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

Part 17:
Form filling dialogues

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

Partie 17: Dialogues de type remplissage de formulaires

ISO 9241-17:1998(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.

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 9241 was prepared by Technical Committee ISO/TC 159, *Ergonomics,* Subcommittee SC 4, *Ergonomics of human-system interaction.*

ISO 9241 consists of the following parts, under the general title *Ergonomic requirements for office work with visual display terminals (VDTs)*:

— *Part 1: General introduction*

— *Part 2: Guidance on task requirements*

— *Part 3: Visual display requirements*

— *Part 4: Keyboard requirements*

— *Part 5: Workstation layout and postural requirements*

— *Part 6: Guidance on the work environment*

— *Part 7: Display requirements with reflections*

— *Part 8: Requirements for displayed colours*

— *Part 9: Requirements for non-keyboard input devices*

— *Part 10: Dialogue principles*

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— *Part 15: Command dialogues*

— *Part 16: Direct manipulation dialogues*

— Part 17: Form filling dialogues

Annexes A and B of this part of ISO 9241 are for information only.

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Introduction

ISO 9241 is a multipart standard that deals with both the hardware and software ergonomic aspects of the use of VDTs. The description of the parts, their interrelationships, and a description of the expected users of the parts is provided in ISO 9241-1:1992, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 1: General introduction.*

This part of ISO 9241 is concerned with the ergonomic design of form filling dialogues. In form filling dialogues, users fill in, select entries for, or modify labelled fields on an area of the screen display.

This part of ISO 9241 serves the following types of users:

a) The user interface designer, who will apply this part of ISO 9241 during the development process.

b) The designer of printed forms which serve as source documents.

c) The buyer, who will reference this part of ISO 9241 during the product procurement process.

d) Evaluators responsible for ensuring products meet the recommendations in this part of ISO 9241.

e) Designers of user interface development tools to be used by interface designers.

f) End users who will gain from the potential benefits provided by this part of ISO 9241.

This part of ISO 9241 consists of a number of conditional recommendations concerning form filling dialogues. Conditional recommendations are recommendations which should be met only within the specific context for which they are relevant (e.g, particular kinds of users, tasks, environments, technology). These conditional recommendations were developed primarily by reviewing the existing relevant literature and empirical evidence, then generalizing and formulating this work into recommendations for use by the interface designer and/or evaluator. Sources for the individual recommendations are listed in Informative Annex B.

Designers using this part of ISO 9241 need to know that they are developing an interface that will meet the recommendations provided in this part. Likewise, buyers and evaluators need a means to determine how a product matches the recommendations in this part of ISO 9241. It is not intended that every recommendation should be applied, only those that are relevant. Informative Annex A provides an example of a procedure for evaluating the applicability of and adherence to the conditional

recommendations provided in this part of ISO 9241. Design objectives are provided prior to each of the major clauses to focus on the intent of the recommendations within the clause.

The application of this part of ISO 9241 is expected to improve the overall quality of the form filling dialogue, but this standard (like any other standard) will not guarantee the quality of the interface. Quality depends on specific usability criteria as set by the user, buyer or other form filling dialogue consumer which may include specifications based on this part of ISO 9241.

It should be noted that ISO 9241-10 describes dialogue principles that are relevant for the design of form filling dialogues. These principles should provide the designer and evaluator with additional information concerning the ergonomic rationale for the various recommendations in this part of ISO 9241 and, therefore, assist in making tradeoffs. However, it may be necessary to base tradeoffs on other considerations as well.

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

Part 17:
Form filling dialogues

1 Scope

This part of ISO 9241 provides conditional recommendations on dialogue design, input design and output design for computer dialogues in which form filling and dialogue boxes are used to accomplish typical office tasks. **Form filling dialogues** are dialogues in which the user fills in, selects entries for, or modifies labelled fields on a "form" or a dialogue box presented by the system. Often the system then creates, or updates the database associated with the form. Form filling entries typically are in the form of typed input (abbreviations, or full names) or selections from available option lists. This part of ISO 9241 pertains to form filling dialogues generated through both VDT character-based and bit-mapped screen displays (often referred to as "GUIs") and input through keyboards and optional pointing devices (e.g. mice). In addition, this part includes the use of non-text methods for providing forms entries (e.g. list boxes) and pertains to dialogue boxes which utilize form filling dialogue techniques. It should be noted that some of the recommendations in this part of ISO 9241 are based on Western Language conventions. For other languages, the recommendations may need to be modified to fit the readability considerations inherent in these languages. These recommendations can be utilized throughout the development process (e.g., as guidance for designers during design, as a basis for heuristic evaluation, as guidance for usability testing) and in the procurement process.

Interface design depends upon the task, the user, the environment, and the available technology. Consequently, this part of ISO 9241 cannot be applied without a knowledge of the design and use context of the interface and it is not intended to be used as a prescriptive set of rules to be applied in their entirety (see ISO 9241-11). Rather, it assumes that the designer has proper information available concerning task and user requirements and understands the use of available technology (this may require consultation with a qualified ergonomics professional as well as empirical testing with real users).

The recommendations relate to the three major design components of user interfaces, i.e., dialogue, input, and output.

Dialogue design determines the way in which a user is guided by the system to make inputs and influences the amount of control the user has over the dialogue. Form filling dialogues should be designed to support the user in his/her actual work without creating additional work caused by system peculiarities as well as enabling the user to become well-informed and to remain in control of the flow of work (also, see ISO 9241-10 which deals with dialogue principles). Dialogue design is covered in this part of ISO 9241 in terms of designing form filling structures, providing feedback mechanisms and providing appropriate navigation methods.

Input design is concerned with how input devices can be applied to facilitate the entry and modification of form fields. One or more devices such as an alphanumeric keyboard, function keys, pointing devices and voice (other devices are not excluded) can be provided depending on the task at hand and dialogue requirements, as well as on individual preferences. This part of ISO 9241 provides conditional recommendations for text entry, choice entry, and control using various input devices.

Output design is concerned with how data is to be presented consistently and distinctly on the screen display. This part of ISO 9241 provides conditional recommendations for the output design of form filling dialogues in terms of the content and placement of fields and groups of fields (also see ISO 9241-12 for general information on the presentation of information).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9241. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9241 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 9241-2:1992, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 2: Guidance on task requirements*.

ISO 9241-10:1996, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 10: Dialogue principles*.

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

ISO 9241-12:—[1], *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 12: Presentation of information*.

ISO 9241-13:1998, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 13: User guidance*.

ISO 9241-14:1997, *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 14: Menu dialogues*.

ISO 9241-16:—[1], *Ergonomic requirements for office work with visual display terminals (VDTs) — Part 16: Direct manipulation dialogues*.

3 Definitions

For the purposes of this part of ISO 9241, the following definitions apply.

3.1 entry field: Type of field in a form in which data is entered. Entry fields may be optional fields or required fields.

3.2 field: Area on a screen display in which data is entered or presented.

3.3 form: Structured display with labelled fields that the user reads, fills in, selects entries for (e.g., through choice buttons or radio buttons), or modifies.

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[1] To be published.

3.4 label: Short descriptive title for an entry or read-only field, table, control or object. In some applications, labels are classified as protected fields.

3.5 navigation: Ability to move from field to field within a form, to proceed forward and backward through a form and move from form to form.

3.6 optional field: Field that not necessarily needs to be filled in or modified by the user.

3.7 protected field: Field that contains data that cannot be modified by the user. These fields are sometimes called "read-only" fields.

3.8 required field: Field that must be completed by the user if it does not already have a value.

4 Application of this part of ISO 9241

4.1 Appropriateness of form filling dialogues

Form filling dialogues are appropriate for data entry tasks requiring input or modification of multiple data items. A major use for form filling dialogues is the input of information into a computer from a paper source document. Examples include: income tax returns, registration (school, motor vehicle), service order completion. Form filling dialogues are very commonly used in specifying application options and parameters within a dialogue box. Another use for form filling dialogues is for entering information received over the telephone (e.g. orders, reservations) into the computer. Also, form filling dialogues are often appropriate for certain complex data retrieval requests where users might find it easier to fill in parameter information than to input the parameters via a command language. It is important to emphasize that these tasks can be the source of the emergence of monotonous repetitive work. Users, buyers and producers of dialogue systems using form filling should take this into consideration. A way to minimize the negative consequences of repetitive form filling tasks is to incorporate other tasks into the dialogue system as well. (See ISO 9241-2) Form fields can be required or optional and/or can depict default values.

Form filling dialogues are especially appropriate for one or more of the following conditions, which have been grouped to reflect user and task issues. The applicability of form filling dialogues becomes greater as more conditions are met.

a) User characteristics

1) Users are experienced with paper forms but have limited experience with computers.

2) Users are familiar with the use of keyboard.

3) Users have moderate to good typing skills (for intensive use of data entry form filling dialogues).

b) Task requirements

1) It is not necessary to show a large set of alternatives.

2) Data must be input from a paper form.

3) Input data is gathered verbally from customers.

4) Unlimited flexibility of input is not required.

5) User's input is dominated by parameter values rather than commands.

6) It is important to display default or current values/selections.

4.2 Applying the recommendations

General ergonomic design objectives are provided in each of clauses 5 through 8. The individual recommendations aimed at achieving these objectives are valid within the specific context for which they are relevant (e.g., particular kinds of users, tasks, environments, technology). The format for the individual recommendations is: statement of the recommendation, example (if appropriate), and notes (if appropriate). Examples provided for the various recommendations generally depict an implementation that embodies the recommendation. Some examples also indicate preferred solutions.

Individual recommendations should be evaluated for their applicability and, if judged to be applicable, should be implemented in the relevant form filling dialogue unless there is evidence that to do so would cause deviation from the design objectives or would result in an overall degradation in usability. When determining applicability, the recommendations generally should be evaluated in the order presented in the relevant clause or subclause. In judging whether applicable recommendations have been met, evaluators should evaluate the product or observe representative users of the product in the context of accomplishing the user's tasks via the form filling dialogue system. Sample procedures which support the determination of applicability and for determining whether a recommendation has been followed are provided in Annex A.

4.3 Evaluation of products

If a product is claimed to have met the applicable recommendations in this part of ISO 9241, the procedure used in establishing requirements for developing, and/or evaluating, the form filling dialogues shall be specified. The level of specification of the procedure is a matter of negotiation between the involved parties.

Users of this part of ISO 9241 can either utilize the procedures provided in Annex A, or develop another procedure tailored to their particular development and/or evaluation environment.

5 Form filling structure

Form filling dialogues should be designed such that the user enters information or data in a manner which is natural to the user, without concern for how the computer will process the data or information. Form filling dialogues should reflect the user's needs rather than the computer process, and the syntax structure should be consistent with user expectations, task requirements and the input media. Users also should be able to easily determine the overall structure of the form presented by the computer.

5.1 General

5.1.1 Titles

Forms, dialogue boxes and other entry screens should be titled (usually at the top) to clearly indicate their purpose and to differentiate them from other forms. The title should be consistent with the command or selection item which initiated its display.

5.1.2 Visual coding

If the task requires or is enhanced by discrimination between user entries, defaults, and previously entered data, distinctively different visual coding should be used.

5.1.3 Form display density

Form filling dialogues should limit the density of the textual information displayed. For most applications, a limit of 40 % overall density, based on the percent of textual information displayed in relation to the total form space available, is recommended. (Also see ISO 9241-12:—[1], subclause 5.4.2.)

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1) To be published.

5.1.4 Instructions

If casual or intermittent users may enter data on the form, instructions should be provided on the screen display (or easily accessible through a "help" facility) for navigating through, completing, saving, and transmitting the form.

5.1.5 Overview of structure

If the form structure is complex, an overview of the form structure or a visual presentation of the structure should be provided to users.

5.2 Layout

5.2.1 Paper document source

If a paper document is used as the source for computer input, the form filling dialogues screen should be designed to be consistent with the structure of the paper source document in terms of item ordering, grouping, units for input of values (e.g. mm or m), etc.

NOTE — Compatibility with paper source documents is an important layout consideration. However, if the layout of the paper source document is not compatible with efficient task performance, redesign of the source document is worthy of consideration. If there are conflicting requirements between those filling in the paper forms (e.g. customers) and those filling in the computer forms, it may be more important to ensure that those filling in the paper forms achieve the highest efficiency at the expense of the computer input.

5.2.2 No source document

If form filling dialogues do not depend upon a source document, entry fields should be grouped by function, importance, etc. (see ISO 9241-12:—[1], subclause 5.6 "Groups") or optimized, based on input sequences from the user's point of view.

NOTE — If data is supplied by a customer, the sequence could depend on customer needs (for example, in a telephone sales transaction). In some cases, the form presented can be modified dynamically, to guide the user, depending on the initial input provided.

5.2.3 Required fields and optional fields

If the form contains both required fields and optional fields within a functional or logical grouping of fields, required fields should be positioned first unless such positioning is inappropriate to the user's task (e.g. it would not be consistent with a paper source document).

NOTE — It also can be appropriate to establish the tabbing order to go through the required fields prior to the optional fields.

5.2.4 Alphanumeric field alignment

If appropriate to the language context, alphanumeric entry fields should be aligned vertically in columns and left-justified within each column.

NOTE — This will improve visual scanning and often minimizes the keystrokes required to move between fields.

5.2.5 Numerical field alignment

If groups of entry fields are all numeric and the field lengths are different, these fields should be displayed right-justified. If numerical fields contain decimal points, they should be aligned to the decimal point.

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1) To be published.