SLOVENSKI STANDARD
oSIST prEN ISO 9241-220:2016

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Ergonomija medsebojnega vpliva človek-sistem - 220. del: Procesi za omogočanje, izvajanje in ocenjevanje na človeka osredotočenega načrtovanja interaktivnih sistemov v organizacijah (ISO/DIS 9241-220)

Ergonomics of human-computer interaction - Part 220: Processes for enabling, executing and assessing human-centred design within organizations (ISO/DIS 9241-220)

Ergonomie der Mensch-System-Interaktion - Teil 220: Prozesse zur Ermöglichung, Durchführung und Bewertung menschzentrierter Gestaltung für interaktive Systeme in Hersteller- und Betreiberorganisationen (ISO/DIS 9241-220)

Ergonomie de l'interaction homme-système (ISO/DIS 9241-220:2016)

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Ergonomics of human-computer interaction —

Part 220: Processes for enabling, executing and assessing human-centred design within organizations

Ergonomie de l'interaction homme-système

ICS: 13.180; 35.180

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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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 2.

The main task of technical committees is to prepare International Standards. 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.

ISO 9241-220 was prepared by Technical Committee ISO/TC159 *Ergonomics,* Subcommittee SC4.

ISO 9241-220 revises and replaces ISO/TR18529:2000. The major changes are:

- Technical update to take account of developments in human-centred design and usability, and concepts such as user experience.
- Introduction of a collective term for the results of human-centred design of interactive systems.
- Architectural update to clarify the different types of process described (management, technical and lifecycle).
- Format update to align with ISO/IEC 24774 in the description of processes.
- Content update with increased detail and number of process descriptions and inclusion of work product descriptions from ISO/IEC 25060 and ISO/IEC 15504-6.

Introduction

This part of ISO 9241 describes processes that represent good practice for human-centred design within and across projects. The primary intended users of ISO 9241-220 are those institutionalising human-centred design in an organization, who need to specify, assess and improve human-centred design in the organization. This application needs the clear and consistent structure that is provided by process definitions, as described in ISO/IEC TR 24774.

Process models offer:

a) the potential to analyse the ability of an organization to deliver and/or maintain a system that meets a required level of performance and quality;

b) a description of the factors that hinder this ability; and

c) a means of addressing such shortcomings and mitigating associated risks of adverse consequences.

These have led to the widespread adoption of process modelling and assessment as an element in the assurance of timely and effective system delivery. Processes are defined at the level of **what** is done to develop and operate a system or organization.

NOTE 1 Process models have been defined for particular applications and industries. International standard process models are being developed by ISO and ISO/IEC JTC1. The specification in ISO 9241-220 provides a bridge between standardization in the area of Ergonomics (by ISO TC159) and the life cycle standardization being carried out by ISO/IEC JTC1/SC7 *Software engineering*.

The processes in ISO 9241-220 represent good international practice in human-centred design from a range of industries. They are described from the perspective of those who analyse, design and evaluate the human use of interactive systems. This includes associated requirements for project management and top management support for human-centred design.

ISO 9241-220 uses the same structured format as other International Standards for process models. Rather than describing each process with “shalls” and “shoulds”, the process is defined in a table where the process outcomes are the requirements, and the typical process activities are the recommended ways of achieving the outcomes.

ISO 9241-220 can be used for:

- implementing human-centred design as part of a system development or procurement process and/or support lifecycle;
- assessing an enterprise’s existing capability to carry out the human-centred processes;
- improving the application of human-centred design as part of an existing system development process;
- development of competence in human-centred design.

For executives/top management ISO 9241-220 gives guidance on governance in the area of human-centred quality. Using ISO 9241-220 as the basis gives confidence that interactive systems developed and used by an organization will be usable and accessible.

For managers ISO 9241-220 facilitates integration of human-centred design into the system lifecycle and quality management system. Human-centred activities can be specified, assessed and improved as required for projects.

ISO 9241-220 enables efficient interaction between human-centred design and other disciplines. The services and information that technical staff provide to projects are defined so that their value and purpose can be understood.

Relationship to ISO 9241-210

ISO 9241-210 *Human-centred design for interactive systems* describes the principles of a human-centred approach and the activities necessary to be human-centred in design. ISO 9241-220 elaborates these principles and activities as structured processes with defined outcomes. Conformance to ISO 9241-220 can be achieved either by applying all the processes, or a selected set that are justified as being relevant, and meeting the outcomes of all selected processes.

ISO 9241-210 describes human-centred design activities in less detail. Conformance is achieved by carrying out all the required activities and other recommended activities that are justified as being relevant.

NOTE 2 ISO 9241-220 can be used as a means of showing conformance to the requirements and applicable recommendations in ISO 9241-210 by using the mapping in Annex C of ISO 9241-220. The extra detail provided by ISO 9241-220 can provide a basis for organizational improvements in human-centred design where any non-compliances are identified.

ISO 9241-210 also explains that human-centred design has a broad range of benefits. These can include improving usability, accessibility and user experience, and reducing the risk of the interactive system failing to meet stakeholder requirements. In ISO 9241-220 human-centred quality is the collective term used to refer to these outcomes. The target of human-centred design is thus to establish an acceptable level of human-centred quality.

Relationship to ISO/IEC 25010

Quality in use (defined in ISO/IEC 25010) that is composed of effectiveness, efficiency, satisfaction and freedom from risk is a similar concept to human-centred quality, but includes risks of adverse consequences that could arise from any aspect of the quality of the product or system.

Demonstrating conformance to other aspects of human-centred design Other International Standards specify other aspects of human-centred design.

- ISO/TS 18152:2010 *Ergonomics of human-system interaction – Specification for the process assessment of human-system issues*. ISO TS 18152 is a process model of the same form as ISO 9241-220, but with a wider scope that includes all human-system issues in an organization.

- ISO FDIS 27500 *The human-centred organization – Rationale and general principles.* ISO 27500 defines seven principles for human-centred organizations. It recommends that an organization's executive board establish a policy to implement a human-centred approach that implements these principles. ISO 27500 explains the management of risk through consideration of ergonomics.

- ISO 27501 WD *The human-centred organization – Management level processes*. *[Will be deleted if 27501 is not FDIS before publication of 9241-22-0]*

- ISO 26800 *Ergonomics – General approach, principles and concepts.* ISO 26800 requires an ergonomics approach to design to be human-centred. It defines basic requirements on an ergonomics-orientated design processes.

- ISO/IEC 2506x *Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE) – Common Industry Format for usability reports*. The ISO/IEC 2506x series of International Standards specify the content of a range of reports of usability activities including context of use specification, user needs report, evaluation reports.

- IEC 62508 *Guidance on human aspects of dependability.* IEC 62508 provides guidelines in the form of detailed principles and recommendations on human-centred design for dependable systems, i.e. systems that have to perform as and when required.

Ergonomics of human-system interaction – Part 220: Processes for enabling, executing and assessing human-centred design within organizations

1 Scope

ISO 9241-220 describes the processes by which human-centred design (HCD) is supported and carried out within organizations, and used to achieve human-centred quality throughout the life cycle of interactive systems. The process descriptions include the purpose, benefits, outcomes, typical activities and work products for each process. The process descriptions are for use in the specification, implementation, assessment and improvement of the activities used for human-centred design and operation. They can also provide the basis for professional development and certification.

ISO 924-220 describes processes associated with the domains of ergonomics/human factors, human computer interaction, usability and user experience. ISO 9241-220 does not describe processes for organizational redesign. Ergonomics has a scope that includes the design of organizations as well as systems for human use, and is used beyond the domain of design; for example in the forensic analysis of the causes of accidents and in the generation of data and methods of measurement.

NOTE 1 ISO TS 18152 is a related standard with a broader scope than ISO 9241-220 that includes the organizational processes for the identification and handling of issues related to people (users and other stakeholders).

The intended application of ISO 924-220 is computer-based interactive systems.

NOTE 2 Relevant processes can also be applied to simpler or non-computer-based systems.

This part of ISO 9241 does not include specific methods for human-centred design.

2 Conformance

A claim of conformance to ISO 9241-220 is a claim to have successfully applied a set of the processes in ISO 9241-220 in a project or organization.

There are three ways of applying the processes in ISO 9241-220:

1. Applying all processes defined in 9241-220. In this case conformance means meeting the outcomes of all processes;

2. Applying a selected set of processes that are relevant to the project or organizational context. In this case conformance means both justifying the selection of processes and meeting the outcomes of all selected processes;

3. Adapting processes to apply the process purpose to a different context or domain (e.g. if not applying processes to interactive systems). This is known as “tailoring” (see Annex B).

A claim of conformance to ISO 9241-220, shall:

1. declare the set of processes for which conformance is claimed;

2. provide a justification of omission for each process that is omitted;

3. describe any tailoring of processes and work products (following the requirements of Annex B).

Assessment of the performance of processes shall use the process outcomes as evidence. Assessment of process application is usually carried out by a **process capability assessment**. In this case the requirements in the relevant parts of ISO/IEC 33000 may be applied.

All applicable process outcomes within the declared set shall be achieved for conformance.

3 Terms and definitions

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

3.1
accessibility
<interactive system> usability of a product, service, environment or facility by people with the widest range of capabilities

Note 1 to entry: The concept of accessibility addresses the full range of user capabilities and is not limited to users who are formally recognised as having a disability.

Note 2 to entry: The usability-orientated concept of accessibility aims to achieve levels of effectiveness, efficiency and satisfaction that are as high as possible considering the specified context of use, while paying particular attention to the full range of capabilities within the user population.

[SOURCE: ISO 9241-171]

3.2
context of use
combination(s) of users, goals and tasks, resources, and physical and social environments

[SOURCE: ISO/DIS 9241-11]

Note 1 to entry: This can apply to an existing context of use or an intended context of use.

3.3
effectiveness
accuracy, completeness and lack of negative consequences with which users achieved specified goals

[SOURCE: ISO/DIS 9241-11]

3.4
efficiency
relationship between the result achieved and the resources used

[ISO 9000:2005 3.2.15]

3.5
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 and overall system performance

[SOURCE: ISO 26800:2011]

3.6
enterprise
that part of an organization with responsibility to acquire and to supply products and/or services according to agreements.

Note 1 to entry: An organization may be involved in several enterprises and an enterprise may involve one or more organizations.

[SOURCE: ISO/TS 18152:2010, 4.4]

3.7
evaluation
systematic determination of the extent to which an entity meets its specified criteria

[SOURCE: ISO/IEC 12207:2008]

3.8
goal
intended outcome

[SOURCE: ISO 9241-11:1998, 3.8]

3.9
human factors data
information about humans and human behaviour

Note 1 to entry: This includes existing knowledge or new user related research. For example, anthropometric data, health and safety data, psychometric measurements, ergonomics standards, accessibility standards, and expert knowledge in human sciences (e.g. psychology, sociology, medicine, human computer interaction, behavioural science, anthropology, management science, education, personnel and staffing management), and codifications of this information and knowledge (e.g. international standards, legislative requirements, existing patents, good practice, style guides and project standards) as appropriate.

[ISO/TS 18152:2010 modified to move “existing knowledge or new user related research” from the definition to the Note.]

3.10
human-centred design
HCD

approach to system design and development that aims to make interactive systems more usable by focussing on the use of the system; applying human factors, ergonomics and usability knowledge and techniques

Note 1 to entry: The term “human-centred design” is used rather than “user-centred design” in order to emphasize that this standard also addresses impacts on a number of stakeholders, not just those typically considered as users. However, in practice, these terms are often used synonymously.

Note 2 to entry: Usable systems can provide a number of benefits including improved productivity, enhanced user wellbeing, avoidance of stress, increased accessibility, and reduced risk of harm.

[SOURCE: ISO 9241-210:2010, 2.7]

Note 3 to entry: In ISO 9241-220, “human-centred design” is used as a noun phrase, and “HCD” as an adjective phrase.

3.11
human-centred quality
extent to which requirements relating to usability, accessibility, user experience and minimizing risks arising from use are met

Note 1 to entry: Human-centred quality is a collective term for the intended outcomes of human-centred design.

Note 2 to entry: The term "human-centred quality" is also used as a qualifier to refer to factors that contribute to achieving human-centred quality.

3.12
inspection-based evaluation
evaluation based on the judgment of one or more evaluator(s) who examine or use a system to identify potential usability problems and/or deviations from established criteria

Note 1 to entry: The evaluators making the inspections typically are usability specialists but can also include end users and members of the design team.

Note 2 to entry: Established criteria typically include user requirements, usability guidelines in standards, design conventions contained in manufacturer guidelines and style guides, task models to be supported as well as standardized principles.

Note 3 to entry: The evaluation can be conducted with or without the help of reference documents.

Note 4 to entry: Inspection-based evaluation is a generic term for methods that include, but are not limited to, heuristic evaluation, cognitive walkthroughs, standards inspection, pluralistic walkthroughs, and consistency inspections.

Note 5 to entry: Inspection-based evaluation can be automated by machines in some cases, e.g. when consistency with required terminology is being evaluated. In this case the machine represents the evaluator.

[ISO/IEC DIS 25066]

3.13
interaction object
<interactive system> control or component (including information) assisting the user in carrying out tasks using the interactive system

3.14
interactive system
combination of hardware, software and/or services that receives input from, and communicates output to, users

Note 1 to entry: This includes, where appropriate, packaging, branding, user documentation, on-line help, support and training.

Note 2 to entry: This definition emphasises that the user interacts with the system. An interactive system provides feedback to user input and initiates further actions internally or by other systems as required.

[SOURCE: ISO 9241-210:2010, 2.8 modified to add Note 2]

3.15
life cycle
the stages and activities spanning the life of the system from the definition of its requirements to the termination of its use covering its conception, development, operation, maintenance support and disposal

Note 1 to entry: Adapted from definitions in IEC 61508, ISO 13407 and ISO/IEC 12207.

3.16
process
set of interrelated or interacting activities that transforms inputs into outputs

[SOURCE: ISO 9000:2005]

3.17
process category
set of processes addressing the same general area of activity

[SOURCE: ISO/TS 18152:2010]

3.18
process capability
capability of a process to meet its purpose as managed by an organization's management and process definition structures

Note1 to entry: This usage differs from human capability, military capability and operational capability.

Note 2 to entry: Process capability levels are described in ISO/IEC 33002 *Performing an assessment*.

3.19
process assessment
disciplined evaluation of an organization's processes against a Process Assessment Model

[SOURCE: ISO/IEC 15504-1:2004, 3.29]

3.20
process benefit
positive achievement from the execution of a process

Note 1 to entry: Benefits are often spread broadly across the business and not necessarily related to the technical or business intent of executing a process.

Note 2 to entry: A benefit might provide the motivation to execute a process, but it might not be the primary reason to do so.

[SOURCE: ISO/IEC 24774:2010]

3.21
process improvement
actions taken to change an organization's processes so that they more effectively and/or efficiently meet the organization's business goals

[SOURCE: ISO/IEC 15504-1:2004, 3.40]

3.22
process outcome
observable result of the successful achievement of the process purpose

[ISO/IEC 12207:2008]

3.23
process purpose
high level objective of performing the process and the likely outcomes of effective implementation of the process

Note 1 to entry: The implementation of the process should provide tangible benefits to the stakeholders.

[ISO/IEC 12207:2008]

3.24
project
endeavour with defined start and finish dates undertaken to create a product or service in accordance with specified resources and requirements

[SOURCE: ISO/IEC 15288:2008, 4.20]