

# SVENSK STANDARD

## SS-EN 894-3+A1:2008

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### **Maskinsäkerhet – Ergonomiska krav på utformning av avläsningsinstrument (display) och manövreringsorgan – Del 3: Kontrollmanöverdon**

### **Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 3: Control actuators**

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Denna standard ersätter SS-EN 894-3, utgåva 1.

The European Standard EN 894-3:2000+A1:2008 has the status of a Swedish Standard. This document contains the official English version of EN 894-3:2000+A1:2008.

This standard supersedes the Swedish Standard SS-EN 894-3, edition 1.

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EUROPEAN STANDARD

**EN 894-3:2000+A1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2008

ICS 13.100; 13.180

Supersedes EN 894-3:2000

English Version

## Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators

Sécurité des machines - Exigences ergonomiques pour la conception des dispositifs de signalisation et des organes de service - Partie 3: Organes de service

Sicherheit von Maschinen - Ergonomische Anforderungen an die Gestaltung von Anzeigen und Stellteilen - Teil 3: Stellteile

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## Foreword

This document (EN 894-3:2000+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of an identical text or by endorsement, at the latest by April 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.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 2008-08-14.

This document supersedes EN 894-3:2000.

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

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 894-3+A1:2008 (E)

### 1 Scope

This European Standard gives guidance on the selection, design and location of control actuators so that they are adapted to the requirements of the operators, are suitable for the control task in question and take account of the circumstances of their use.

It applies to manual control actuators used in equipment for occupational and private use. It is particularly important to observe the recommendations in this European Standard where operating a control actuator may lead to injury or damage to health, either directly or as a result of a human error.

### 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 (including amendments).

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

EN 292-2, Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.

EN 574, Safety of machinery - Two hand control devices - Functional aspects – Principles for design

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.

prEN 1005-3, Safety of machinery - Human physical strength - Part 3: Recommended force limits for machinery operation.

EN 1050, Safety of machinery - Risk assessment.

ISO 447, Machine tools - Direction of operation of controls.

IEC 60447, Man-machine interface (MMI) - Actuating principles.

### 3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

**3.1**  
**control actuator**  
the part of the control actuating system that is directly actuated by the operator, e.g. by applying pressure [EN 894-1]



**3.2**

**manual control actuator**

a control actuator adjusted or manipulated by human hand to effect change in a system, e.g., push-button, knob, steering wheel. Touch sensitive actuation is not included.

**3.3**

**control type**

a range of control actuators with the same movement and grip characteristics, and fulfilling similar task requirements

**3.4**

**control family**

a group of control types

**3.5**

**operator**

the person or persons given the task of installing, operating, adjusting, maintaining, cleaning, repairing or transporting machinery [EN 292 -1]

**3.6**

**task (work task)**

an activity or activities required to achieve an intended outcome of the work system [EN 614-1]

**3.7**

**control task**

an activity where a control actuator is used to achieve a task goal

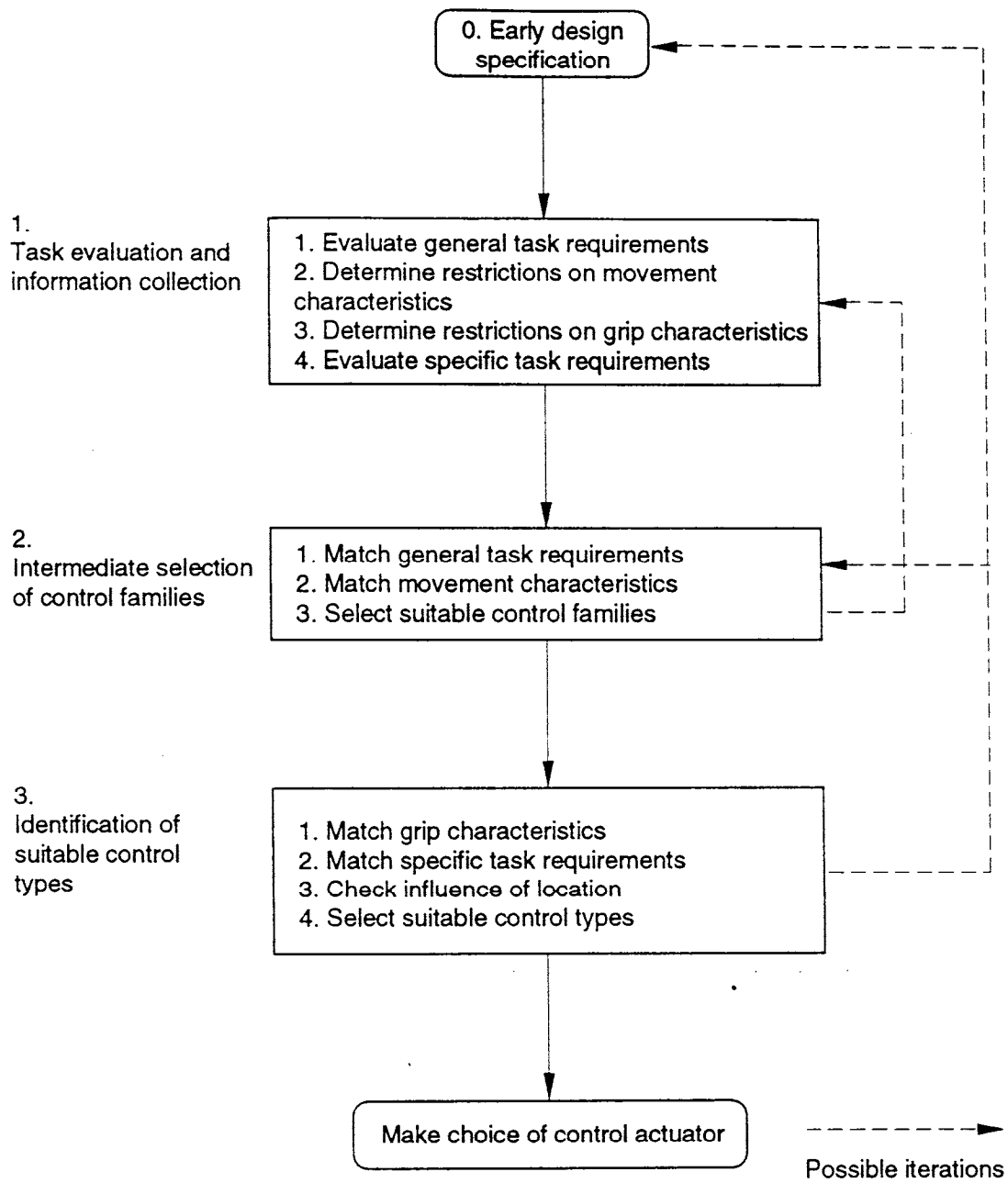


Figure 1 — Overall selection process for manual control actuators

## 4 Selection procedure

Many types of manual control actuators are available from push-buttons to hand wheels. Each type is suited to particular task requirements and to certain operator capabilities. Environmental factors (e.g. illumination, vibration) and organisational factors (e.g. team work, workstation separation) also have to be considered.

To ensure safe and efficient operation, correct selection of control actuators is important. The following describes a systematic procedure that will enable designers and manufacturers to select manual control actuators meeting their specific requirements.

The selection procedure involves three steps which are carried out in an iterative manner. These are:

- task evaluation and information collection;
- intermediate selection of control families;
- identification of suitable control types.

The main steps in the selection procedure are shown in figure 1. An example of a form for recording the results of the evaluation is shown in figure 2. Clause 5 describes the information that is required in order to select appropriate control actuators, clauses 6 and 7 then describe how this information is used in order to make the selection.

## 5 Task evaluation and information collection

### 5.1 Requirements and characteristics

The division of tasks between the operator and the equipment should have been determined early in the design process in accordance with the recommendations in EN 614 -1 and EN 894 -1.

There are general and specific requirements imposed by a task which normally cannot be changed. If it is not possible to find a suitable control actuator for a specified task then the allocation of this task or the task itself has to be reconsidered.

The task requirements considered in this European Standard are ones that experience has shown to be most important in selecting manual control actuators, as follows:

General task requirements

- a) Accuracy required in positioning the manual control actuator (**accuracy**);
- b) Speed of setting required (**speed**);
- c) Force/torque requirements (**force**).

Specific task requirements

- d) Need for visual checking of manual control actuator setting (**visual check**);
- e) Need for tactile checking of setting (**tactile check**);
- f) Need to avoid inadvertent operation (**inadvertent operate**);
- g) Need to avoid hand slipping from manual control actuator (**friction**);