# INTERNATIONAL STANDARD

# ISO
# 9241-17

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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*

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**Annexes**

# 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*

— *Part 11: Guidance on usability*

— *Part 12: Presentation of information*

— *Part 13: User guidance*

— *Part 14: Menu dialogues*

—  *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.

# 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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### 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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### 5.2.6 Allowable field values

Information should be provided indicating allowable field values (i.e., either display the information on the form or on demand).

### 5.2.7 Differing label lengths

If text or alphanumeric fields are aligned vertically in columns, and if label lengths could differ significantly and the task involves sequential data entry, labels should be right-justified and fields should be left-justified.

EXAMPLE —

```
      Name:   _____
Birth Date:   __/__/__
Occupation:   _____
       Sex:   _ (M/F)
```

### 5.2.8 Similar label lengths

If text or alphanumeric fields are aligned vertically in columns and if field label lengths do not differ significantly, field labels and fields may both be left-justified.

EXAMPLE —

```
Name:     _____
Age:      ___
Sex:      _ (M/F)
School:   _____
```

### 5.2.9 Multiple instances of a field

If a label is used for multiple instances of a field (e.g. table), the label should be located above the column, or to the left of the row.

### 5.2.10 Multiple pages

a)  If a multiple page form must be used, each page should be identified consistently in the same part of the form or window title area and should be in a format to ensure that the location of the page within the whole form is apparent.

    EXAMPLE — "Page 1 of 3" shown close to the title at the top of the form.

b)  If the form is columnar, the labels of the columns should be redisplayed.

## 5.3  Fields and labels

It should be noted that many of the recommendations stated below also are covered generically in ISO 9241-12.

### 5.3.1  Fixed length fields

If the text entry fields are of fixed length, lengths should be explicitly shown.

EXAMPLE 1 — For non-proportional fonts, an underscore character is presented for each character that needs to be entered by the user.

EXAMPLE 2 — For proportional fonts, a string of alpha characters is presented to depict the exact length of the field.

### 5.3.2 Required versus optional field entries

Required and optional entry fields should be presented so that the differences between them should be immediately perceptible to any user.

EXAMPLE 1 — Underscores are used for required entries and periods for optional entries.

EXAMPLE 2 — Required entry fields have a border around them, while optional entry fields do not.

EXAMPLE 3 — Different colours or shades are used to distinguish required and optional fields, with colours that are distinguishable on a monochrome display.

NOTE —   It is important that optional and required entry coding be distinguishable from "read-only" fields.

### 5.3.3 Modifiable versus non-modifiable fields

Users should be able to easily distinguish between fields that can be modified and those that cannot ("read-only" fields) by appropriate coding (see ISO 9241-12:—[1], subclause 5.10.1).

### 5.3.4 Descriptive field labels

All fields should be clearly and unambiguously labelled to describe what kind of content should be entered.

### 5.3.5 Distinctive labels

Distinctive words and/or codes (e.g., position, border, font, colour) should be used for entry-field labels, and the approach used should be applied consistently throughout the form, so that entry fields will not be confused with data, instructions, etc. (see ISO 9241-12:—[1], subclause 5.9.2).

### 5.3.6 Symbols or units

Symbols or units ($, $f$, %, mph, cm, l, etc.) should be displayed as an additional label when it is required by the user for interpretation of the data in an entry field. (Also see ISO 9241-12:—[1], subclause 5.9.9.)

NOTE —   The symbol or unit can be added to the column label in the case of a column of fields.

### 5.3.7 Cues

Cues for data entry format (e.g. for a time duration "hh:mm:ss") should be displayed within the entry field or in field labels. If abbreviated values are used, it should be clear to the user what the abbreviations mean (e.g. Y/N, for Yes or No).

### 5.3.8 Initial upper-case (capital) letter for field labels

To facilitate readability, text field labels should begin with an upper-case letter. The rest of the label should contain lower-case (small) letters, except for cases where the label is a logo, an acronym, or language convention requires each word in the label to begin with a capital letter.

## 6 Input considerations

User input considerations include: user control of the dialogue at all times, the capability for users to recover easily from errors, and the avoidance of requiring users to input more information than is necessary for successful task performance or to input information that is already currently available in the system.

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## 6.1 General

### 6.1.1 Cursor movement

The user actions required to move the cursor from one entry field to the next should be minimized.

EXAMPLE — A tab key is used to jump from field to field.

### 6.1.2 Incomplete text entry field

If the (required) number of characters entered into the field does not fill the whole field, the user should be allowed to move directly to the next field (i.e., do not require the user to enter blank spaces to complete the field).

### 6.1.3 Default values

a)   Fields should contain default values wherever possible and appropriate to the task. (Also see clause 5.1.2.)

b)   Text default field values should be editable by the user using conventional editing commands.

### 6.1.4 Switching between input devices

If appropriate to the task, the need for users to switch between different input devices when filling in a form should be minimized.

EXAMPLE 1 —   Fields that require text entry within a logical group on a form are grouped separately from those that can be completed with a pointing device.

EXAMPLE 2 —   Multiple data entry methods are available for use in the same field where appropriate.

EXAMPLE 3 —   Navigation to all form fields with all input devices is provided for a given form.

### 6.1.5 Pointing devices

If a pointing device can be used for input in a form, it should be usable for navigation as well.

## 6.2 Alphanumeric text entry

### 6.2.1 Justification of entries

If the entries need to be justified within the field, the system (not the user) should do the justification.

### 6.2.2 Leading zeros

If leading zeros are needed for numeric entries, the system (not the user) should provide the leading zeros.

### 6.2.3 Multiple lines

If the field contains multiple lines of text, i.e., sentence or a paragraph:

a)   **Input area size —** The size of the multi-line input area should be clearly indicated.

   EXAMPLE — Borders are placed around the text area as shown below:

Data entry in this area is bounded by the
border of the field.
The text entry area cannot exceed this area.

b) **Auto wrap —** An auto-wrap capability should be provided and individual words should not be broken.

c) **Editing and navigation** — Normal text navigation and editing conventions should be used.

### 6.2.4 Mutually exclusive fields

If fields are mutually exclusive, a visual cue should be provided to indicate that only one of the fields may be used.

EXAMPLE — Radio buttons in a dialogue box or the use of the word "or".

### 6.2.5 Interdependency rules

The use of complex "if/then" interdependency rules among entry fields should be avoided (e.g. if "Y" is entered in field 1, then fields 2 and 4 must be left blank; if "N" is entered in field 1, then field 2 should contain ---, etc.) or they should automatically be handled by the system by constraining user choices and visible fields.

NOTE — If interdependencies between fields are necessary, consider providing automatic movement through the required completion sequence by the system and consider visually coding fields available for input due to interdependencies.

### 6.2.6 Text entry field area

Each text field should be large enough to accommodate the majority of anticipated entries without scrolling.

## 6.3 Choice entries

Choice entries are typically grouped into the following categories:

— **Exclusive choice** (a group of choices in which only one choice can be selected at a time).

— **Binary choice** (a choice between two state settings, e.g., on/off, activated/deactivated).

— **Non-exclusive choice** (a group of choices in which more than one choice can be selected, i.e. the choices are independent of each other).

### 6.3.1 Limited entry options

If the number of acceptable entry options is limited and predetermined, a mechanism should be provided to enable the user to view and select available options.

EXAMPLE 1 — Providing pop-up menus or list boxes.

EXAMPLE 2 — The use of soft machine controls, which are graphical representations having an explicit or historical analogy to hardware controls or other entities (e.g. buttons, sliders, radio buttons, check boxes).

### 6.3.2 Discriminable visual cues

Discriminable visual cues should be used to discriminate among different logical types of choice entries in an application.

EXAMPLE 1 — Circles are used to indicate exclusive choices (e.g. radio buttons) and square boxes (e.g. checkboxes) are used to indicate non-exclusive choices.

EXAMPLE 2 — Diamonds are used to indicate exclusive choices and square boxes are used to indicate non-exclusive choices.

EXAMPLE 3 — Touching rectangles are used to indicate exclusive choice and separate rectangles are used to indicate non-exclusive choices.

### 6.3.3 Menus

If the user must select an entry option from a known set of options, a menu should be considered as the entry technique. When a menu is used:

a) **Visual cues —** A visual cue that a menu is associated with the field should be provided (e.g., an arrow in the field label or in the button surrounding the data value) unless the list of menu options is continuously visible.

EXAMPLE —

**Colour:** | red ⇨ |

| red |
|---|
| yellow |
| blue |
| green |
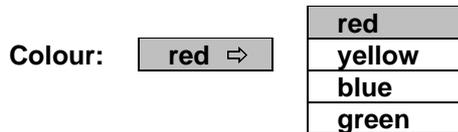
NOTE —   Visual cues can be omitted if all of the fields have this characteristic (see ISO 9241-14).

b) **Field value —** The form field should present the most recent selection from the menu as the current value for the field.

### 6.3.4 Lists

If the user must select one or more entries from a large and/or variable set of values, or if users can customize a list, the use of non-scrolling or scrolling lists should be considered. When lists are used:

a) **Visual cues —** A visual cue should be provided that allows users to discriminate selected from non-selected values.

EXAMPLE — Check marks or highlighting of selected values.

b) **Long lists —** If a list is extremely long, it should be presented in the appropriate logical order (e.g. alphabetical, numeric, date order) and a mechanism should be provided so that users can rapidly navigate through the list.

EXAMPLE 1 — Users are allowed to skip to parts of a list by typing in the initial letter(s) of list items.

EXAMPLE 2 — Users can use a direct manipulation device to quickly access items on a list.(See ISO 9241-16.)

### 6.3.5 Screen buttons

If the user must select a small number of values (2 to 5) and the values become effective immediately after selection, the use of screen buttons (see ISO 9241-14:1997, Definition 3.26) should be considered. (Also see ISO 9241-16.)

### 6.3.6 Choice buttons

If the user must select among an exclusive set of choices, choice buttons that change appearance depending on their state should be considered (e.g. "radio buttons").

a) **Sets of choices —** Exclusive choice buttons should be presented in sets of 2 or more choices.

b) **Default choice —** If there is a default for the field, the default choice in the set should be visibly selected when the field is first presented or an alternative has not been selected.

### 6.3.7 Binary state settings

If the user must choose among multiple binary state settings, and sufficient display space is available, the use of binary state buttons (check boxes, state boxes) that change appearance when selected (e.g. appear filled, or contain an 'X' or check mark or other graphic) should be considered.

a) **Group presentation —** Binary state buttons related to a task should be presented in a group rather than as individual items.

b) **Indication of state —** When the form is presented, binary state buttons should provide a visual indication of their current state.

### 6.3.8 Stepper buttons

If the user must select one or more entries and display space is limited and/or the options need not be changed frequently, the use of stepper buttons (e.g. cycle buttons, spin buttons) that cycle through a list of choices may be considered.

EXAMPLE — A box displaying a choice and arrow buttons used to step through the choices.

If stepper buttons are used:

a) **Displayed initial choice —** The initially displayed choice should be the most appropriate default choice.

b) **Typing values —** Users should be allowed to type in values in order to quickly set a value.

## 6.4 Control

### 6.4.1 Corrections before processing

The user should be allowed to go back to the initial state of the form at any time and start over again, cancel entries, or change any entry before the form is processed by the computer.

### 6.4.2 Identifying and locating errors

a) If validation checking of multiple fields detects fields in error and if appropriate to the task, these fields should be indicated and the cursor should be placed on the first field in error and the user should be allowed to easily move through the fields in error in order to correct the entries. (Also see ISO 9241-13:—[1], subclause 9.4.5.)

EXAMPLE — All fields in error are highlighted by the reverse video display of these fields.

b) If there are dependencies between fields, and if it is appropriate to the task, potential errors resulting from such dependencies should be indicated.

### 6.4.3 Re-entering data

If the field contains an error, the user should be required only to correct the erroneous part of the input. (Also see ISO 9241-13:—[1], subclause 9.4.4.)

### 6.4.4 Unavailable areas

Areas of the screen display not available for user input (e.g. read-only fields) should not be accessible by the user (i.e., the user should not be able to place the cursor in those areas) and these areas should have visual cues indicating that they cannot be accessed.

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1) To be published.

### 6.4.5 Easy transmission

If transmission of the form is required, the transmission of the field entries to the computer to be processed should be accomplished by means of a simple explicit action.

NOTE — It is important that the transmission action takes place no matter where the cursor is currently located on the form (i.e. the user is not required to navigate to a particular field in order to use the transmission control key[s]).

### 6.4.6 User control

Unless it is obvious to the user, the form should state how to carry out the following actions, if provided:

— signal completion of the form and redisplay an empty form (with default values, if appropriate) for the entry of new data;

— signal completion of the form and redisplay the previously completed version of the form or a default version (template) of the form;

— escape from the form without changing any data in the system, e.g., by means of the "Escape" or "Cancel" function;

— use "undo".

### 6.4.7 Temporary save

If appropriate to the task and if system constraints allow it, a temporary save function should be provided so that users can leave the form temporarily (because the required item of data is not available, for example) and return to it later without having to re-enter all the data on the form.

NOTE — If a temporary save function is provided, when the form is re-selected and there is already a put-aside form of that type (from a previous save), it is beneficial to provide users with the option of continuing with the saved form or starting a new form.

## 6.5 Field validation

### 6.5.1 Single field validation

If system capabilities are available, the data entry system should check the entry in each field before accepting it, based on criteria defined for that field individually. If values in a field are defined from a predefined range or list, the editing criteria should simply verify that the entry matches some item in the predefined range or list.

### 6.5.2 Multiple field validation

If there are dependencies between fields on a form, or between the field on other incidents of the same form, the following additional validation checks may be considered:

a) Data already entered in other fields of the same form.

   EXAMPLE — The user is not allowed to enter data in the field "Age of child?" if the entry in the field "Children?" is "None" (see also 6.2.5).

b) Data already entered in the same field in other forms.

   EXAMPLE — A field is a "key field" and is required to be unique. The system checks to make sure this value has not been used before on another instance of the form.

## 7  Feedback

Users need to be provided with information allowing them to control the dialogue, recognize errors, and determine their next course of action.

### 7.1  Echoing

Typed-in characters should be echoed back to the user, character by character, as entered.

NOTE —  In some cases, echoing may be undesirable (e.g., during the entry of a password, non-identifiable characters such as "★★★★★" would be echoed back to the user instead of the actual characters typed).

### 7.2  Cursor and pointer position

Cursor position should always be clearly visible if it is within the currently displayed portion of the form.

If a pointing device is available, the position of the pointer should always be clearly visible to the user (see ISO 9241-16:—[1], subclause 6.2.13).

### 7.3  Field errors

If a field contains an error and, if it is appropriate to the task and within the system's capabilities, error feedback should be provided as soon as the user completes the field (e.g., by highlighting the error, or by providing information on the nature of the error and correct entries). (Also see ISO 9241-13:—[1], subclause 9.4.4.)

NOTE —  If the terminal provides audio output, a beep could be provided to call attention to the error.

### 7.4  Transmission acknowledgement

The system should provide an acknowledgement to the user that the transmission of the form entries has been accepted by the system.

### 7.5  Database changes

If the form filling dialogue changes a database, feedback that the database has been updated should be provided to the user.

## 8  Navigation

Users will need navigation methods to access the areas of the form that are required by their tasks. Choice of the method needs to take into account the particular user population and compatibility with the user's flow of work.

### 8.1  Initial cursor position

When the form is first displayed, the cursor should be positioned automatically at the first entry field that must or may be completed by the user.

### 8.2  Movement between fields

a)  The user should be provided with the capability to move backward and forward between fields within a group and, if appropriate, to move to nonadjacent fields in other groups.

EXAMPLE — A tab key, cursor keys, or pointing device can be used to move between fields.

_____

1)  To be published.

b) If rapid access to a specific field in a form is required, a quick access mechanism should be provided.

   EXAMPLE — A field is accessed by its label or number.

## 8.3   Return to initial field

If appropriate to the task, a key or command should be provided so that the user can return to the initial field on the form.

## 8.4   Tabbing

### 8.4.1   Partially filled-in fields

If the fields on the form are partially filled in, or are a mixture of partially and completely filled in fields, manual tabbing should be provided to move from field to field.

### 8.4.2   Completely filled-in fields

If all of the fields on the form are to be completely filled in and the forms are easily learned, auto-skip tabbing from field to field should be provided (i.e., the cursor automatically skips to the next field when the last character position in the field is filled).

NOTE —   Auto-skipping is appropriate only when it is consistent with user expectations, when it does not repeatedly create errors or delays, and when reverse tabbing is provided to correct errors.

### 8.4.3   Mixing approaches

Manual tabbing and auto-skipping should not be mixed in a given form filling dialogue unless there is evidence that mixing the two approaches would not degrade performance.

### 8.4.4   Mutually exclusive fields

If mutually exclusive fields are present on the form, skipping remaining fields should be allowed when an entry has been made for one of the choices in the field (also see 6.2.5).

### 8.4.5   Form sections

If the form is organized into meaningful information groups (sections), users should be provided with the capability to move from group to group, i.e., users should not have to tab through all of the fields in a group to move to the next group.

### 8.4.6   Record cycling

If the data is organized in sequential records and a form represents a view of data from one record, a mechanism should be provided to cycle from record to record, forward and backward.

### 8.4.7   Pointing device and multiple forms

If a pointing device is used for input and the task involves multiple forms, a mechanism to navigate between forms using the pointing device should be provided.

## 8.5  Scrolling

### 8.5.1  Field scrolling

If the maximum length of the data to be presented in a displayed field is longer than the field, a scrolling mechanism should be provided.

NOTE —  Consider providing an auto wrap capability for text entry only.

## 8.6  Form selection

If an application contains various forms, it is beneficial to provide the user with mechanisms to access a particular form and move between the forms.

### 8.6.1  Direct form access

If appropriate to the task, and if forms can be accessed independently, the user should be able to select those forms directly, e.g. by naming the form, by selection from a menu, by selecting a form "container object" through direct manipulation.

### 8.6.2  Movement between forms

If forms can be accessed independently and it is appropriate to the task, the user should be able to move from form to form, forward and backward, in a predefined sequence without losing input.

### 8.6.3  Hierarchical level movement

If the set of forms is hierarchical, the user should be provided with the capability to move to both the next higher and lower level in the structure.

### 8.6.4  Returning to the initial form

If the set of forms is hierarchical, the user should be provided with a simple means to return to the initial form (i.e., the form at the top of the hierarchy) from any form in the application.

### 8.6.5  Forms in a window environment

If more than one form can be displayed in a window environment, only the last selected form should be active and ready for input.

NOTE —  It is expected, however, that users are provided with the capability to switch to another form to make it active.

### 8.6.6  Default form

If one form is more likely to be used than others, either overall or for a particular task, user, environment, and technology configurations, that form should be the initial form (i.e., the system should display that form on the screen automatically when the system or forms application is initially activated).

# Annex A
(informative)

# Sample procedure for assessing applicability and adherence

## A.1  General

This Annex provides an example of a procedure for determining whether the applicable recommendations in this part of ISO 9241 have been met. It should be noted that the procedure described below is provided as guidance and is not a rigid process to be used as a substitute for the standard itself. This approach provides a two-stage process for

1)  determining which recommendations are relevant, and

2)  determining whether those relevant recommendations have been adhered to.

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 its entirety. Rather, it assumes that the designer has proper information available concerning task and user requirements and understands the use of available technology (this could require consultation with a qualified ergonomics professional as well as empirical testing with real users).

The evaluation procedure should be based on an analysis of typical users, their typical and critical tasks, and their typical usage environments. Form filling dialogue evaluations generally fall into the two following categories:

a)  When users and user tasks are known, evaluators evaluate the product or observe representative users of the product in the context of accomplishing typical and critical user tasks in a typical usage environment.

b)  When specific users and user tasks are not known, evaluators evaluate all forms used in the product being evaluated.

Determination of whether a product meets a given recommendation should be based on the set of forms encountered during the evaluation described above. Form filling dialogues that can be shown to be better than ones that meet the recommendations described in this part of ISO 9241 would also be accepted as meeting the recommendations of the standard.

Users of this part of ISO 9241 could demonstrate how they met the recommendations by listing the forms evaluated (e.g. all forms or a task-derived subset of forms); the method used to judge applicability (as described in A.3); the method used to judge adherence (as described in A.4); and the results.

## A.2  Applicability

The applicability of a recommendation is based on the following two factors:

a)  Whether the conditional, if included as part of the statement, is true. A particular recommendation is (or is not) applicable when the conditional if-statement is (or is not) true. For example, if casual users are not expected to enter data on the form, recommendation 5.1.4 would not be applicable.

b)  The design environment. A particular recommendation may not be applicable because of user, task, environment and technology constraints, such as unknown user community, variations in tasks, noisy office, screen resolution, lack of a pointing device, etc. However, if the design environment did involve user characteristics, tasks, or technology features addressed by a particular recommendation, that recommendation

would be applicable. For example, if form filling input were allowed by means of choice entries, conditional recommendations in 6.3 should be evaluated to determine their applicability.

The methods which are appropriate to determine the applicability of a particular recommendation are:

**a) system documentation analysis,**

**b) documented evidence,**

**c) observation,**

**d) analytical evaluation,**

**e) empirical evaluation.**

The following clause (A.3) describes each of the applicability methods in more detail.

## A.3 Description of applicability methods

### A.3.1 System documentation analysis

System documentation analysis refers to the analysis of any documents which may describe the general and specific properties of the form filling dialogue. Such documents may include design documents containing system and user requirements, manuals, user guides, etc. For example, according to system requirements for a particular application, only the alphanumeric keyboard will be used for the entry of forms.

### A.3.2 Documented evidence

Documented evidence refers to the analysis of any relevant documented information about the task requirements or characteristics, flow of work, user skills, user aptitudes, existing user conventions or biases, test data from the design of similar systems, etc. Such information may be used to determine whether a given recommendation is applicable. For example, task analysis data may have indicated that it would be inappropriate to the user's task to place required fields first on the form (recommendation 5.2.3).

### A.3.3 Observation

Observation means simply to examine or inspect the form filling dialogue for the presence of a particular observable property, e.g., a source document is used for input. Observations can be made by anyone who has the necessary skill to systematically check the form filling dialogue and determine if it has the particular properties associated with the applicability of given conditional recommendations. Due to their obvious nature, such observations can readily be confirmed by another person.

### A.3.4 Analytical evaluation

Analytical evaluation pertains to "informed" judgments concerning the properties of a form filling dialogue by a relevant expert (i.e., of those properties). This method is typically used for the evaluation of properties which can be judged only in the context of other information or knowledge. In addition, analytical evaluation may be appropriate when the system exists only in terms of design documents, user populations are not available for empirical evaluation, or time and resources are constrained. Analytical evaluation can be used to determine whether a particular recommendation is applicable, e.g., to determine if a temporary save function (recommendation 6.4.7) would be appropriate to the user's task.

Analytical evaluation can be performed by any suitably qualified person who has the necessary skill and experience to judge the relevant property of the form filling dialogue. Where these properties concern the application of ergonomic principles, the expert needs to possess appropriate skills in software ergonomics. If the properties concern the work environment, system characteristic, or other aspects of the design, the judge needs to be an expert in the particular relevant domain.

### A.3.5  Empirical evaluation

Empirical evaluation refers to the application of test procedures using representative end users to determine the applicability of a recommendation. This method is most appropriate when a prototype or the actual system is available, and potential or actual user population representatives are available. Many kinds of test procedures could be used, but in each case the test subjects need to be representative of the end user population and be of sufficient number that the results can be generalized to the user population as a whole. For example, empirical evaluation to determine whether error feedback should be provided as soon as the user completes a field (recommendation 7.3) could be done by having typical users enter and correct field values under both the condition of providing the feedback immediately after the field is completed and providing the feedback prior to transmitting the completed form.

It should be noted that empirical evaluation needs to be conducted by individuals possessing appropriate skills in testing methodology and evaluation techniques.

## A.4  Adherence

If a recommendation is applicable on the basis of the criteria described in A.2, it is then necessary to determine whether or not the recommendation has been met. Adherence is determined by using one or more of the methods listed below.

NOTE — The methods which are appropriate to determine adherence for a particular recommendation are listed in conjunction with that recommendation in the Checklist in table A.1.

a) **Measurements.**

b) **Observation.**

c) **Documented evidence.**

d) **Analytical evaluation.**

e) **Empirical evaluation.**

It is important to note that the results of applicability tests are often important in determining adherence. The various adherence methods are further described in A.5.

## A.5  Description of adherence methods

### A.5.1  Measurements

Measurements refers to measuring or calculating a variable concerning properties of the form filling dialogue. An example of such properties is screen density. Adherence is determined by comparing the obtained value from the measurement with the value stated in the recommendation.

### A.5.2  Observation

Observation means simply to examine or inspect the form filling dialogue to confirm that a particular observable condition has been met, e.g., instructions are provided on the form, fields are aligned vertically and left-justified, etc. Observations could be made by anyone who has the necessary skill to systematically check the form filling dialogue and determine if a statement concerning an observable property has been consistently applied. The observed property is compared with the recommendation to determine adherence.

### A.5.3  Documented evidence

For adherence, documented evidence refers to any relevant documented information related to the form filling dialogue's adherence to the appropriate conditional recommendations. Such evidence may include existing user

conventions or biases, prototype test data, test data from the design of similar systems, etc. For example, test data from a similar system may have indicated that mm/dd/yy is the appropriate cue for date entries. In this case, adherence is essentially determined on the basis of documented evidence of adherence for that recommendation for the similar system.

## A.5.4   Analytical evaluation

As stated in A.3.4, analytical evaluation pertains to "informed" judgments concerning the properties of a form filling dialogue by a relevant expert (i.e., of those properties). This method is typically used for the evaluation of properties which can be judged only in the context of other information or knowledge. In addition, analytical evaluation can be an appropriate adherence method when the system exists only in terms of design documents, user populations are not available for empirical evaluation, or time and resources are constrained. For example, analytical evaluation might be used to determine adherence for distinctive labels (5.3.5). In the above case, "distinctive" is the judgmental aspect.

In A.3.4, it was noted that analytical evaluation can be performed by any suitably qualified person who has the necessary skill and experience to judge the relevant property of the form filling dialogue. For adherence, the expert also needs to have the skills and knowledge necessary to reliably judge the appropriateness and usability of a particular design solution. It also should be noted that analytical evaluation can verify the tenability of a design, but cannot validate the design. Validation can be accomplished only by using empirical evaluation.

## A.5.5   Empirical evaluation

Empirical evaluation refers to the application of test procedures using representative end users to determine whether a recommendation has been met. As stated in A.3.5, this method is most appropriate when a prototype or the actual system is available and potential or actual user population representatives are available. Many kinds of test procedures could be used, but in each case the test subjects need to be representative of the end user population and be of sufficient number that the results can be generalized to the user population as a whole. The task performance of end users using the form filling dialogue could be analysed to determine adherence with the various conditional recommendations. For example, by analysing learning time and keying time and errors, it would be possible to determine if the input sequence of the form filling dialogue is optimized (see 5.2.2). Such tests could be performed both during the development process (e.g., by prototyping) and after the design and implementation of the system (e.g., by system evaluation techniques) and could be based on both objective and subjective user data. Special tests also could be designed to measure whether a particular recommendation has been met. For example, a learning study could be designed to determine if forms are clearly titled to indicate purpose (see 5.1.1).

Typically, empirical evaluations are used to determine adherence by comparing the test results against specific form filling dialogue recommendations. However, it is often necessary to also evaluate test results in terms of effectiveness (e.g., the form filling dialogue supports the user in his/her task in a manner which leads to improved performance, results in a difficult task being performed with less difficulty, or enables the user to accomplish a task that he/she would not have been able to otherwise).
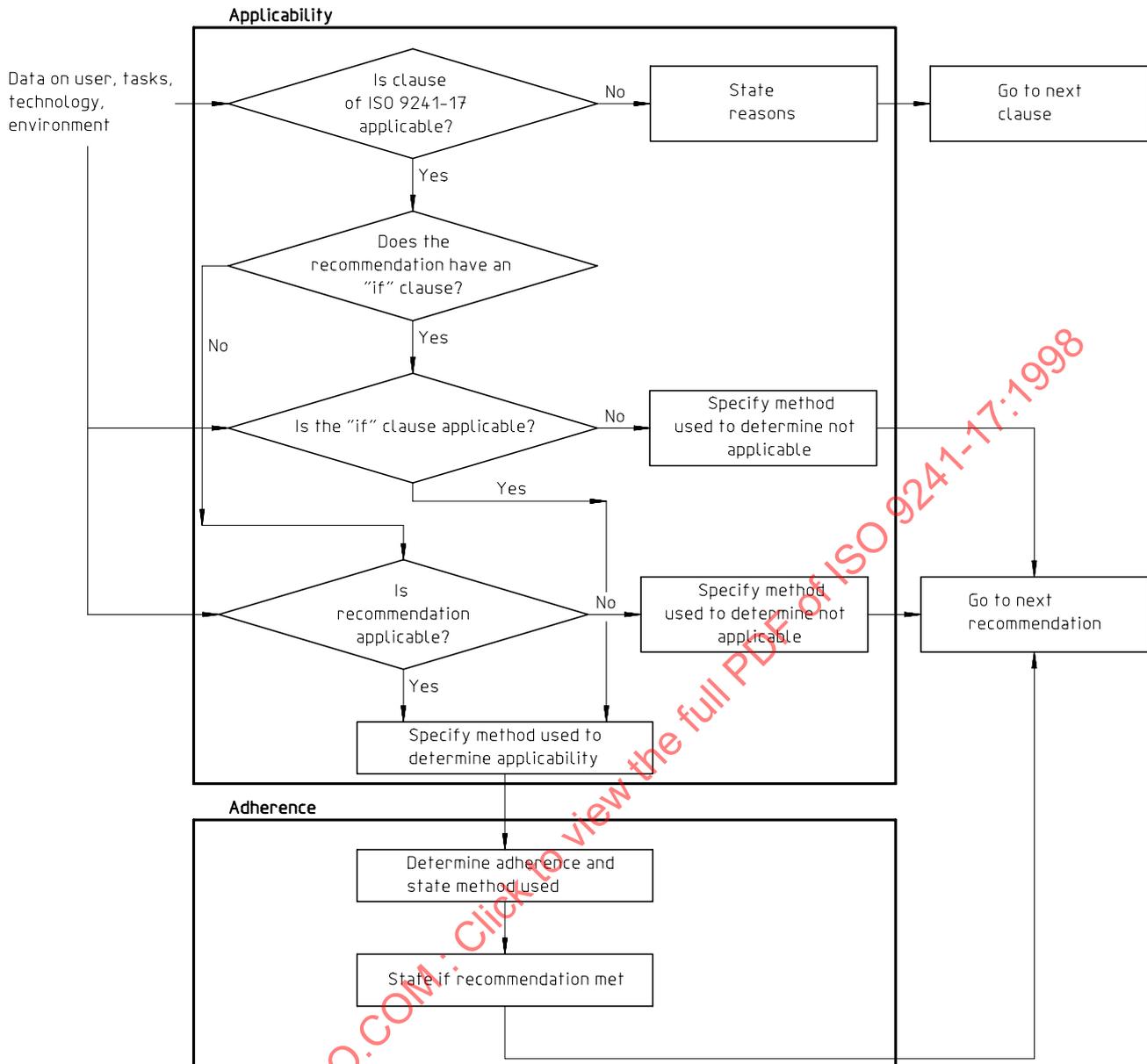
**Figure A.1 — Decision Process — Evaluation Situation**

## A.6 Procedure

The following procedure (also see Figure A.1) can be followed in evaluating a particular form filling dialogue application with respect to the recommendations in this part of ISO 9241:

### A.6.1 "If clause" conditional recommendations

a) **Applicability:** Each recommendation has an if-condition either in the statement itself (e.g. 5.2.5), or implied in the text or in the title to a clause or subclause (e.g. subclause 6.3). For each conditional recommendation, the applicability of the if-statement should be determined using the methods proposed to test if the if-condition is true or not (e.g. in 6.1.3, documented evidence, analytical evaluation, or empirical evaluation is appropriate to determine whether default values should be shown).

b) **Adherence:** For each applicable conditional recommendation as defined in a), the adherence of the recommendation should be determined using the proposed methods (e.g., if 6.1.3 is applicable, then observation should be used to determine that default values have been provided).

## A.6.2  Other conditional recommendations

a) **Applicability:** Non- "if statement" conditional recommendations are generally appropriate to any form filling dialogue. However, a number of the subclauses (e.g. 6.3, Choice entries) are applicable only if the form filling dialogue utilizes such features. If the form filling dialogue did use choice entry input, the conditional recommendations in that subclause would be applicable (and applicability of the "if statements" would be determined as in A.6.1).

b) **Adherence:** For each non- "if statement" conditional recommendation as determined in a), information about adherence to the recommendation as described in A.6.1 b) above is necessary. For example, analytical evaluation or empirical evaluation would both be appropriate methods to determine adherence with respect to whether the user can easily move through fields in error (6.4.2). If there are valid reasons for not following the proposed recommendation, both the reasons and the design solution chosen also would be of interest to users of this part of ISO 9241.

As an aid for applying the evaluation procedures described above, an evaluation checklist for applicability and adherence is provided in Table A.1.

## A.7  Checklist

NOTE —  Users of this part of ISO 9241 may freely reproduce the checklist in this annex so that it can be used for its intended purpose and may further publish the completed checklist.

The checklist in Table A.1 is intended as an aid for both designers and evaluators of form filling dialogues in evaluating both the applicability of, and adherence to, the conditional recommendations in this part of ISO 9241. This checklist contains a "short version" of all of the recommendations of this part of ISO 9241 and provides a logical structure to assist users in determining applicability. Many of the conditional recommendations allow a number of alternative solutions. The checklist depicts such interdependencies by means of "and" "or" connectors. These connectors are shown only for conditional recommendations within a particular clause (it is assumed that the clauses have inherent "ands" to the degree that the clause is applicable). In some cases, "and/or" is specified because the choices are not mutually exclusive.

### A.7.1  Description of the checklist

#### A.7.1.1  Recommendations column

The first column of the checklist contains the "short version" conditional recommendations, connected by the logic connectors, and separated by subclause. Since each conditional recommendation is numbered with its subclause number, users can look up the full text easily in the relevant clauses of this part of ISO 9241.

#### A.7.1.2  Applicability columns

The first two columns of the Applicability portion of the checklist are provided for recording the result of the applicability determination by a checkmark in the "Y" or "N" column. In addition, this part of the checklist indicates which of the applicability methods are relevant for each of the conditional recommendations and provides space to "check off" the method used by the designer or evaluator. Those methods that are not relevant for a particular recommendation are shaded to make the checklist easier to use. The codes used for the applicability methods are:

    S = System documentation analysis

    D = Documented evidence

    O = Observation

    A = Analytical evaluation

E = Empirical evaluation

DM = Different Method (method other than above used)

If a different method is used (i.e., "DM" is checked), that method can be described in the Comments column. It also should be noted that checking off the applicability methods used is considered an optional feature of the checklist.

### A.7.1.3  Adherence columns

This part of the checklist indicates which methods are appropriate for determining adherence to each of the conditional recommendations and provides space for designers or evaluators to "check off" the method used. Those methods that are not relevant for a particular recommendation are shaded to make the checklist easier to use. If the result of the adherence test is positive, the "P" column is checked (for "passed") and if the result is negative, the "F" column is checked (for "failed"). The codes used for the adherence methods are:

M = Measurement

O = Observation

D = Documented evidence

A = Analytical evaluation

E = Empirical evaluation

DM = Different Method (method other than above used)

As for applicability, if a different method is used ("DM" checked), that method can be described in the Comments column. Also, as noted for applicability, checking off the methods used to evaluate adherence is considered an optional feature of the checklist.

### A.7.1.4  Comments

The comment column provides space for additional statements and comments pertaining to each of the conditional recommendations and can be used to indicate the source of the assessment (e.g., name of expert, title of documented evidence) as well as for describing "Different Methods" when used. Since different solutions (methods) can be appropriate in specific situations, it is best to describe such unique solutions in the comments column. This description can include how these solutions relate to the form filling dialogue design recommendations and appropriate dialogue principles.

### A.7.1.5  Summary data

Users of the Applicability and Adherence Checklist could summarize the results of the evaluation by computing an adherence rating (AR). The AR is the percentage of the applicable recommendations successfully adhered to (i.e., the number of checkmarks in the "P" column divided by the number of checkmarks in the "Y" column). It is highly recommended that all of the data (i.e., number of Ps and the number of Ys) be reported in conjunction with the ARs. Depending on the complexity of the form filling dialogue application, it may be useful to complete a checklist for each form and dialogue box used in the system and then average the ARs across the forms/dialogue boxes to determine the average AR for the form filling application. However, it should be noted that the AR is no more than an arithmetic count which cannot be used as a reliable measurement of the degree of adherence with applicable recommendations without taking into account the respective weights of the items (both by themselves and in the context of use).

**Table A.1 — Applicability and adherence checklist**

| Recommendations | Applicability – Results | | Applicability – Method Used | | | | | | Adherence – Method Used | | | | | | Adherence – Results | | Comments (including sources) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Y | N | S | D | O | A | E | DM | M | O | D | A | E | DM | P | F | |
| **5**  **Form filling structure** | | | | | | | | | | | | | | | | | |
| **5.1**  **General** | | | | | | | | | | | | | | | | | |
| **5.1.1 Titles** Forms, dialogue boxes, entry screens titled to clearly indicate purpose. | | | | | | | | | | | | | | | | | |
| **5.1.2 Visual coding** Distinctive visual coding used to depict user entries, defaults, and previously entered data. | | | | | | | | | | | | | | | | | |
| **5.1.3 Form display density** Overall density not more than 40 % (based on percent of total available form space filled). | | | | | | | | | | | | | | | | | |
| **5.1.4 Instructions** Instructions provided on the display (or easily assessable through a "help" facility) for completing, saving, and transmitting the form. | | | | | | | | | | | | | | | | | |
| **5.1.5 Overview of structure** If form complex, overview or visual presentation of structure provided. | | | | | | | | | | | | | | | | | |
| **5.2**  **Layout** | | | | | | | | | | | | | | | | | |
| **5.2.1 Paper document source** If used, form filling dialogue screen designed to be consistent with the layout of the paper source document. | | | | | | | | | | | | | | | | | |
| **5.2.2 No source document** Entry fields grouped by function, importance, etc., or optimize the input sequence from the user's point of view. | | | | | | | | | | | | | | | | | |
| **5.2.3 Required fields and optional fields** Required fields positioned first unless such positioning is inappropriate to the user's task. | | | | | | | | | | | | | | | | | |
| **5.2.4 Alphanumeric field alignment** If appropriate to language content, entry fields should be aligned vertically in columns and left-justified. | | | | | | | | | | | | | | | | | |
| **5.2.5 Numerical field alignment** If field lengths are different, display right-justified. If decimal, align to decimal point. | | | | | | | | | | | | | | | | | |

**Table A.1** *(continued)*

| Recommendations | Applicability | | | | | | | | Adherence | | | | | | | | Comments |
| | Results | | Method Used | | | | | | Method Used | | | | | | Results | | (including sources) |
| | Y | N | S | D | O | A | E | DM | M | O | D | A | E | DM | P | F | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **5.2.6 Allowable field values**<br>Information provided concerning allowable field values. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.2.7 Differing label lengths**<br>If text or alphanumeric fields are aligned vertically in columns and if label lengths could differ significantly and task involves sequential data entry, labels right-justified and field left-justified. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.2.8 Similar label lengths**<br>If text or alphanumeric fields are aligned vertically in columns and if field label lengths do not differ significantly, both field labels and fields may be left-justified. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.2.9 Multiple instances of a field**<br>If a label is used for multiple instances of a field, the label located above the column, or to the left of the row. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.2.10 Multiple pages**<br>a) Each page identified consistently in the same part of the form.<br>b) If form is columnar, labels in columns redisplayed. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.3 Fields and labels** | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | ▓ | |
| **5.3.1 Fixed length fields**<br>If the entry fields are of fixed length, lengths explicitly shown. | | | | ▓ | | ▓ | | | | | ▓ | ▓ | | | | | |
| **5.3.2 Required versus optional field entries**<br>Users able to easily distinguish between optional and required fields. | | | | ▓ | | ▓ | | | ▓ | | ▓ | ▓ | | | | | |
| **5.3.3 Modifiable versus non-modifiable fields**<br>Users able to distinguish between modifiable and non-modifiable fields. | | | | ▓ | | ▓ | | | | | ▓ | ▓ | | | | | |
| **5.3.4 Descriptive field labels**<br>Field labels clearly and unambiguously describe data to be entered. | | | | ▓ | | ▓ | | | | | ▓ | ▓ | | | | | |
| **5.3.5 Distinctive labels**<br>Distinctive and consistent words and/or codes used for field labels. | | | | ▓ | | ▓ | | | | | ▓ | ▓ | | | | | |

**Table A.1** *(continued)*

| Recommendations | Applicability — Results | | Applicability — Method Used | | | | | | Adherence — Method Used | | | | | | Adherence — Results | | Comments (including sources) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Y | N | S | D | O | A | E | DM | M | O | D | A | E | DM | P | F | |
| **5.3.6 Symbols or units**<br><br>Symbols or units displayed as an additional label. | | | | ■ | | | | | ■ | | ■ | ■ | | | | | |
| **5.3.7 Cues**<br><br>Cues for data entry format (e.g. mm/dd/yy) displayed within the entry field or in field labels and the use of abbreviations clear to the user. | | | | ■ | | ■ | | | ■ | | | | | | | | |
| **5.3.8 Initial upper-case (capital) letter for field labels**<br><br>Text field labels begin with an upper-case letter, followed by lower-case (small) letters in the remainder of the word. | | | | ■ | | ■ | | | ■ | | | ■ | | | | | |
| **6 Input considerations** | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| **6.1 General** | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| **6.1.1 Cursor movement**<br><br>The user actions required to move the cursor from one entry field to the next minimized. | | | | ■ | | ■ | | | ■ | | ■ | ■ | | | | | |
| **6.1.2 Incomplete text entry field**<br><br>If the entry does not fill the whole field, user allowed to move directly to the next field. | | | | ■ | | ■ | | | ■ | | ■ | ■ | | | | | |
| **6.1.3 Default values**<br><br>a) Fields contain default values wherever possible and appropriate to the task, and<br><br>b) Text default fields editable. | | | ■ | | ■ | | | | ■ | | ■ | ■ | | | | | |
| **6.1.4 Switching between input devices**<br><br>If appropriate to task, switching between input devices minimized. | | | | | | ■ | ■ | | ■ | | ■ | ■ | | | | | |
| **6.1.5 Pointing devices**<br><br>If a pointing device can be used for input in a form, it should be usable for navigation as well. | | | | ■ | | ■ | ■ | | ■ | | ■ | ■ | | | | | |

**Table A.1** *(continued)*

| Recommendations | Applicability | | | | | | | | Adherence | | | | | | | | Comments (including sources) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Results | | Method Used | | | | | | Method Used | | | | | | Results | | |
| | Y | N | S | D | O | A | E | DM | M | O | D | A | E | DM | P | F | |
| **6.2 Alphanumeric text entry** | | | | | | | | | | | | | | | | | |
| **6.2.1 Justification of entries**<br>System does entry justification, not user. | | | | | | | | | | | | | | | | | |
| **6.2.2 Leading zeros**<br>If leading zeros are needed for numeric entries, the system provides them. | | | | | | | | | | | | | | | | | |
| **6.2.3 Multiple lines**<br>If the field contains multiple lines of text (i.e., sentence or paragraph):<br>a) Input area size — The size of the input area clearly indicated, and<br>b) Auto wrap — An auto-wrap capability provided, and<br>c) Editing and navigation — Normal conventions. | | | | | | | | | | | | | | | | | |
| **6.2.4 Mutually exclusive fields**<br>Visual cue provided to indicate only one of the fields to be used. | | | | | | | | | | | | | | | | | |
| **6.2.5 Interdependency rules**<br>The use of complex "if/then" interdependency rules among entry fields avoided. | | | | | | | | | | | | | | | | | |
| **6.2.6 Text entry field area**<br>Text field large enough to accommodate the majority of entries without scrolling. | | | | | | | | | | | | | | | | | |
| **6.3 Choice entries** | | | | | | | | | | | | | | | | | |
| **6.3.1 Limited entry options**<br>Mechanism provided to enable the user to view and select available options. | | | | | | | | | | | | | | | | | |
| **6.3.2 Discriminable visual cues**<br>Discriminable visual cues used to discriminate among different logical types of choice entries in an application. | | | | | | | | | | | | | | | | | |
| **6.3.3 Menus**<br>a) Visual cues — A visual cue that a menu is associated with the field is provided unless option list is continuously visible.<br>b) Field value — The form field contains the most recent selection from the menu as the current value. | | | | | | | | | | | | | | | | | |

**Table A.1** *(continued)*

| Recommendations | | Applicability | | | | | | | | Adherence | | | | | | | | Comments (including sources) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Results | | Method Used | | | | | | Method Used | | | | | | Results | | |
| | | Y | N | S | D | O | A | E | DM | M | O | D | A | E | DM | P | F | |
| **6.3.4** | **Lists** | | | | | | | | | | | | | | | | | |
| | a) Visual cues — A visual cue provided to discriminate selected from non-selected options. | | | | | | | | | | | | | | | | | |
| | b) Long lists — Mechanism provided to allow users to rapidly navigate through the list. | | | | | | | | | | | | | | | | | |
| **6.3.5** | **Screen buttons** Buttons used if users must select a small number of options (2 to 5) and the options are activated immediately after selection. | | | | | | | | | | | | | | | | | |
| **6.3.6** | **Choice buttons** | | | | | | | | | | | | | | | | | |
| | a) Sets of choices — Exclusive choice buttons appear in sets of 2 or more choices. | | | | | | | | | | | | | | | | | |
| | b) Default choice — If there is a default for the field, the default choice in the set is visibly selected. | | | | | | | | | | | | | | | | | |
| **6.3.7** | **Binary state settings** | | | | | | | | | | | | | | | | | |
| | a) Group presentation — Binary state buttons should be presented in a group. | | | | | | | | | | | | | | | | | |
| | b) Indication of state — When the form is presented, binary state buttons provide a visual indication of their current state. | | | | | | | | | | | | | | | | | |
| **6.3.8** | **Stepper buttons** | | | | | | | | | | | | | | | | | |
| | a) Displayed initial choice — The initially displayed should be the most appropriate default choice. | | | | | | | | | | | | | | | | | |
| | b) Typing values — Users allowed to type in values in order to quickly navigate between choices. | | | | | | | | | | | | | | | | | |
| **6.4** | **Control** | | | | | | | | | | | | | | | | | |
| **6.4.1** | **Corrections before processing** The user should be allowed to start over again, cancel entries, or change any entry before the form is processed. | | | | | | | | | | | | | | | | | |