in IEC 60050-845:

#### 3.1

##### **functional radiation emission**

emission of radiation by a machine needed for its function in the process area

NOTE An example of functional radiation emission is a radiation beam used for thickness gauging.

#### 3.2

##### **undesirable radiation emission**

all radiation emissions, other than functional radiation emissions emitted to any points outside the process area

NOTE An example of an undesirable radiation emission is the leakage radiation from a printing machine, in which the printing inks are cured by ultraviolet radiation.

#### 3.3

##### **trivial radiation emission**

radiation emissions and fields, the intensity of which are so very low that cannot influence on the categorization of the machine, according to clause 7

#### 3.4

##### **accessible surface**

hypothetical surface, just enveloping the machine, from which the measurement points are located

### 4 Classification of radiation emissions

#### 4.1 Classification of radiation by frequency and wavelength

For the purposes of this standard, the classification of radiation by frequency and wavelength or energy is given in table 1.

**Table 1 — Classification of non ionization radiation**

Nature	Type	Frequency/ Wavelength
Electric and/or magnetic fields	Extremely low and low frequency	$0 < f < 30 \text{ kHz}$
Electromagnetic waves	Radio frequency	$30 \text{ kHz} < f < 300 \text{ GHz}$
Optical radiation	Infrared	$1 \text{ mm} > \lambda > 780 \text{ nm}$
Optical radiation	Visible	$780 \text{ nm} > \lambda > 380 \text{ nm}$
Optical radiation	Ultra-violet	$380 \text{ nm} > \lambda > 100 \text{ nm}$
$f$ = frequency. $\lambda$ = wavelength.		

NOTE The above specified intervals of the frequency and wavelength of the radiation may be different in other documents dealing with radiation.