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English Version

**Ergonomics of human-system interaction - Part 310:  
Visibility, aesthetics and ergonomics of pixel defects  
(ISO/TR 9241-310:2010)**

Ergonomie de l'interaction homme-système - Partie  
310: Visibilité, esthétique et ergonomie des défauts de  
pixel (ISO/TR 9241-310:2010)

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## European foreword

This document (CEN ISO/TR 9241-310:2015) has been prepared by Technical Committee ISO/TC 159 “Ergonomics” in collaboration with Technical Committee CEN/TC 122 “Ergonomics” the secretariat of which is held by DIN.

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## Introduction

This part of ISO 9241 summarises information that ISO/TC 159/SC 4/WG 2, *Visual display requirements*, collected on pixel defects and their impact on aesthetics and ergonomics during preparation of ISO 13406 and other parts in the ISO 9241 “300” subseries. It uses terms and definitions from ISO 9241-302 and VESA FDPM<sup>[20]</sup>.

It is based on research and reports that were available at the end of year 2005. The annexes contain information upon which the Working Group could not reach consensus, as well as some additional information, collected during the year 2006, that did not undergo the same review and analysis process as the earlier material.

# Ergonomics of human-system interaction —

## Part 310:

## Visibility, aesthetics and ergonomics of pixel defects

**IMPORTANT** — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

### 1 Scope

This part of ISO 9241 provides a summary of existing knowledge on ergonomics requirements for pixel defects in electronic displays at the time of its publication. It also gives guidance on the specification of pixel defects, visibility thresholds and aesthetic requirements for pixel defects. It does not itself give requirements related to pixel defects, but it is envisaged that its information could be used in the revision of other parts in the ISO 9241 series.

### 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 2.1

##### **pixel**

smallest addressable spatial unit of a display that can show all the colours of the display

NOTE 1 Typical pixel heights for single-user displays range from 0,05 mm to 0,40 mm. Multi-user displays viewed from a distance use bigger pixel sizes.

NOTE 2 Adapted from ISO 9241-302:2008, definition 3.4.29.

#### 2.2

##### **subpixel**

independently addressable unit of a pixel, the smallest addressable unit of a display, used for spatial dithering to change colour or luminance

#### 2.3

##### **pixel fault**

defective pixel or subpixel that is visible under the intended context of use

[ISO 9241-302:2008]

#### 2.4

##### **pixel defect**

pixels that operate improperly when addressed with video information

EXAMPLE A pixel addressed to turn black could remain white. If it never changes state, it is said to be a stuck pixel. If it changes state without the proper addressing signal, it could be intermittent.

[VESA FPDM 303-6]