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**Ergonomic requirements for work with  
visual displays based on flat panels —**

**Part 1:  
Introduction**

*Exigences ergonomiques pour travail sur écrans de visualisation à  
panneaux plats —*

*Partie 1: Introduction*



## 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.

International Standard ISO 13406-1 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 4, *Ergonomics of human-system interaction*, WG 2, *Visual display requirements*, in collaboration with IEC/SC 47C/WG 2 (responsible for flat-panel engineering standards).

ISO 13406 consists of the following parts, under the general title *Ergonomic requirements for work with visual displays based on flat panels*:

- *Part 1: Introduction*
- *Part 2: Requirements for flat panel displays*

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## Introduction

ISO 13406 addresses the ergonomic considerations that should be taken into account when using flat-panel visual displays. ISO 13406 is based on the ergonomic foundations and principles addressed in ISO 9241. During the development of ISO 9241-3:1992, it was recognized that the use of the same ergonomic principles results in a different approach and specification for flat panels.

ISO 13406 exists for three reasons:

- a) ISO 9241 is sometimes not sufficient to ensure that a display meets basic front-of-screen ergonomic requirements when flat-panel visual displays are used instead of conventional CRT-based VDTs;
- b) ISO 9241 measurement methods are sometimes inappropriate for characterizing flat-panel visual displays;
- c) ISO 9241 addresses office work, but the scope of ISO 13406 includes extended uses and applications.

Examples of special flat-panel considerations are

- picture element discreteness (leading to the possibility of isolated defects);
- optical properties that strongly depend on viewing direction (leading to the need to carefully describe viewing direction during evaluation);
- slow response time of the electro-optical effect (leading to suitability questions when image dynamics are important for performance or comfort);
- panels that electrically vary the reflection properties at the picture element site (leading to complications in evaluation).

ISO 13406, where appropriate, provides physical requirements based on models in ergonomic research and physical measurement protocols to provide consistent compliance decisions. In ISO 9241-3, ISO 9241-7 and ISO 9241-8, an alternative decision route is sometimes appropriate and necessary. These three standards include annexes concerning visual performance tests. These tests address legibility, legibility when unwanted reflections exist on the display screen, and discriminability of colours. When these tests are approved, they will provide an alternative means to decide compliance. These tests (unmodified or with appropriate modifications to account for flat-panel specific environmental considerations) may be used to decide compliance to ISO 13406-2.

ISO 13406-2 treats the ergonomics of directly viewed flat-panel displays. It covers the ergonomic topics of ISO 9241-3, ISO 9241-7, and ISO 9241-8. The requirements and measurements in ISO 13406-2 treat panels with uniformly spaced and constructed pixels. In addition, panels are sufficiently large to display at least three measurement targets, of at least 400 pixels each, that do not overlap.

Figure 1 illustrates a directly viewed flat-panel configuration that cannot be evaluated under ISO 13406-2 because each pixel is specially sized and shaped to represent a specific portion of a numeric symbol. This type of display is known as a segmented display.

Figure 2 illustrates another directly viewed flat-panel configuration that cannot be evaluated under ISO 13406-2 because the uniformly constructed pixels are not uniformly spaced. For economic reasons, the pixel positions between character rows and columns are omitted. With this type of panel, measurement targets are unavailable.

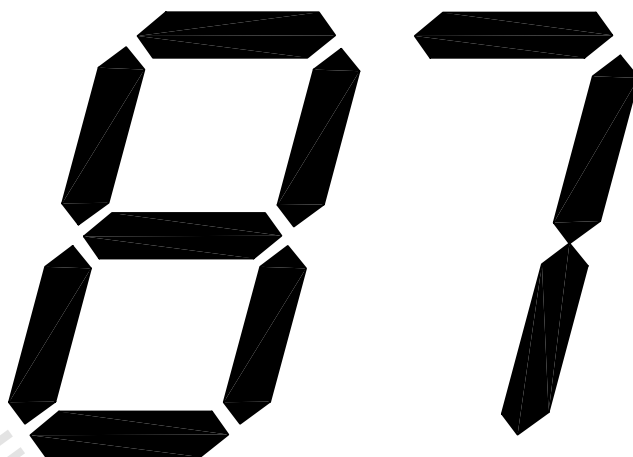


Figure 1 — Segmented display

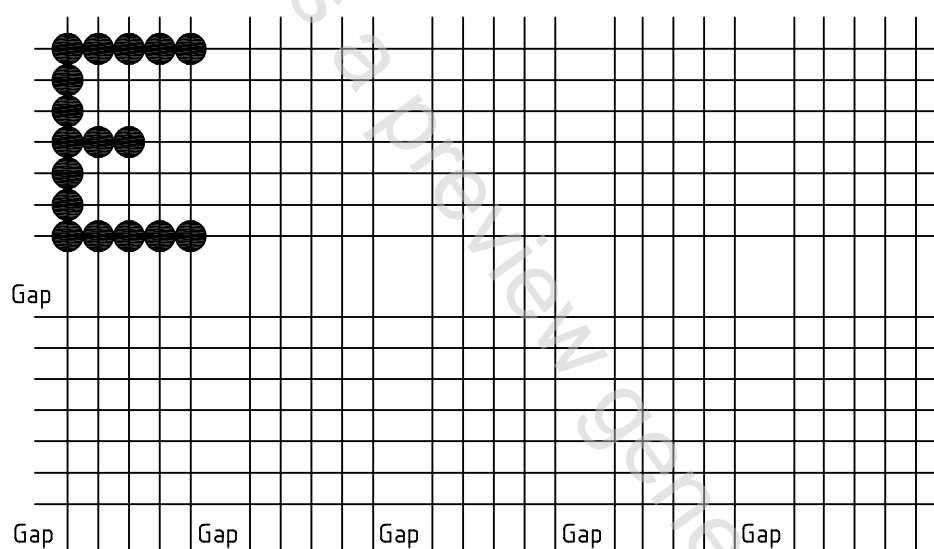


Figure 2 — Display with built-in gaps

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# Ergonomic requirements for work with visual displays based on flat panels —

## Part 1: Introduction

### 1 Scope

This part of ISO 13406 establishes the rationale for ergonomic requirements for work with visual displays based on flat panels.

This part of ISO 13406 is applicable to flat-panel technology applied to displays for office work and similar work.

### 2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 13406. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13406 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9241-11:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 11: Guidance on usability*.

### 3 Term and definition

For the purposes of this part of ISO 13406, the following term and definition applies.

#### 3.1

##### **flat panel**

display that incorporates a flat surface  $> 2$  m radius of curvature, for the presentation of information; the surface contains an active area consisting of a regular array of electrically alterable, discrete picture elements (pixels) in rows and columns