

**SLOVENSKI STANDARD**  
**SIST EN 29241-3:2001/A1:2001**  
**01-junij-2001**

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**Ergonomic requirements for office work with visual display terminals (VDTs) - Part 3: Visual display requirements (ISO 9241-3:1992/AM1:2000)**

Ergonomic requirements for office work with visual display terminals (VDTs) - Part 3: Visual display requirements (ISO 9241-3:1992/AM1:2000)

Ergonomische Anforderungen für Bürotätigkeiten mit Bildschirmgeräten - Teil 3: Anforderungen an visuelle Anzeigen (ISO 9241-3:1992/AM1:2000)

Exigences ergonomiques pour travail de bureau avec terminaux a écrans de visualisation (TEV) - Partie 3: Exigences relatives aux écrans de visualisation - (ISO 9241-3:1992/AM1:2000)

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**Ta slovenski standard je istoveten z: EN 29241-3:1993/A1:2000**

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**ICS:**

13.180	Ergonomija	Ergonomics
35.180	Terminalska in druga periferna oprema IT	IT Terminal and other peripheral equipment

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 29241-3:1993/A1**

December 2000

ICS 13.180; 35.080; 35.180

English version

**Ergonomic requirements for office work with visual display terminals (VDTs) - Part 3: Visual display requirements (ISO 9241-3:1992/AM1:2000)**

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This amendment A1 modifies the European Standard EN 29241-3:1993; it was approved by CEN on 15 December 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This amendment 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 Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: rue de Stassart, 36 B-1050 Brussels**

CORRECTED 2001-12-05

## Foreword

The text of the Amendment ISO 9241-3:1992/AM1:2000 to the EN 29241-3:1993 has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with CMC.

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 June 2001, and conflicting national standards shall be withdrawn at the latest by June 2001.

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

## Endorsement notice

The text of the International Standard ISO 9241-3:1992/AM1:2000 was approved by CEN as a European Standard without any modification.

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# INTERNATIONAL STANDARD

# ISO 9241-3

First edition  
1992-07-15

**AMENDMENT 1**  
2000-12-15

Corrected version  
2002-12-15

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## Ergonomic requirements for office work with visual display terminals (VDTs) —

### Part 3: Visual display requirements

#### AMENDMENT 1

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*Exigences ergonomiques pour travail de bureau avec terminaux à écrans  
de visualisation (TEV) —*

*SIST EN 29241-3:2001/A1:2001*

*Partie 3: Exigences relatives aux écrans de visualisation*

*AMENDEMENT 1*



Reference number  
ISO 9241-3:1992/Amd.1:2000(E)

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this Amendment may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to International Standard ISO 9241-3:1992 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*.

This corrected version of ISO 9241-3:1992/Amd.1:2000 incorporates the following corrections.

On page 1, the phrase "Delete NOTE 11, in 7.1" has been deleted, indicating that the entire text of 7.1 has been replaced.

The text of 7.2 e) has now been deleted.

On page 13, a new sentence has been added before "Add the following references to the Bibliography", and the publication date of [28] has been changed.

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# Ergonomic requirements for office work with visual display terminals (VDTs) —

## Part 3: Visual display requirements

### AMENDMENT 1

*Pages iii and iv, Contents*

Replace the titles of annex C and clauses C.2 and C.5 to C.12 with the following:

**Annex C Visual performance and comfort test**

**C.2 Test participants**

**C.5 Methods**

**C.6 Dependent measures**

**C.7 Statistical treatment of results**

**C.8 Conformance**

**C.9 Critical values for Barnard's  $U$  test**

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*Page vi, Foreword*

Replace the final sentence with the following text:

Annex C forms a normative part of this part of ISO 9241. Annexes A, B and D are for information only.

*Pages 15 and 16, subclause 7.1*

Replace the existing text of 7.1 with the following text:

**7.1** Conformance with this part of ISO 9241 is achieved by meeting all the mandatory requirements of clause 5.

Where the physical measurements required to comply with clause 5 cannot be carried out because the display under test uses a new technology that makes the metrological measurements difficult or impossible, compliance is achieved by obtaining a positive result using the test method and associated mandatory requirements specified in annex C.

*Page 16, subclause 7.2*

Delete 7.2 e).

*Page 22, annex C*

Replace annex C with the following text.

## Annex C (normative)

### Visual performance and comfort test

#### C.1 Principle

##### C.1.1 Purpose and use of test

This annex describes a procedure for testing the visual quality of VDTs where the entire set of physical requirements (defined in clause 5) cannot be applied, for example, to novel display technologies such as new types of flat panel display (such as electroluminescent and field emission displays). The test consists of a search task and an assessment of visual comfort. The combination of test results will be referred to as the visual quality of a display.

##### C.1.2 Intent and scenario of use

The intention behind this test method is to provide a test method for displays that cannot otherwise be tested for conformance with this part of ISO 9241. This test method is not an alternative test method, in the sense that a display manufacturer can choose either the physical requirements specified in clause 5 or this method. Instead, the test method provides a testing route for displays that *cannot be tested* according to the requirements specified in clause 5 because the display under test uses a new technology that makes the metrological measurements difficult or impossible (see 7.1).

##### C.1.3 Overview of test method

This test procedure measures the effectiveness of the transfer of visual information in terms of participants' search performance for targets embedded in alphanumeric characters on a candidate display versus those same participants' performance for such a task on a benchmark display. Effectiveness in this context means that the user is able to detect and recognize the visual targets accurately, quickly and without visual discomfort. If the display passes this particular visual search and rating performance test, it can be assumed capable of other presentations of information such as (but not limited to) non-alphanumeric languages and business graphics. The dependent variables of the test are the search velocity achieved by the test participants in a visual letter search task and subjective ratings of visual comfort using a category scale. The combination of the test results will be referred to as the visual quality of a display. Testing takes place in a simulated office environment, with test participants representative of the anticipated user population.

The method i.e. a letter search task applying pseudo-text in combination with scaling of experienced visual comfort, was first developed and tested by researchers of the IPO, Center for Research on User-System Interaction (Boschman & Roufs [3]).

The visual quality of a display, referred to as a test display, is assessed against a benchmark display known to meet or exceed the mandatory requirements of clause 5 of this part of ISO 9241. Both the velocity in the visual search task and the subjective ratings must meet certain minimum requirements for the test display to pass. Sequential statistics, or an equally robust equivalent statistical procedure, are used to determine if the participant's performance on the test display exceeds or falls short of performance on the benchmark display.

##### C.1.4 Avoidance of bias

All tests are open to bias, and this is especially true in the area of psychological testing. The assessment should therefore be carried out under the supervision of those qualified to carry out such testing, with the necessary education and at least one year of experience. Rules governing the ethical conduct of human experimental testing

should be followed. Examples of such rules can be found in the American Psychological Association (1990) [23] and the British Psychological Society (1991) [27].

The test administrator should ensure that all potential sources of error are minimized or controlled. The following list describes some potential sources of bias and error; the list is not intended to be complete.

- Selection of test participants (e.g. avoid selection of particular age groups).
- Configuration of displays (during the test, the benchmark display shall meet all the requirements of clause 5).
- Environmental conditions (lighting and other conditions shall be equal for both displays, to avoid detrimental conditions for one of them).
- Instructions to the test participants (these should be impartial).

## C.2 Test participants

Test participants should be a sample representing the anticipated user population (those who perform office tasks as specified in the scope of this part of ISO 9241). All test participants shall have near visual acuity that is normal, or corrected to normal, at the design viewing distance and shall be without any obvious physical or physiological conditions that could influence either their search performance or their perceived image quality.

## C.3 The displays

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The test display shall be a production or full-feature pre-production unit. It shall incorporate all anti-glare and reflection filters and treatments that will be in the production unit. The benchmark display shall be supplied or nominated by the supplier of the test display and shall meet or exceed all mandatory requirements in clause 5 of this part of ISO 9241.

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The displays may be labelled for identification purposes (e.g. "Display 1" and "Display 2"). Under these conditions, the test participants should not be informed which is the test and which is the benchmark display, so half of them should have the test display labelled as "Display 1" and the other half should have the benchmark display labelled as "Display 1".

## C.4 Test workstation and environment

### C.4.1 General requirements

The test shall be conducted in an area that is free from distractions and external interference which could influence the test results. The ambient conditions shall fall within the range defined in ISO 9241-6. These conditions shall be comfortable and shall not be subject to significant variation during the test, both within a test participant's session and between test participants.

### C.4.2 Environment

The thermal environment, the background noise level, the ambient lighting, and the reflectance of work surfaces shall meet the minimum requirements in ISO 9241-5 and ISO 9241-6. The ambient illumination shall be designed to minimize glare and specular reflections (see ISO 9241-7). Constant lighting conditions shall be maintained both within a participant's session and between test participants. The test participants shall be light-adapted by being placed in the test room for 10 min prior to the test.

NOTE This period may be used by the experimenter to instruct each test participant about the test.