

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 159, *Ergonomics*, Subcommittee SC 1, *General ergonomic principles*.

This third edition cancels and replaces the second edition (ISO 6385:2004), which has been technically revised with the following changes:

- terms were aligned with the terms given in ISO 26000;
- 3.2, 3.7 and Clause 4 have been technically revised;
- life cycle of a work system was introduced in 3.2;
- principle of adjustment was added to 3.7 and validation replaced by verification;
- new subclause on conformity was added to Clause 4;
- examples were added in several clauses.

## Introduction

Technological, economic, organizational and human factors affect the work behaviour and well-being of people as part of a work system. Applying ergonomic knowledge in the light of practical experience in the design of a work system is intended to satisfy human requirements.

This International Standard provides a basic ergonomic framework for professionals and other people who deal with the issues of ergonomics, work systems and working situations. The provisions of this International Standard will also apply to the design of products for use in work systems.

Following the principles and requirements described in this International Standard will support management in making better decisions, for instance related to the sustainability of investments in work system innovation.

In the design of work systems in accordance with this International Standard, the body of knowledge in the field of ergonomics is taken into account. Ergonomic evaluations of existing or new work systems will show the need for, and encourage attention to, the role of the worker within those systems.

ISO 26800 provides a general starting point for thought on ergonomics and determines the essential general principles and concepts. This International Standard presents these in the context of the design and evaluation of work systems.

This International Standard is also valuable in the application of management systems such as OHSAS 18001. Besides guidelines for processes, it also offers guidance for achieving good human performance.

## 1 Scope

This International Standard establishes the fundamental principles of ergonomics as basic guidelines for the design of work systems and defines relevant basic terms. It describes an integrated approach to the design of work systems, where ergonomists will cooperate with others involved in the design, with attention to the human, the social and the technical requirements in a balanced manner during the design process.

Users of this International Standard will include executives, managers, workers (and their representatives, when appropriate) and professionals, such as ergonomists, project managers and designers who are involved in the design or redesign of work systems. Those who use this International Standard can find a general knowledge of ergonomics (human factors), engineering, design, quality and project management helpful.

The term “work system” in this International Standard is used to indicate a large variety of working situations, including permanent and flexible work places. The intention of this International Standard is to assist in the improvement, (re)design or change of work systems. Work systems involve combinations of workers and equipment, within a given space and environment, and the interactions between these components within a work organization. Work systems vary in complexity and characteristics, for example, the use of temporary work systems. Some examples of work systems in different areas are the following:

- production, e.g. machine operator and machine, worker and assembly line;
- transportation, e.g. driver and car or lorry, personnel in an airport;
- support, e.g. maintenance technician with work equipment;
- commercial, e.g. office worker with workstation, mobile worker with a tablet computer, cook in a restaurant kitchen;
- other areas like health care, teaching and training.

The observance of ergonomic principles applies to all phases throughout the life cycle of the work system from conception through development, realization and implementation, utilization, maintenance and support to decommissioning.

The systems approach in this International Standard gives guidance to the users of this International Standard in existing and new situations.

The definitions and ergonomic principles specified in this International Standard apply to the design of optimal working conditions with regard to human well-being, safety and health, including the development of existing skills and the acquisition of new ones, while taking into account technological and economic effectiveness and efficiency.

The principles in this International Standard are applicable to many other human activities, e.g. in the design of products for domestic and leisure activities. A more general description of the principles in this International Standard can be found in [ISO 26800](#).

NOTE 1 This International Standard is considered to be the core ergonomic standard for work systems from which many others on specific issues are derived.

Note 2 Although elements of the system can be the same, this International Standard is not intended to be applied to systems used in a non-work context (e.g. the use of a vehicle for private purposes).

## 2 Terms and definitions

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

### 2.1

#### **well-being**

<work system> sustainable internal state resulting from satisfaction of the physical and cognitive needs of the **worker** (2.4) during his/her activity

Note 1 to entry: Well-being can contribute to the quality of working life.

### 2.2

#### **work system**

system comprising one or more **workers** (2.4) and **work equipment** (2.6) acting together to perform the **system function** (2.21), in the **workspace** (2.9), in the **work environment** (2.8), under the conditions imposed by the **work tasks** (2.17)

### 2.3

#### **ergonomics** **human factors**

scientific discipline concerned with the understanding of interactions among human and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human **well-**

**being** (2.1) and overall system performance

[SOURCE: ISO 26800:2011, 2.2]

## 2.4

### **worker**

person performing one or more activities to achieve a goal within a **work system** (2.2)

[SOURCE: ISO 26800:2011, 2.11, modified — synonym “operator” omitted]

## 2.5

### **work organization**

interacting **work systems** (2.2) acting to produce a specific overall outcome

Note 1 to entry: The process of work organization includes coherent actions in relation to establishing the form and mode of organization to be adopted (e.g. individual or collective work, teams working separately or interdependently, etc.). It is also necessary to define and allocate resources and determine the means and channels of communication. All these actions lead to the definition and assignment of prescribed tasks to the operators involved.

## 2.6

### **work equipment**

tools, including hardware and software, machines, vehicles, devices, furniture, installations and other components used in the **work system** (2.2)

## 2.7

### **work process**

sequence in time and space of the interaction of **workers** (2.4), **work equipment** (2.6), materials, energy and information within a **work system** (2.2)

## 2.8

### **work environment**

physical, chemical, biological, organizational, social and cultural factors surrounding a **worker** (2.4)

## 2.9

### **workspace**

volume allocated to one or more persons in the **work system** (2.2) to complete the **work task** (2.17)

## 2.10

### **external work load**

#### **work stress**

external conditions and demands in a **work system** (2.2) which influence a person's physical and/or mental internal load

Note 1 to entry: In some countries, “external work load” is referred to as “work stress”.

Note 2 to entry: Compare [ISO 26800:2011, 2.4](#).

## 2.11

### **work strain**

internal response of a **worker** (2.4) to being exposed to **external work load** (2.10) depending on his/her individual characteristics (e.g. body size, age, capacities, abilities, skills, etc.)

Note 1 to entry: In [ISO 26800](#), “work strain” is called “internal load”.

Note 2 to entry: Compare [ISO 26800:2011, 2.6](#).

## 2.12

### **usability**

extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use

Note 1 to entry: Systems, products or services are part of **work systems** (2.2) and used by **workers** (2.4) within those systems.

Note 2 to entry: In this International Standard, the context of use is within a work system.

[SOURCE: ISO 9241-210:2010, 2.13]

## 2.13

### **human-centred design**

approach to systems design and development that aims to make interactive systems more usable by focusing on the use of the system and applying *human factors/ergonomics* (2.3) and **usability** (2.12) knowledge and techniques

[SOURCE: ISO 9241-210:2010, 2.7, modified — Notes 1 and 2 to entry omitted]

**2.14**  
**accessibility**  
extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use

[SOURCE: ISO 26800:2011, 2.1, modified — Notes 1 and 2 to entry omitted]

Note 1 to entry: Products, systems, services and facilities are part of **work systems** (2.2) and used by **workers** (2.4) within those systems.

Note 2 to entry: In this International Standard, the context of use is within a work system.

**2.15**  
**allocation of functions**  
process of deciding whether **system functions** (2.21) will be implemented by humans, by equipment and/or hardware and/or software

**2.16**  
**job**  
organization and sequence in time and space of an individual's **work tasks** (2.17) or the combination of all human performance by one **worker** (2.4) within a **work system** (2.2)

**2.17**  
**work task**  
activity or set of activities required of the **worker** (2.4) to achieve an intended outcome

**2.18**  
**workstation**  
combination and spatial arrangement of **work equipment** (2.6), surrounded by the **work environment** (2.8) under the conditions imposed by the **work tasks** (2.17)

**2.19**  
**work fatigue**  
impairing non-pathological manifestation of **work strain** (2.11), completely reversible with rest

Note 1 to entry: Work fatigue can be mental, physical, local and/or general.

Note 2 to entry: Compare ISO 26800:2011, 2.5.

**2.20**  
**target population**  
people for whom the design is intended, specified according to the relevant characteristics

Note 1 to entry: Relevant characteristics include, for example, the skill level, intelligence or physical characteristics, such as anthropometric dimensions, of these people. Gender and age can be related to variations in these characteristics. In addition to these intrinsic characteristics, extrinsic factors (e.g. cultural differences) could also be relevant.

[SOURCE: ISO 26800:2011, 2.8]

**2.21**  
**system function**  
broad category of activity performed by a system

**Only informative sections of standards are publicly available. To view the full content, you will need to purchase the standard by clicking on the "Buy" button.**

## Bibliography

- [1] ISO 1503, *Spatial orientation and direction of movement — Ergonomic requirements*
- [2] ISO 9241 (all parts), *Ergonomics of human-system interaction*
- [3] ISO 9355 (all parts), *Ergonomic requirements for the design of displays and control actuators*
- [4] ISO 10075, *Ergonomic principles related to mental work-load — General terms and definitions*
- [5] ISO 10075-2, *Ergonomic principles related to mental workload — Part 2: Design principles*

- [6] [ISO 10075-3](#), *Ergonomic principles related to mental workload — Part 3: Principles and requirements concerning methods for measuring and assessing mental workload*
- [7] [ISO 11064 \(all parts\)](#), *Ergonomic design of control centres*
- [8] [ISO 11226](#), *Ergonomics — Evaluation of static working postures*
- [9] [ISO/IEC/IEEE 15288:2015](#), *Systems and software engineering — System life cycle processes*
- [10] [ISO/TR 16982](#), *Ergonomics of human-system interaction — Usability methods supporting human-centred design*
- [11] [ISO/TR 22411](#), *Ergonomics data and guidelines for the application of ISO/IEC Guide 71 to products and services to address the needs of older persons and persons with disabilities*
- [12] [ISO 26800](#), *Ergonomics — General approach, principles and concepts*
- [13] [ISO/IEC Guide 71](#), *Guidelines for standard developers to address the needs of older person and persons with disabilities*
- [14] [EN 614-1:2006+A1:2009](#), *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*
- [15] [EN 614-2:2000+A1:2008](#), *Safety of machinery — Ergonomic design principles — Part 2: Interactions between the design of machinery and work tasks*
- [16] [EN 1005-4](#), *Safety of machinery — Human physical performance — Part 4: Evaluation of working postures and movements in relation to machinery*
- [17] [EN 1005-5](#), *Safety of machinery — Human physical performance — Part 5: Risk assessment for repetitive handling at high frequency*
- [18] [EN 12464-1](#), *Light and lighting — Lighting of work places — Part 1: Indoor work places*
- [19] [EN 16710-2](#), *Ergonomics methods — Part 2: A methodology for work analysis to support design*
- [20] [OHSAS 18001](#), *Occupational health and safety management systems. Requirements*