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I.S. EN 1005-4:2005+A1:2008

# Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery

## I.S. EN 1005-4:2005+A1:2008

*Incorporating amendments/corrigenda issued since publication:*

EN 1005-4:2005/A1:2008

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**EUROPEAN STANDARD**

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English Version

## **Safety of machinery - Human physical performance - Part 4: Evaluation of working postures and movements in relation to machinery**

Sécurité des machines - Performance physique humaine -  
Partie 4: Evaluation des postures et mouvements lors du  
travail en relation avec les machines

Sicherheit von Maschinen - Menschliche körperliche  
Leistung - Teil 4: Bewertung von Körperhaltungen und  
Bewegungen bei der Arbeit an Maschinen

This European Standard was approved by CEN on 17 February 2005 and includes Amendment 1 approved by CEN on 18 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.



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## Foreword

This document (EN 1005-4:2005+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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-08-18.

This document supersedes EN 1005-4:2005.

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

EN 1005 consists of the following Parts, under the general title *Safety of machinery - Human physical performance*:

- *Part 1: Terms and definitions;*
- *Part 2: Manual handling of machinery and component parts of machinery;*
- *Part 3: Recommended force limits for machinery operation;*
- *Part 4: Evaluation of working postures and movements in relation to machinery;*
- *Part 5<sup>1</sup> : Risk assessment for repetitive handling at high frequency.*

This European Standard includes a Bibliography.

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.

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<sup>1</sup> This European Standard is under preparation by CEN/TC 122/WG 4 "Biomechanics".

## **Introduction**

About one third of all workers in the European Union are involved in painful or tiring postures for more than half of their working day, and close to 50 % of all workers are exposed to short repetitive tasks, which are mostly accompanied by painful and tiring movements [2]. Pain and fatigue may lead to musculoskeletal disorder, reduced productivity, and deteriorated posture and movement control. The latter can increase the risk of errors and may result in reduced quality and hazardous situations. Within the life cycle of a machine, from construction to dismantling, all machine-related actions require certain postures and movements. The role of the machinery designer should be to avoid painful and tiring postures and movements.

The requirements in this European Standard aim to reduce the health risks associated with machine-related actions and could also have a positive effect on the quality, efficiency and profitability of those actions.

The requirements in this European Standard are based on current ergonomic knowledge and expert opinions, and will be subject to changes in accordance with future research [1].

This document is a type B standard as stated in EN ISO 12100-1.

The provisions of this European Standard can be supplemented or modified by a type C standard.

For machines which are covered by the scope of a type C standard and which have been designed and built according to the provisions of that standard, the provisions of that type C standard take precedence over the provisions of this type B standard.

## 1 Scope

This European Standard presents guidance when designing machinery or its component parts in assessing and affecting health risks due only to machine-related postures and movements, i.e. during assembly, installation, operation, adjustment, maintenance, cleaning, repair, transport, and dismantlement. This European Standard specifies requirements for postures and movements without any or with only minimal external force exertion. The requirements are intended to reduce the health risks for nearly all healthy adults.

This European Standard is not applicable to the machinery, which is manufactured before the date of publication of this European Standard by CEN.

## 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.

EN 547-1, *Safety of machinery - Human body measurements - Part 1: Principles for determining the dimensions required for openings for whole body access into machinery.*

EN 547-2, *Safety of machinery - Human body measurements - Part 2: Principles for determining the dimensions required for access openings.*

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.*

EN 894-1, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 1: General principles for human interactions with displays and control actuators.*

EN 894-2, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays.*

EN 894-3, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators.*

EN 1005-1:2001, *Safety of machinery - Human physical performance - Part 1: Terms and definitions.*

EN 1005-2, *Safety of machinery - Human physical performance - Part 2: Manual handling of machinery and component parts of machinery.*

EN 1005-3, *Safety of machinery - Human physical performance - Part 3: Recommended force limits for machinery operation.*

prEN 1005-5<sup>2</sup>, *Safety of machinery - Human physical performance - Part 5: Risk assessment for repetitive handling at high frequency.*

EN 1050, *Safety of machinery – Principles for risk assessment.*

EN ISO 12100-1:2003, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003).*

EN ISO 12100-2, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles (ISO 12100-2:2003).*

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<sup>2</sup> This European Standard is under preparation by CEN/TC 122/WG 4 "Biomechanics".

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