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Document management — Machine-readable paper forms — Optimal design for user friendliness and electronic document management systems (EDMS)

Gestion de document — Formulaires papier exploitables par machine — Conception optimale pour la facilité d'emploi et systèmes de gestion de document électronique (EDMS)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12029 was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 2, *Application issues*.

This first edition cancels and replaces ISO/TS 12029:2007, which has been technically revised.

Introduction

This International Standard discusses issues and provides guidance for the design of forms that are used for electronic capture of handwriting information. Features include colour dropouts, type fonts, printing screen tints, line width, data storage and other interrelated issues. It is necessary to balance conflicting requirements of user-friendliness and electronic capture. Making a form appealing by use of colour or graphics could assist users when they complete the form but could also decrease the form's scannability or other automated, related functions. This conflict might require compromise in the design of a form.

While this International Standard focuses on the design and structure of paper-based forms, it is worth noting that the design and structure of electronic based forms can have different characteristics, ensuring usability and readability. The user is advised that use of these specifications when developing paper-based forms while keeping in mind that electronic forms can be easily replicated in an electronic format (with the same content as in the paper-based form), but with differing fonts and spacing.

Document management — Machine-readable paper forms — Optimal design for user friendliness and electronic document management systems (EDMS)

1 Scope

This International Standard specifies requirements concerning the design of forms for user friendliness, with optimal machine readability for processing by electronic document management systems (EDMS). These requirements are limited to forms using roman characters.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1073-1, *Alphanumeric character sets for optical recognition — Part 1: Character set OCR-A — Shapes and dimensions of the printed image*

ISO 1073-2, *Alphanumeric character sets for optical recognition — Part 2: Character set OCR-B — Shapes and dimensions of the printed image*

ISO 12651-1, *Electronic document management — Vocabulary — Part 1: Electronic document imaging*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12651-1 and the following apply.

3.1
alphanumeric
pertaining to a character set that contains letters, numbers and other characters, such as punctuation marks and symbols

NOTE Adapted from ISO/IEC 2382-4.

3.2
character pitch
number of characters per unit length of a line of print

3.3
dropout ink
ink of a colour that cannot be detected by a scanner

3.4
font
complete set of characters of a given size, weight and style of type, including capitals, small capitals and lower-case characters, together with figures, punctuation marks, ligatures, etc.

NOTE Adapted from ISO/IEC 2382-23.

3.5
ICR
intelligent character recognition
advanced optical character recognition (OCR), or rather more specifically, hand-printed recognition system that allows fonts and different styles of handwriting to be learned by a computer during processing to improve accuracy and recognition levels

3.6
MICR
magnetic ink character recognition
machine recognition of digits printed with magnetizable ink

3.7
OMR
optical mark recognition
machine recognition of a mark such as a tick, cross or spot based on minimum area rather than shape of the mark

[ISO 2033]

3.8
recognition zone
area around a recognition data field that is free of other data

4 Layout and design

4.1 General

The design of a form easiest for a person to complete can be in conflict with the most machine-readable form. For example, in a user-friendly layout, the following items, all interspersed with printed instructions next to specific areas, might be desirable:

— large print,

— colour-coded areas, and

— areas to be completed with both alphabetic and numeric information.

However, in a form designed for an electronic image management system (EIM), strict segregation of spaces for numeric and alphabetic information and instructional text within dropout colour areas can all be essential features. Optimum design can require a compromise between ideal user and scanner requirements. All logically connected information should be placed on the same page.

4.2 Data storage requirement

The designer should be aware of the impact on data storage requirements of line borders, screened tints and logos or other design elements with large areas of reversed print. Reversed print will make heavy demands on data storage. For all designs, particularly those having large areas of reversed print, the amount of data storage required should be determined and compared to the amount of data storage available within the system.

4.3 Page format

On each page of a form, the margin all around should not be less than 10 mm. If the document is bound, padded or has punched holes or die cuts, the margin at that edge should be not less than 25 mm, and holes and die cuts should be restricted to that margin.

Text and entry fields should not be within 6,5 mm of any crease or perforation.

4.4 Typeface and font

4.4.1 Typeface

There are two styles of typeface commonly used on forms, serif and sanserif, as illustrated in Figure 1.

a) Serif **b) Sanserif**

Figure 1 — Comparison of serif and sanserif typefaces

Serif style is designed for ease of legibility, has variable line width within a character and a cross-line finishing a stroke of a letter. Sanserif has uniform line width within a character and no cross-lines. It is the style used in ISO standards.

Serif type will inherently take more data storage capacity in a compressed image than sanserif type because more information has to be recorded for each character. With the most commonly used compression techniques, approximately 10 % more storage is required for a page printed in serif, as compared with one printed in sanserif type.

Sanserif generally requires less horizontal line space and more vertical height than the same point size serif type. Because of its uniform line width, it is preferred for photocopying, microfilming and scanning.

For forms which might be used in optical character recognition (OCR) applications, sanserif typefaces should be used.

For information on a form that is not required to be captured by scanning, the style of typeface used is not important.

4.4.2 Symbols

An OCR program can use a particular symbol to prompt an action. The form designer should be aware of any such symbols and avoid their use other than as a prompt.

4.4.3 Spacing

In typesetting, character spacing can be either fixed or proportional. In fixed typesetting, each character takes up equal horizontal space. Proportional typesetting allows for characters of different width, such as that of “i” compared with “w” and automatically adjusts space between the individual characters to give a more natural appearance.

There should be a clear gap between characters. The recommended minimum gap is not less than the width of the vertical stroke of characters of the font.

The designer should also be concerned with vertical spacing requirements of an OCR system. Although 4,2 mm vertical spacing is usually sufficient for typewritten entries, at least twice that amount of space is necessary for hand-printed entries and for separating entries for OCR.

4.4.4 Character pitch

Form design should allow no more than 0,4 characters per millimetre for character pitch.

4.4.5 Character size

In the printing industry, type size is usually specified in millimetres. In a computer or typewriter, type size is usually indicated in points. Fortunately, the printing industry is familiar with both systems and can easily translate requirements. The point (0,35 mm) is a unit derived from the height of metal slugs, once commonly but now rarely, used to set type. The size of character is not directly related to point size. For a given point size, the actual heights of the same upper-case character can be different for various typefaces. There is also variation in the ratio of heights of lower-case “e” to upper-case characters. This means that for a given point size, even if upper-case characters of two different typefaces have the same height, there is a possibility that this may not be so for lower-case characters. Since it is the size of the lower-case characters that will limit scannability, minimum acceptable point size should be determined by the height of the lower-case “e”. The recommended minimum height of the lower-case “e” is 1,4 mm.

If the EIM system is used as a transfer medium as part of overall processing of the information extracted from a form, the minimum type size used shall allow for any degradation of image quality resulting from subsequent parts of the process.

4.4.6 Weight

The weight of a type font is its relative line thickness, ranging from light to extra bold. Font weight directly affects the number of dots or pixels used to display a character of an electronic image. Different weights can also be used to emphasize or reduce significance of text blocks or captions for the user.

4.4.7 Type family

Design variations on a basic typeface can include italic, condensed, expanded and others. Form designers should try to keep the number of type families used within a form to a minimum to project an uncomplicated appearance that is pleasing to the eye. EIM systems and particularly OCR software can also benefit from limited use of type families.

4.5 Machine-printed stylized information

4.5.1 General

Information may be presented on a form as a bar code or in OCR or MICR characters. These bar codes and stylized character sets are especially designed for automated processing and are machine readable with high accuracy.

Machine reading is not always wholly accurate. The degree of accuracy achievable can be improved if forms have error-checking features built into their design. Whenever possible, forms should be designed to use a second source of information for cross checking. When calculation is involved, both subtotal and entry figures should appear on forms so the processing system can recalculate the subtotal to compare it with the amount read. Other examples of information for cross checking are account number/customer name, version number/issue date.

4.5.2 OCR fonts

OCR fonts such as Farrington 7B, OCR-A and OCR-B are available with numeric only and alphanumeric character sets for automated recognition. Data encoded using OCR fonts shall be printed in accordance with the relevant International Standards listed in Table 1.

Table 1 — OCR font standards

Code types supported	International Standard
OCR-A numeric	ISO 1073-1
OCR-A alphanumeric	ISO 1073-1
OCR-B numeric	ISO 1073-2
OCR-B alphanumeric	ISO 1073-2

OCR characters should be printed by a laser printer at the highest resolution whenever possible. The use of a dot matrix printer will generally give poorer print quality and reduce the accuracy of the OCR reading. Black characters printed on a white or light-coloured background are preferred.

OCR characters may be placed anywhere on the form, however, they should preferably be in a clearly defined recognition zone and printed parallel to the other text. For an example of an OCR font, see Figure 2.

Figure 2 — Sample OCR code

4.5.3 MICR fonts

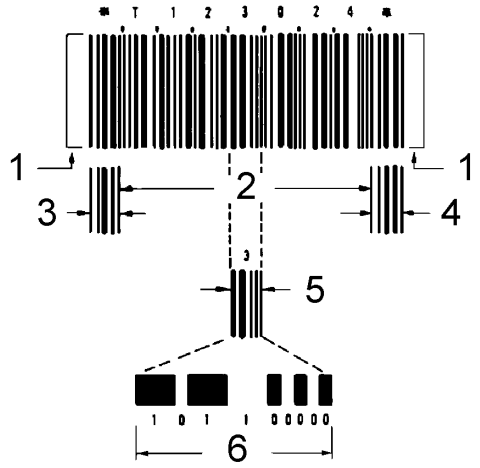
MICR fonts, shown in Figure 3, are limited, highly stylized character sets that are printed using magnetic ink. Among several fonts available, E-13B and CMC-7 are the fonts frequently used on financial transaction documents such as cheques. E-13B is highly machine readable because of its solid clear character format. CMC-7, on the other hand, is more difficult for optical recognition because the characters are made of discrete, thin vertical lines.

Figure 3 — Sample MICR code

4.5.4 Bar codes

4.5.4.1 General

Bar codes, as shown in Figure 4, may be placed anywhere on a form provided appropriate steps are taken to protect their integrity.



Key

1 quiet zone (10×)
2 data
3 start
4 stop
5 typical data character
6 9 bits

Figure 4 — Sample bar code

4.5.4.2 Using bar codes on forms

Bar codes are commonly used as a faster, cheaper, and more accurate alternative for the capture of textual information about an individual, a place, or thing. There are many different types of bar code symbolization available with the choice of symbolization being applications driven.

Bar codes can be printed using most of the printing processes. They can also be applied as labels at different stages of forms processing. When printing bar codes, the specifications governing the applicable symbolization should be strictly followed so as to ensure that the codes will be successfully read.

Bar codes may be incorporated to automate forms-handling by representing the form number, certain fields of the user-entered information, and possibly a control or tracking number to facilitate inventory requirements.

4.5.4.3 When to add bar code

If the bar code represents information that is contained on the blank form (e.g. form number), the bar code should be placed on the original prior to making distribution copies from it. A quiet zone containing no dark marks, lines, print, etc., should surround the bar code area.

If the bar code represents information that is filled in by the user (e.g. an invoice number), the bar code should be created by the user, and the only form-design requirements would be to allow a sufficiently large quiet zone and instructions for the placement of a bar code label.

4.5.4.4 Location of bar code

Ideally, the form should be designed so that a bar code representing specific information will always appear in the same area on each form. Designing the form in this manner facilitates automatic and single sheet scanning.

An eye-readable version of what the bar code represents should be printed along with the bar code so that users of the form know what the symbol represents. This should be considered and space allowed when designing the form.

4.6 Hand-printed information

Machine recognition of hand-printed characters is used in subsystems that recognize either constrained or unconstrained hand-printed alphanumeric characters. This capability should be taken into account when a user is required to fill in blocks with letters or numbers from a list.

Hand-printed numerals can be interpreted with a high degree of accuracy because each has a distinct appearance. However, several of the 26 alphabetic characters can look very similar to each other, leading to difficulty in differentiation. It is not uncommon for users to connect letters even when they are printing them, and this decreases accuracy of hand-print recognition. It has been observed that the more hand-printing required to complete a form, the more the quality of printing deteriorates.

4.7 Location or registration marks

When designing a form intended for automated information capture, marks or codes should be used to ensure correct orientation and positioning of the form during scanning. There are several different marks suitable for location or registration purposes. These include Kermit code, cross hairs, rectangular blocks and triangular blocks. Using pre-printed text or graphic symbols is also possible depending on the particular software selected.

Samples of Kermit code are shown in Figure 5.

Location or registration marks should be placed on the document spread as far apart as possible, avoiding edges of the page and corners where staples or clips might be placed.

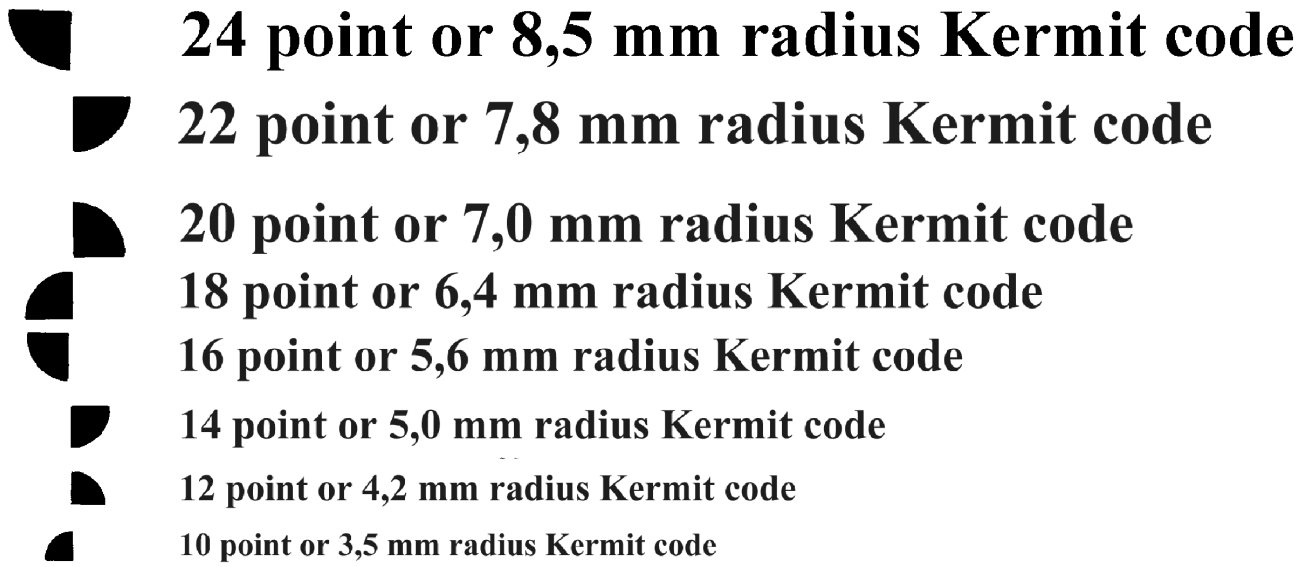


Figure 5 — Samples of Kermit code

These marks should be offset to give the software the best opportunity to de-skew the document before the scanning process.

There should be at least four, preferably six location or registration marks in case some are defaced.

4.8 Highlighting

Methods for highlighting an area of the form using screened solid or borders of recordable colour can seriously increase the data storage requirement. When dotted or lined screened areas are used, the data storage requirement increases with the width of the dot or line. A solid of high density could reduce contrast with black print to an undesirably low level, making capture difficult. A line border is more economical of data storage than a solid of the same area. Using a dropout ink that will consistently be read as white by the scanner is extremely efficient for image storage.

4.9 Line printing rules

Line thickness should not be less than 0,7 mm. All lines should be parallel to an edge of the form.

5 User guidance

5.1 General

Instructions and form attributes guide a user to enter appropriate information into each of the entry fields. Instructions are either printed text, or design features of a form that lead the user to complete the form in the way intended. Instructions are not considered information to be captured and should be printed in a dropout colour.

5.2 Hand-printed entries

Instructions for hand-printing alphabetic or numeric characters on forms may include the following statements:

— “PLEASE PRINT USING CAPITAL LETTERS ONLY”;

— “PLEASE PRINT LIKE THIS”;

— “PRINT YOUR CHARACTERS LIKE THIS, ONE CHARACTER PER BOX”;

— “PRINT CHARACTERS AS SHOWN”;

— “PRINT ALL NUMBERS AS SHOWN”;

— “PRINT ALL LETTERS AS SHOWN”;

— “PRINT CAREFULLY ALMOST FILLING BOXES AS BELOW”;

— “DO NOT USE FELT TIP PENS”.

An instruction like some of the examples listed above, in conjunction with a sample of hand-printing style, such as shown in Figure 6, provide useful aids to form completion. The user is instructed what to do and given an example of how to do it using hand-printing of the required style.

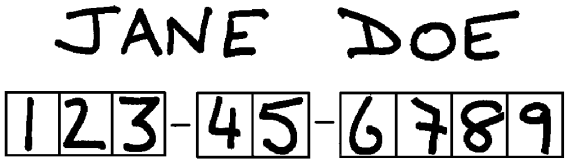


Figure 6 — Illustration of desired hand-printing

5.3 Printed instructions

Printed instructions should be clear, concise and adjacent to the corresponding entry field. Extensive, detailed instructions and those that refer to a separate space on a form, the reverse side of a form, a completely separate sheet, or completely separate set of instructions should be avoided.

5.4 Form features

5.4.1 Form features for layout extraction

In order to achieve best results, both in the human interface phase (in which the forms are being filled-in) and in the recognition phase, it is recommended to use predefined printing techniques.

The design of the forms should be planned in such a way that the lines which create the constraint boxes layout will be later removed (dropout), leaving only the filled-in information to be recognized.

There are different methods to ensure the dropout of the constraint boxes. One of the most common ways is by using drop-out ink colours, which are not captured, or minimally captured, by the scanner during the scanning phase. All non-colour scanners have either a red, green, or blue drop-out colour and most scanners can provide the ability to configure which dropout colour is to be used through a control panel, switch, or “bulb” or “light” change. While most scanners have provided the ability to change the “bulb” or “light” to change the dropout colour being used, most scanners on today's market utilized firmware/software configuration capabilities to achieve this change and not hardware changes as in the past.

Another common way is by using only 20 % of the regular ink through a net. This technique produces a light dotted line. The result is the same.

The ways to implement the above-mentioned methods varies from one project to the other, examples include the following.

— The areas around the constraint boxes could be coloured in light blue dropout ink, leaving a white empty area inside the constraint boxes.

— The areas inside the constraint boxes could be coloured in light blue dropout ink, while the rest of the page is white.

— The light dotted line technique could be used to constraint the written areas in boxes.

5.4.2 Form feature for document preparation

It is recommended that the printing house cut off one of the corners of each paper form. This will help the preparation phase personnel, as well as the scanner operators to easily verify that all the forms are in the same position before entering the batch into the scanner. This will also save valuable time on scanning the forms, if they are orientated correctly.

5.4.3 Registration marks

Taking into account that most scanners result in some skewing and minor distortion when the document is being fed through the transport mechanism, each form should include “registration marks”. “Registration marks” are small “dots” in the corners of the document allowing for the scanner to “align” the page, ensuring accurate data capture and recognition. “Registration marks” should be a minimum of 10 mm in diameter and be a solid dark, or black in colour. There should be a minimum of 2 registration marks on each form, and preferably 4. If only 2 “registration marks” are to be used, they should be placed in opposite corners of the document, outside of all information to be captured and processed. If 4 marks are used, each mark should be placed in a corner of the document ensuring proper image alignment prior to processing.

5.4.4 Form identification

One of the most important issues during the data capture phase is to correctly recognize and identify the identification field(s), which uniquely identify each specific form. There are several manners to identify a specific page or image.

The following methods have been used in different projects around the world:

— printing bar codes on each side of a form;

— printing bar code stickers on each side of the form;

— printing a unique serial number on each side of the form;

— including a hand-written, unique serial number on each side of the form.

It is recommended to include a check digit in the serial number to allow logical checking of the recognized information.

All forms within a flow should be compared in order to verify that no two forms are too similar, thus making form identification more difficult. In cases in which two forms are highly similar, it is recommended that both an identification mark on each entry field identification (EFI), as well as numbering EFIs.

5.4.5 Preferred presentation of check boxes

In general, in order to improve recognition results, most of the questions on the form should be in “check box” format (see Figure 7), rather than in alpha or numeric format.

Figure 7 — Optical mark recognition zones

Furthermore, recognition results can be improved if the check boxes are aligned horizontaly [see Figure 8a)], rather than vertically one above the other [see Figure 8b)].

What age group do you belong to:

☐ 0-15 ☐ 16-28 ☐ 29-49 ☐ 50 and above

a) Suitable presentation

What age group do you belong to:

☐ 0-15

☐ 16-28

☐ 29-49

☐ 50 and above

b) Unsuitable presentation

Figure 8 — Use of check boxes on forms

5.4.6 Importance of spacing

One of the most important goals of the form is to ensure the easy interpretation of the filled-in information during the processing phase. To achieve this, it is recommended to implement a method that will segment each mark, or character, or both, from the other. One of the most efficient ways for segmentation is by using a separated constraint box for each filled-in symbol.

The common dimensions for optimal size of the constraint boxes should be as follows:

— for OMR (check box): 3 mm × 3 mm;

— for written numerals and alpha: 6 mm height × 5 mm width.

There should be a space of 1 mm between neighbouring constraint boxes.

It is recommended to have a minimum margin of not less than 1,5 cm between the information written/printed on the form and the edge of the page.

Figures 9 and 10 provide illustrations of constraint boxes.

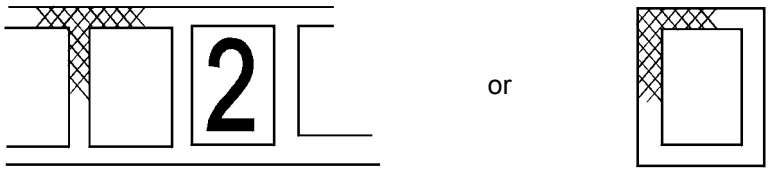
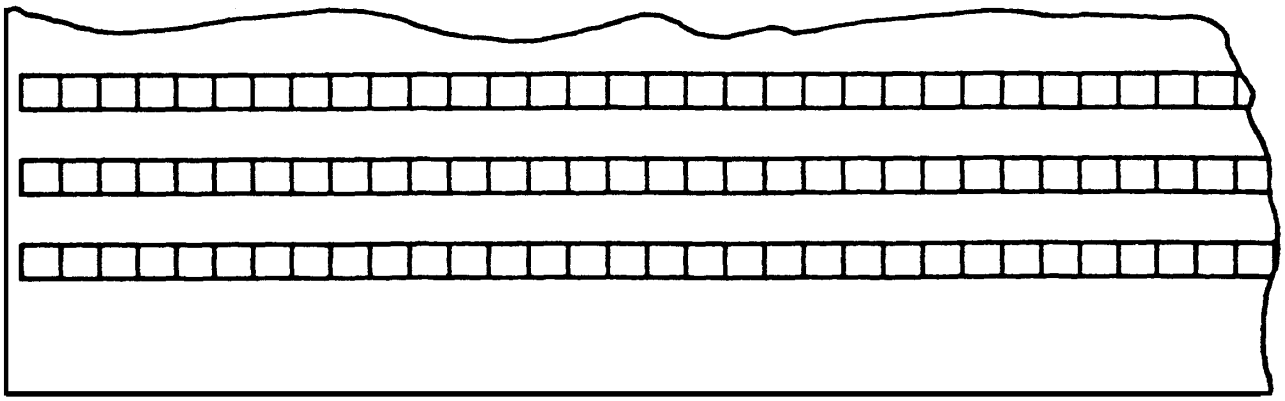
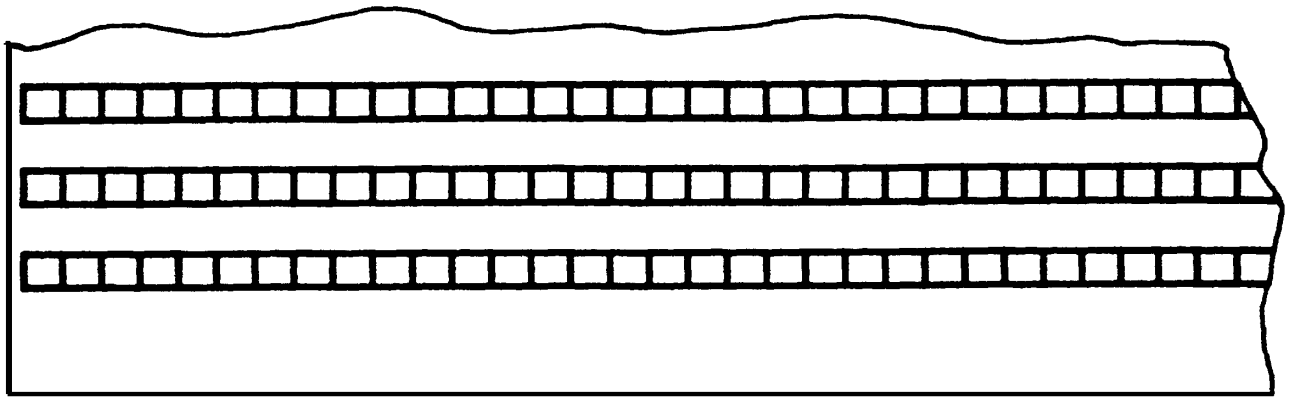


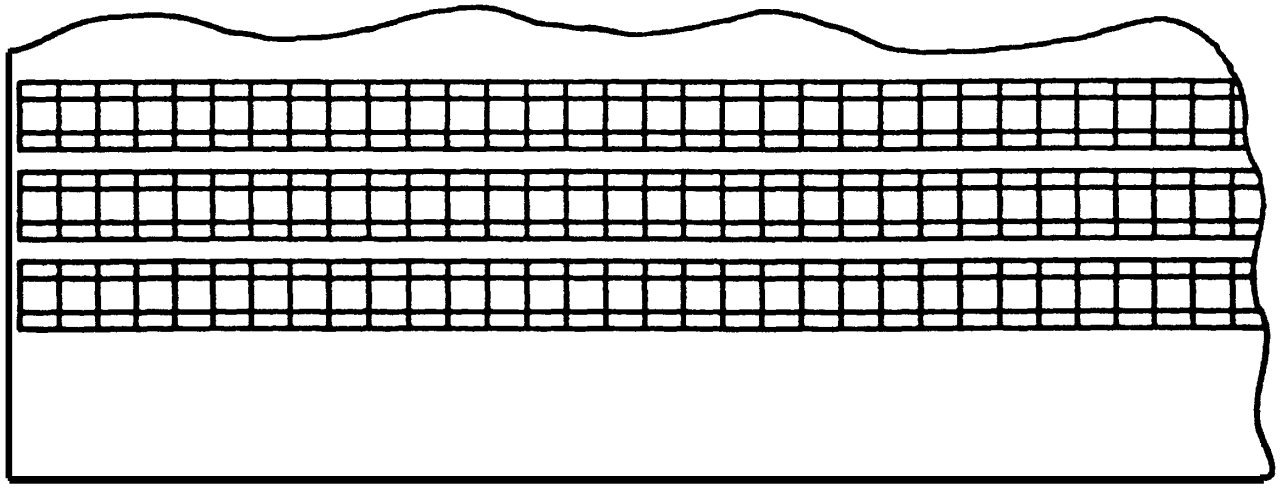
Figure 9 — Sample constraint boxes showing minimum margin



a) Preprinted Guidelines for OCR Handprint NUMERIC ONLY



b) Preprinted Guidelines for OCR Handprint ALPHA-NUMERIC



c) Preprinted Guidelines for OCR Handprint UNIVERSAL SET (5 RAILS)

Figure 10 — Sample constraint boxes

5.5 Optical mark recognition (OMR)

Timing tracks along one edge of the form are printed to indicate to the scanner where to read for marks and where to clip images. An OMR form will also contain form identification marks, which look like black boxes on the top or bottom of the form. Additionally, the cut of OMR forms will be extremely precise and the bubbles will be located in exactly the same location on each form.

Check boxes and circles will be large enough to show a clear and distinct mark. They should be free from background shading and edge shadow. For accurate information capture, square boxes are preferred.

Internal length of box sides and internal diameter of circles should be 7,0 mm $\pm$ 2 mm and minimum line thickness 0,7 mm. The minimum distance between adjacent zones should be 7,0 mm.

The use of drop-out colour on an OMR scanner allows for the use of pens (in addition to pencils) for form completion. In addition, consistent use of proper reflectance and fluorescence of paper influences readability. On both the OMR and imaging scanners, the combination of drop-out colours and consistent paper use enhance the accuracy of results.

6 Post-printing features

6.1 Perforations

Perforations facilitate detachment of part of a form to meet other requirements. Slit perforations are preferred to hole punched perforations because slits are less likely to interfere with document feeding than holes, which can cause jamming by snagging sheet corners. Perforations should be avoided in high-volume processing applications.

6.2 Holes

Holes may be punched to allow forms to be placed in ring-binders. Holes should be placed with centres not less than 12,5 mm from any area to be scanned to avoid eliminating information requiring capture. Drilling or punching should be made cleanly, leaving no loosely attached debris. Loose paper confetti discs can interfere severely with operation of scanners. Avoid placing holes where they can cause jamming or inadvertently signal the feeding mechanism to stop by allowing a light beam to pass through the hole.

6.3 Die-cuts

Die-cuts, used for filing systems and windows, can cause jamming in the document feeder of a scanner. They should be avoided.

6.4 Folds

Not more than two folds should be allowed in a form. Any fold should preferably be made parallel to the machine (grain) direction of the paper and positioned not less than 6,4 mm from information required to be captured.

6.5 Multi-part forms

Multi-part forms that are to be scanned should be collated in logical order for the system. The form design should provide identification of form and part number on each sheet.

6.6 Padding

A low-tack, flexible, high solid content adhesive should be used to make form pads. When detaching a form from a pad, often some of the adhesive remains attached to the form. If it is transferred to the feed mechanism of a scanner, the adhesive can cause jamming. Low-solids-content water-based adhesives can cause waviness of the edges of the paper to which it is applied. After detachment, the wavy edge can cause jamming in the feeder.

6.7 Carbonizing

Forms having patches of a wax-based carbon compound (e.g. airline tickets) are sometimes processed through automatic feed equipment. The carbon compound accumulates on the rollers and belts with which it comes in contact necessitating frequent shutdowns for cleaning. Whenever possible, black chemically or physically mated carbonless copy should be used for this purpose.

7 Materials

7.1 Paper quality

7.1.1 General

The requirements of paper for electronic capture of information are not particularly demanding. The characteristics that require consideration are

— grammage,

— thickness,

— opacity,

— finish, and

— colour.

7.1.2 Paper grammage and thickness

Although there is not a consistent relationship between grammage and thickness, paper is rarely specified by thickness. Grammage is taken to imply thickness. It is recommended that paper in the range 80 g/m^2 to 100 g/m^2 be used.

7.1.3 Paper opacity

The opacity of paper should be sufficient to prevent print or handwriting on the reverse side of the page (or a backing sheet) from showing through when viewing the top side. A minimum opacity of 85 % measured in accordance with ISO 2471 is recommended. In practice, commonly available grades of paper in the recommended grammage range that are likely to be used for producing the forms will have sufficient opacity.

7.1.4 Paper finish

Very rough surfaced paper should be avoided because friction between successive sheets can cause a paper jam when scanning. Matte or MF grades should be used. Again commonly available grades of paper likely to be used for producing the forms will have satisfactory finish.

7.1.5 Paper colour

Paper should preferably be of a colour that cannot be recognized by the scanner. Pale shades of a recognizable colour are acceptable provided sufficient contrast is maintained between information and background when scanned. Acceptable colours and shades can be determined using the colour gamut test chart specified in ISO 12653-2.

7.1.6 Paper life expectancy requirements

For forms intended to be kept permanently because of high intrinsic historical, legal or other significant value archival paper in compliance with ISO 11108 should be used.

7.2 Printing ink

For printed information and design features on the uncompleted form that are to be captured**,** the colour of the ink shall be recognizable to the scanner. Acceptable colours can be determined by use of the colour gamut chart specified in ISO 12653-1 and ISO 12653-2. Account should be taken of the affect of colour of the paper on effective contrast of print and background.

For forms in compliance with 7.1.6, consider the use of inks as specified in ISO 11798.

Information and design features not required to be recorded should be printed in a dropout colour.

8 Form testing

Acceptable test methods should be applied to maximize the form scannability and minimize user discomfort. Any form design plan should include provision to have each form tested by various audiences. These audiences could include groups that would be filling in the forms as well as recognition technology vendors. Results from vendors could help the designer adjust different critical aspects of a draft form.

9 Reference criteria for designing forms

Table 2 lists the main characteristics for different recognition techniques that should be taken into consideration when designing a form.

Table 2 — Reference criteria of recognition characteristics when designing forms using different recognition techniques

Recognition characteristics	OCR	ICR	OMR
Recognition of bubble marks	Y	Y	Y
Recognition of bar code	Y	Y	Y
Hand-print recognition	N	Y	N
Machine-print recognition	Y	N	N
Recognition of checks and “X”s	Y	Y	N
Timing tracks required	N	N	Y
Registration marks required	Y	Y	N
Form identification marks required	Y	Y	Y
Y = Yes N = No			

10 New technology

Changes in technology will continue to affect the forms design process and this document should be used to highlight those areas of potential improvement. Over time, the stringency of design guidelines imposed by scanning and capture technology might be relaxed by the introduction of new developments (e.g. improving speed and accuracy of reading and recognizing unconstrained hand-print).

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