International Standard 5126

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Micrographics — Computer output microfiche (COM) — Microfiche A6

Micrographie — Composition en sortie d'ordinateur sur microforme (COM) — Microfiche A6

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 5126 was developed by Technical Committee ISO/TC 171, *Micrographics*.

This second edition was submitted directly to the ISO Council in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 5126-1978), which had been approved by the member bodies of the following countries :

Belgium
Canada
Chile
Czechoslovakia
Finland
France
Germany, F. R.
India
Iran
Ireland
Italy
Japan
Mexico
Netherlands
New Zealand
Norway
Poland
Romania
South Africa, Rep. of
Sweden
Switzerland
Turkey
United Kingdom
USA
Yugoslavia

The member bodies of the following countries had expressed disapproval of the document on technical grounds :

Denmark
USSR

Printed in Switzerland

Micrographics — Computer output microfiche (COM) — Microfiche A6

1 Scope and field of application

This International Standard specifies the characteristics of transparent A6 size computer output microfiche at reductions of 1 : 24 and 1 : 48. Uniform division formats with frame sizes are provided for A4 and 279 mm × 355 mm (11 in × 14 in) equivalent page sizes at each reduction. This International Standard does not cover computer output microfilm in 16 mm or 35 mm roll formats or graphics, which will be the subjects of separate standards. This International Standard also does not cover computer output microfiche at a reduction of 1 : 42, which is in use but is not compatible with reductions of 1 : 24, most new installations using 1 : 48 reduction; nor does it cover microfiche of source documents, which is the subject of ISO 2707 and ISO 2708. Depending on requirements, the microfiche may be a negative or positive.

2 References

ISO 543, *Cinematography — Motion-picture safety film — Definition, testing and marking.*

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

ISO 2707, *Microcopying — Transparent A6 size microfiche of uniform division — Image arrangements No. 1 and No. 2.*

ISO 2708, *Microcopying — Transparent A6 size microfiche of variable division — Image arrangements A and B.*

ISO 2784, *Continuous forms used for information processing — Sizes and sprocket feed holes.*

ISO 2803, *Photography — Silver-gelatin type microfilms — Processing and storage for archival purposes.*

3 Physical characteristics

3.1 Sheet size

The external dimensions of the microfiche shall be a rectangle of 105 mm × 148 mm.[1)]

When tolerances are specified for the distribution microfiche they will apply immediately after processing. The measurements shall be made when the film has come to equilibrium at 23 ± 2 °C and 50 ± 5 % relative humidity. Size variations due to raw stock slitting and processing should be considered in determining the tolerances. Additional size changes may occur during ageing, especially for films on cellulose ester supports. (See annex A, clause A.2.) Temporary size changes due to temperature and humidity changes are described in annex A, clause A.3.

3.2 Thickness

The gross thickness ranges of microfiche exclusive of the heading area backing, if any, shall be the following :

— cellulose acetate film : 0,13 mm to 0,23 mm;

— polyester base film : 0,10 mm to 0,23 mm.

3.3 Heading area backing

An opaque or translucent backing[2)] for the heading area is optional. If a heading area backing is used, it shall not increase the thickness of the fiche by more than 0,01 mm.

3.4 Identification of sensitized side

To facilitate microfiche-to-microfiche copying, a notch or a corner cut may be used to identify the sensitized layer of the microfiche.

1) ISO 6148, *Photography — Film (silver-gelatin and non-silver gelatin types) for micrographic uses — Dimensions of sheet and roll material* (in preparation) will provide manufacturing tolerances for raw film. Until ISO 6148 is published, the manufacturing tolerances for raw film shall be $105\ ^{0}_{-0,25}$ mm × $148\ ^{0}_{-0,5}$ mm.

(See annex A for more information.)

2) The use of such backing restricts further duplication.

When a notch is used, it shall be made in the shorter side of the sheet, near the appropriate corner. The notch may be of any shape, but it shall not penetrate more than 1,6 mm inward from the edge of the microfiche.

When a corner cut is used, it shall be made in the appropriate corner of the heading area only. The cut shall extend a nominal 6 mm along the longer side of the microfiche and a nominal 9 mm along the shorter side of the microfiche.

The sensitized side shall be identified by one of the following methods :

Method A — When a sheet of raw film or a microfiche is held with the long sides in a horizontal position and the notch in the lower right-hand corner, or the corner cut is in the upper left-hand corner, the sensitized side will be towards the observer.

Method B — When a sheet of raw film or a microfiche is held with the long sides in a vertical position and the notch or corner cut is in the upper right-hand corner, the sensitized side will be towards the observer.

3.5 Corner rounding

The corners of the microfiche may be rounded, with the exception of the corner which has been subjected to a corner cut (see 3.4). When corners are rounded, the process shall not remove more than 3 mm of either of the two edges forming the corner.

3.6 Measurements involving cut-off corners

Where segments of an edge have been removed by corner rounding or corner cuts, a straight line extending the remainder of the edge in the relevant direction shall constitute the basis for measuring dimensions and spacing.

3.7 Safety film

The film used shall comply with ISO 543.

4 Frame size and format

4.1 General layout

Table 1 specifies the arrangements that shall be used for computer output microfiche.

4.2 Microimage placement and orientation

Microimages in arrangements 2, 3, 4 and 5 shall be positioned within the appropriate grid pattern shown in figures 1, 2, 3 and 4. All measurements shall be made from the bottom edge and the bottom left-hand corner of the fiche as reference. When the fiche is held so that the heading is right-reading and upright, microimages shall always be right-reading and upright.

4.3 Effective reduction

Image arrangements No. 2 and No. 3 shall have an effective reduction of 1 : 23 to 1 : 25,5.

Image arrangements No. 4 and No. 5 shall have an effective reduction of 1 : 47 to 1 : 50.

4.4 Heading area

The heading area above the image area of each microfiche shall be reserved for identification references.

All characters in the heading area shall be upright and right-reading. All entries shall be readable without magnification.

The minimum areas reserved for the heading are indicated in figures 1, 2, 3 and 4 by shading.

If additional heading space is required, the area allocated to the next entire row or rows of images shall be used. When more than one row is used for the heading, the frame identification, as specified in 4.7, shall remain unchanged. The heading area constitutes the top of the microfiche. The minimum area reserved for the heading shall be used only for heading and identification purposes on all microfiche, and not for microimages.

4.5 Pagination (see annex B)

When the microfiche is held so that the heading is upright and right-reading, the first microimage shall be placed in the top left corner of the grid area. Succeeding frames shall appear either in sequence downward from left to right from column to column (vertical pagination), or in sequence from left to right and downward from row to row (horizontal pagination).

Table 1 — Microfiche formats*

Arrangement	Equivalent document size	Reduction (see 4.3)	Columns	Rows	Number of frames	See figure
No. 2	A4	1 : 24	14	7	98	1
No. 3	279 mm × 355 mm (11 in × 14 in)	1 : 24	9	7	63	2
No. 4	A4	1 : 48	28	15	420	3
No. 5	279 mm × 355 mm (11 in × 14 in)	1 : 48	18	15	270	4

* Arrangement No. 1 of ISO 2707 is not applicable to COM.
Frame size and placement of images in arrangements 2, 3, 4 and 5 shall be in accordance with figure 1, 2, 3 or 4 respectively.

4.6 Trailer microfiche identification

When trailer microfiche are used, each microfiche in the set, including the first one, shall be identified sequentially. Where practicable the last microfiche in the set should be identified as the last one.

4.7 Frame identification

Where co-ordinate identification is used for location of images, alphabetic letters shall be used to identify rows. Starting at the top row below the heading area, the first row shall be A, the second row B, etc., as indicated in figures 1, 2, 3 and 4.

Columns shall be identified by numerals starting at the left. The first column shall be 1, the second 2, and so on. The indication of co-ordinates on the microfiche is optional. If co-ordinates are shown on the microfiche, they shall be located in the margins (see figures 1, 2, 3 and 4) or in the lower portion of the heading area.[1)]

5 Automation requirements : cutting mark

Each microfiche may carry a cutting mark to provide for automatic cutting of processed roll film into microfiche. This cutting mark shall be 3,0 mm × 3,0 mm square, and the centre of the square shall be located 32,0 ± 0,2 mm from the left edge of the microfiche, with the bottom edge of the square within 0,2 mm of the bottom edge of the microfiche.

6 Index frame

If an index to the microfiche is to be provided, the last microimage of the index shall be placed at the bottom right corner of the grid area. Preceding index frames shall appear in reverse sequence subtracting from the allotted format.

7 Information density (character packing)

The dimensions of the computer output microfilm (COM) images are based on effective reductions. The character packing density of an equivalent paper document is assumed to be 60 characters per 6,45 cm^2 (1 in^2), corresponding to a character pitch of 2,54 mm (0.1 in) and a line spacing of 4,23 mm (0,16 in).

8 Alphanumeric characters

The alphanumeric characters shall meet the legibility requirements specified in 9.1 with the objective of ensuring human readability. A suggested font and some dimensions which are designed to meet this objective are given in annex D which describes the characters specified in part 2 of ISO 1073, and it is desirable to have machine readability potential.

9 Quality requirements

9.1 Legibility of first generation microfiche

9.1.1 Requirements

A square array of 12 lines, of at least 20 characters and symbols presented in a random sequence, and including all characters and symbols capable of being generated by the COM, shall be recorded in the centre and each corner of the full frame size. Each of the five arrays should utilize different random number sequences. (See annex C for five different random number groups using 63 characters and symbols.) The test sample should contain a block of characters representative of each style of font used.

The test samples should contain information compacted horizontally and vertically, representative of the maximum information congestion anticipated for use. Each character or symbol so generated shall be identifiable without error when viewed on a paper print or reader screen.

9.1.2 Test method

A printer or reader magnification of not less than 12 X shall be used so that the smallest size upper case character height will be a maximum of 1,6 mm (0.063 in). The space between successive lines of characters in the array shall be no greater than 7/8 the height of the capital letter E. Alphanumeric COMs with a character height between 2,28 and 2,54 mm (0.09 in and 0.1 in) would use a maximum reader or print magnification to determine system image quality of 16 X for nominal 1 : 24 reduction and 32 X for nominal 1 : 48 reduction COM images. Viewing shall be in an ambient illumination of approximately 540 lx.

Good quality-control practice dictates that this test be performed on a routine basis.

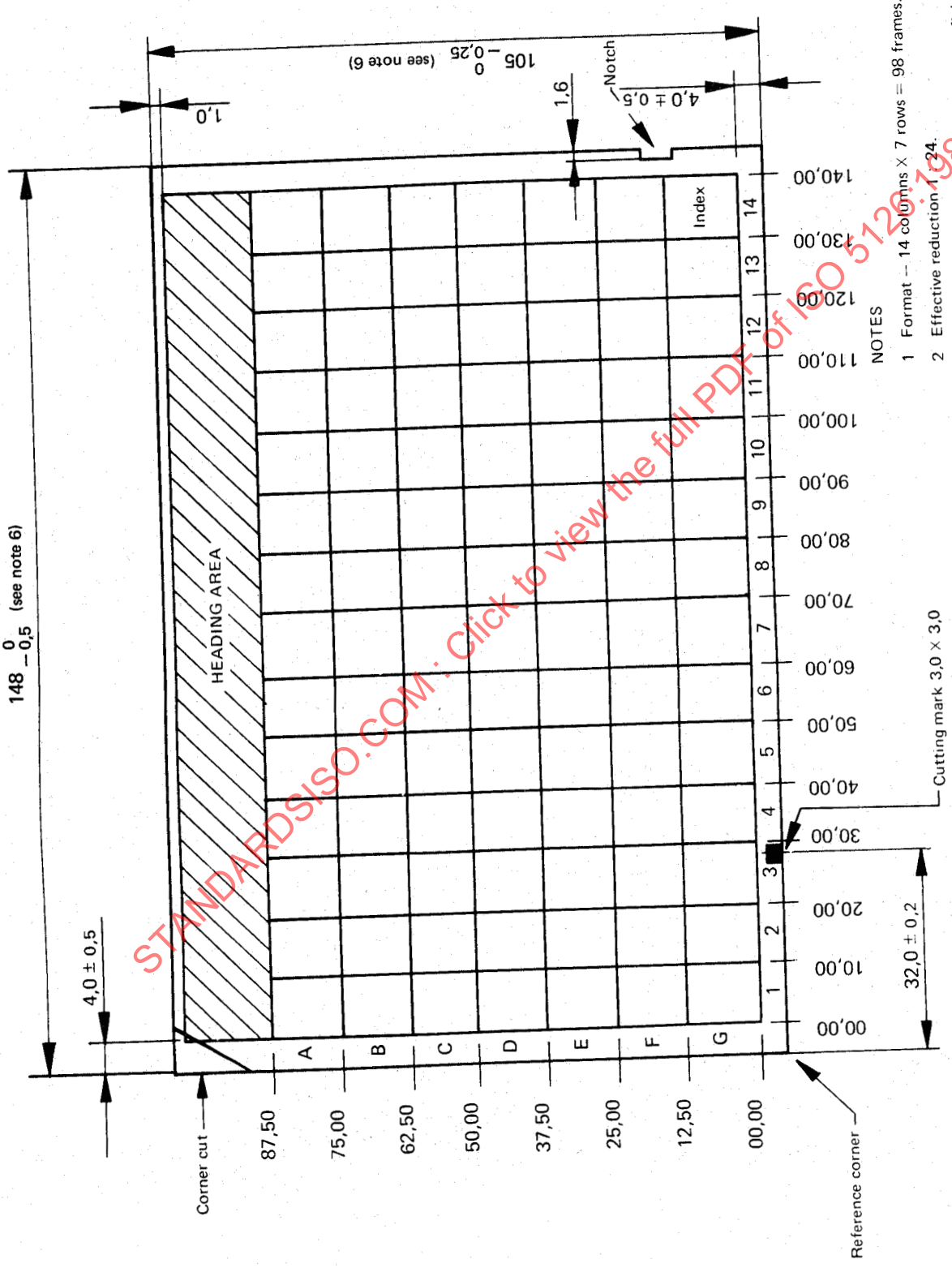
9.2 Legibility of reproduction copies

The subsequent generation which serves as the user copy shall meet the same legibility standard as that described for the first generation.

9.3 Curl and bow

A fully processed microfiche cut to distribution size shall be placed convex side down on a flat surface for at least 6 h in an atmosphere in which the temperature is 23 ± 2 °C and the relative humidity 50 ± 5 %, after which no part of the microfiche shall be more than 6,5 mm above the surface.

1) When co-ordinates are placed in the bottom margin, they may interfere with automatic cutters sensing the cutting mark.



NOTES

1 Format – 14 columns × 7 rows = 98 frames.

2 Effective reduction 1:24.

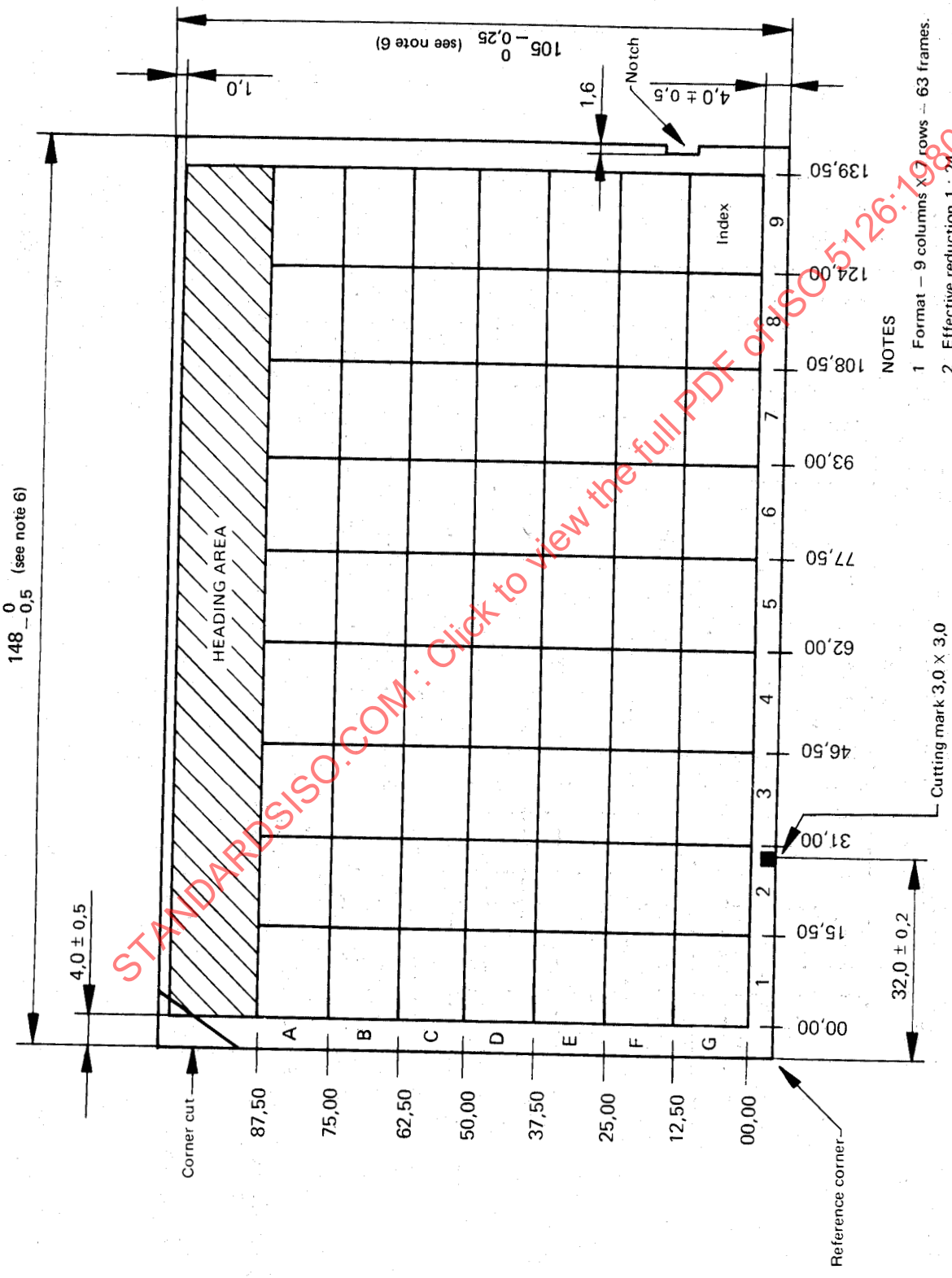
3 Grid lines shown do not appear on microfiche.

4 With the notch and corner cut in the positions shown on this drawing the sensitized layer is facing the observer.

5 Dimensions in millimetres.

6 Manufacturing tolerances for raw film.

Figure 1 — Image arrangement No. 2



NOTES

1 Format – 9 columns × 7 rows – 63 frames.

2 Effective reduction 1 : 24

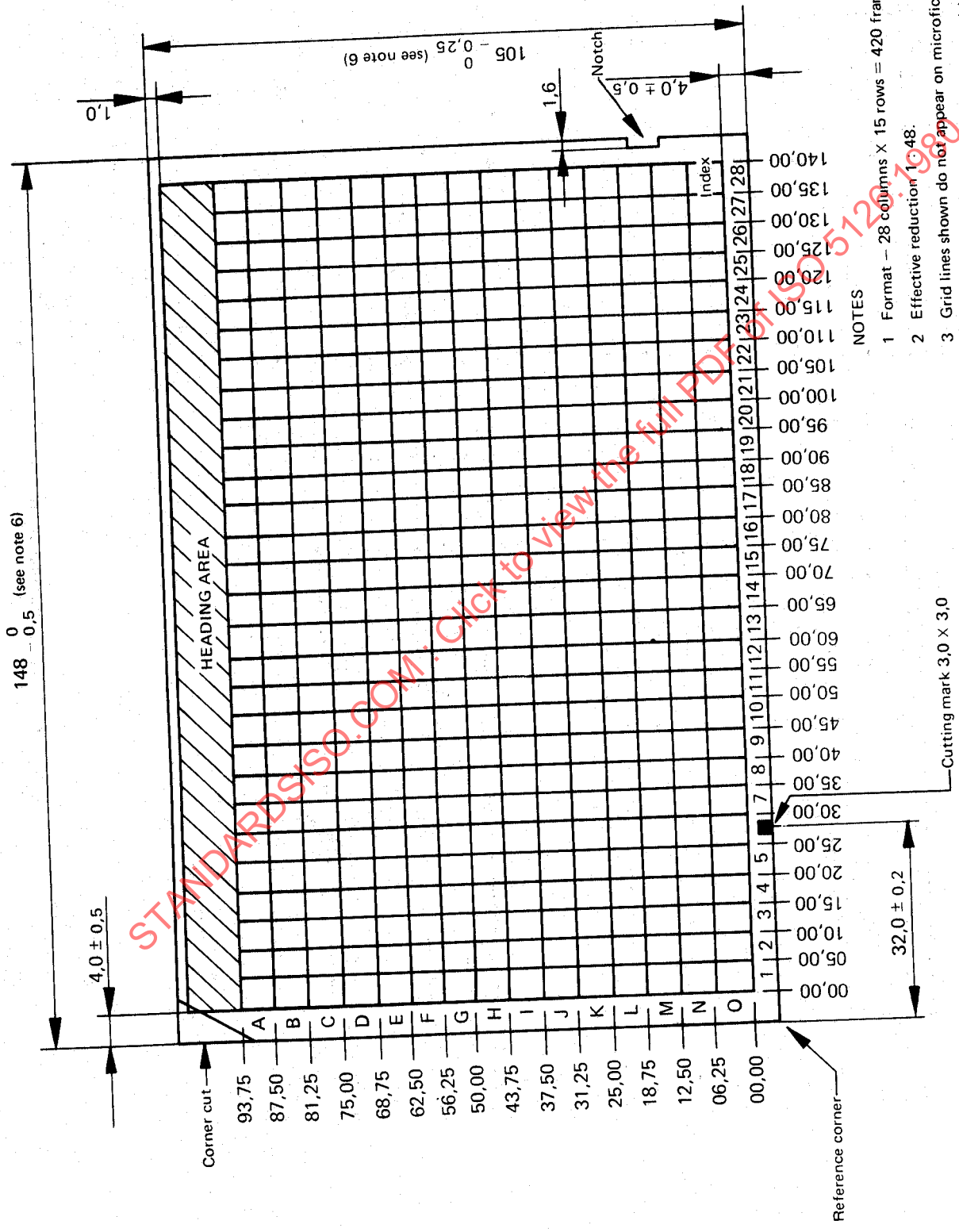
3 Grid lines shown do not appear on microfiche.

4 With the notch and corner cut in the positions shown on this drawing the sensitized layer is facing the observer.

5 Dimensions in millimetres.

6 Manufacturing tolerances for raw film.

Figure 2 — Image arrangement No. 3



NOTES

1 Format – 28 columns × 15 rows = 420 frames.

2 Effective reduction 1:48.

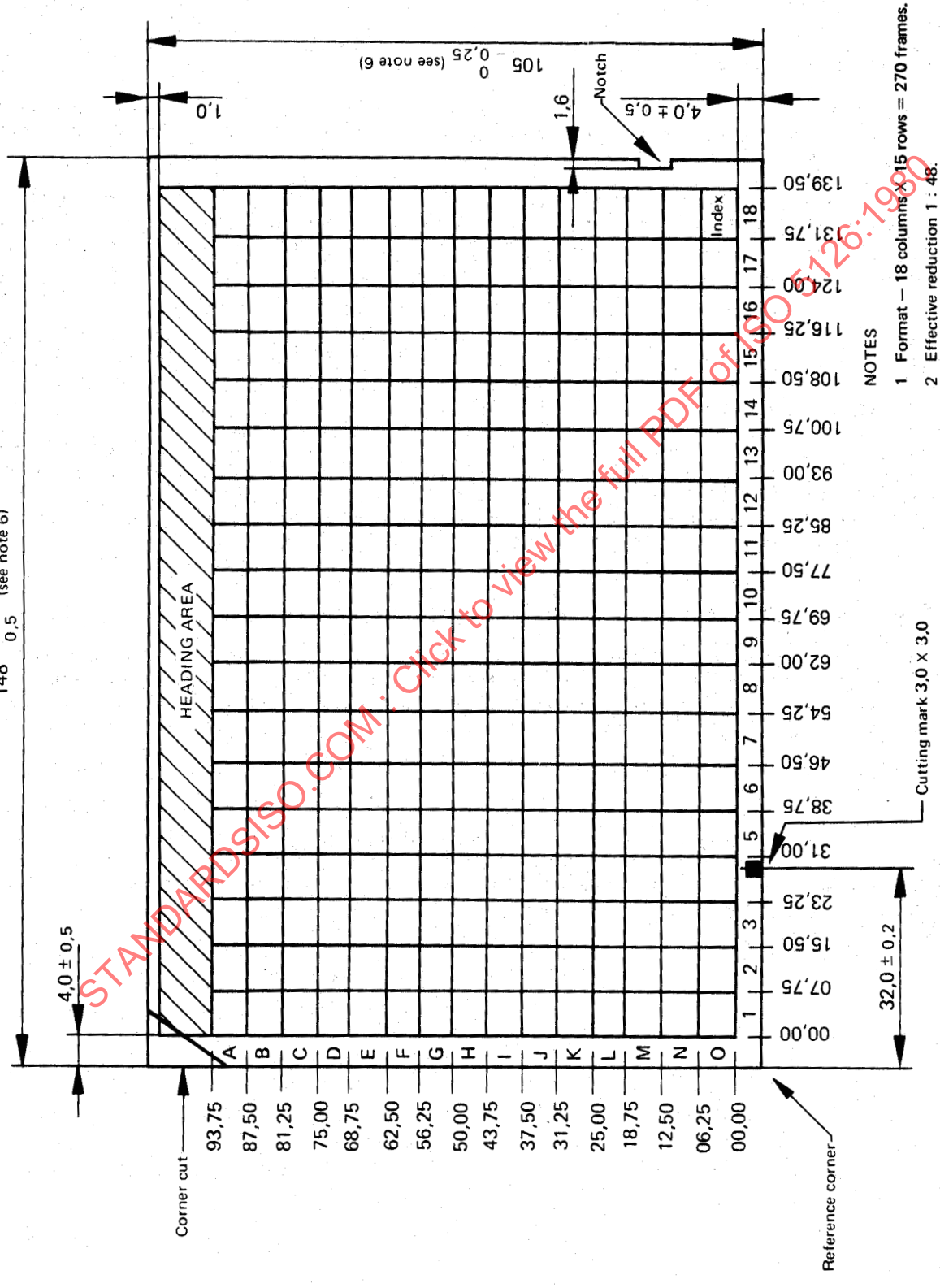
3 Grid lines shown do not appear on microfiche.

4 With the notch and corner cut in the positions shown on this drawing the sensitized layer is facing the observer.

5 Dimensions in millimetres.

6 Manufacturing tolerances for raw film.

Figure 3 — Image arrangement No. 4



NOTES

1 Format — 18 columns × 15 rows = 270 frames.

2 Effective reduction 1 : 48.

3 Grid lines shown do not appear on microfiche.

4 With the notch and corner cut in the positions shown on this drawing the sensitized layer is facing the observer.

5 Dimensions in millimetres.

6 Manufacturing tolerances for raw film.

Figure 4 — Image arrangement No. 5

Annex A

Variations in dimensional characteristics of microfiche

(This annex does not form part of the standard.)

A.1 Variations due to processing

The dimensions of the film immediately after processing cannot be predicted with great accuracy because there are many variables. The films may stretch or shrink depending upon the emulsion, support, moisture content, and film tension in the processor and the time and temperature of processing.

It is estimated that gelatin-silver or diazo-sensitized layers coated on cellulose ester or polyester supports processed by conventional methods will stretch or shrink approximately ± 0,01 %. However, heat-processed microfilms coated on polyester support may show processing size changes from +0,1 to −0,5 %, depending upon the particular film and the time and temperature of processing.

A.2 Variations due to ageing

Processed microfiche may stretch or shrink due to ageing depending upon the conditions of storage and the type of support. Films coated on polyester support show considerably less stretch or shrinkage due to ageing than films coated on cellulose ester support. Microfiche, after processing, should be kept in conformity with ISO 2803.

It is estimated that microfilms on polyester base may shrink approximately 0,01 to 0,03 % over a ten-year period. The shrinkage of films coated on cellulose ester support is dependent upon the rate of loss of residual solvents from the support. Ten years after processing, these films may shrink between 0,1 and 0,7 %. These ranges of shrinkage due to ageing are for films stored at 23 ± 2 °C and 50 ± 5 % relative humidity. The larger values represent the levels reached when the films are stored in freely circulating air. The lower values are indications of the levels reached when the films are stored in closed files or containers.

A.3 Variations due to temperature and humidity

Microfiche will show increases or decreases in size due to increases or decreases in temperature or relative humidity. These changes are temporary. Cellulose ester base films will change approximately 0,006 % for each temperature change of 1 °C, while polyester base films will change approximately 0,002 %. For each 1 % change in relative humidity, cellulose ester base films will change approximately 0,004 % while polyester base film will change 0,001 to 0,002 %, depending upon the film type.

A.4 Microfiche grid variations

The dimensions of the microfiche at any time in its useful life are the sum of the variations due to processing and ageing, in addition to the raw stock dimensions. It should be noted that changes in size due to processing and ageing will affect the location of the images relative to the microfiche grid. The effect these factors will have on the location of a specific image relative to the grid will be proportional to the distance the image is from the reference corner of the microfiche.

Annex B

Commentary on pagination modes

(This annex does not form part of the standard.)

It is recognized that there exists a requirement for both vertical and horizontal pagination. The proper choice depends on an evaluation of the pertinent criteria :

1) Compatibility of generated fiche with existing files.

2) Application-oriented factors such as :

   a) the nature and structure of the information generated, for example text vs. listings;

   b) human factors relating to reading comfort;

   c) unforeseen requirements related to new microfiche applications.

3) Hardware factors that influence COM fiche pagination are related to :

   a) the mode obtainable from the available COM equipment;

   b) conversion from COM roll film to COM fiche, for example jackets or strip up;

   c) the selected storage and retrieval system.

The selection of the optimum pagination mode (vertical or horizontal) will result from the system analysis.

Annex C

Legibility arrays

(This annex does not form part of the standard.)

Five different random groups using 63 numbers will generate legibility arrays by assigning a number to each character and symbol in order to allow creation of the array using a maximum of 63 characters and symbols. Generally, the 64 symbol is a blank, omitted so that all spaces in the array would be filled.

A typical legibility array is shown on the following pages.

LEGIBILITY ARRAY I

	Character position																			
Line	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	22	17	23	35	2	22	57	51	61	9	43	6	58	24	3	47	19	36	27	59
2	46	13	37	55	39	32	9	52	5	30	62	47	51	62	16	23	2	9	61	25
3	21	28	6	24	25	16	13	59	23	5	47	25	43	61	20	44	32	63	61	
4	46	38	3	22	21	21	3	28	28	26	8	37	32	4	5	30	16	9	5	58
5	28	35	7	44	47	22	53	39	7	10	63	35	3	4	8	13	13	51	55	34
6	57	58	54	38	52	6	45	63	18	27	44	19	9	23	35	26	53	61	28	52
7	5	48	34	56	5	61	10	15	39	25	52	15	33	59	5	28	22	26	7	47
8	29	6	58	30	24	18	46	23	34	27	13	24	44	49	18	9	49	16	32	23
9	2	57	35	15	33	24	53	63	9	41	10	47	44	4	55	39	60	4	59	48
10	50	54	48	22	5	34	52	21	27	20	33	29	11	15	29	12	3	61	48	3
11	7	16	39	33	56	10	56	21	30	27	12	49	22	23	62	36	41	26	29	63
12	51	20	52	36	9	41	15	9	60	16	3	3	18	28	31	57	12	2	7	23