INTERNATIONAL STANDARD

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Micrographics — Quality control of COM recorders that generate images using a single internal display system —

Part 2: Method of use

Micrographie — Contrôle de la qualité des microformes produites sur un système électronique (COM) de génération d'image adressage de points —

Partie 2: Méthode d'utilisation

Reference number
ISO 14648-2:2001(E)

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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 3.

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 part of ISO 14648 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14648-2 was prepared by Technical Committee ISO/TC 171, *Document imaging applications*, Subcommittee SC 1, *Quality*.

ISO 14648 consists of the following parts, under the general title *Micrographics — Quality control of COM recorders that generate images using a single internal display system*:

— *Part 1: Characteristics of the software test target*

— *Part 2: Method of use*

Introduction

This part of ISO 14648 specifies methods for using the test targets specified in ISO 14648-1 for initial Computer Output Microfilm (COM) recorder testing, to establish a quality reference and for periodic testing of COM image quality.

Micrographics — Quality control of COM recorders that generate images using a single internal display system —

Part 2: Method of use

1 Scope

This part of ISO 14648 specifies methods for using the software test targets specified in ISO 14648-1.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 14648. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 14648 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 5-2:1991, *Photography — Density measurements — Part 2: Geometric conditions for transmission density*

ISO 5-3:1995, *Photography — Density measurements — Part 3: Spectral conditions*

ISO 6196-1:1993, *Micrographics — Vocabulary — Part 1: General terms*

ISO 6196-3:1997, *Micrographics — Vocabulary — Part 3: Film processing*

ISO 6196-5:1987, *Micrographics — Vocabulary — Part 5: Quality of images, legibility, inspection*

ISO 6196-6:1992, *Micrographics — Vocabulary — Part 6: Equipment*

ISO 6196-7:1992, *Micrographics — Vocabulary — Part 7: Computer micrographics*

ISO 8514-1:2000, *Micrographics — Alphanumeric computer output microforms — Quality control — Part 1: Characteristics of the test slide and test data*

ISO 8514-2:2000, *Micrographics — Alphanumeric computer output microforms — Quality control — Part 2: Method*

3 Terms and definitions

For the purposes of this part of ISO 14648, the terms and definitions given in ISO 6196 and ISO 14648-1 apply.

4 Outline of the method

This test method may be used initially to establish the quality of the images recorded by a COM system. The results of the initial test may be used either to establish an initial quality reference for the system to which future output can be compared or the initial output may indicate certain repairs or adjustments that should be made to bring the system up to the required specification. The primary use of the target should be to establish a working quality reference and then to use it as a means to monitor consistency of performance on a periodic basis. If there are several COM recorder systems in use, the test target also provides a method of checking that equivalent performance is being obtained from each recorder.

The user application may demand that the best image quality be required in the duplicates rather than the master microform. In this case, the optimum exposure level is determined by inspecting the duplicate microform images made on a duplicator that has been properly calibrated and adjusted.

5 Test procedure

5.1 General

The following procedure first establishes the optimum image obtainable from the COM recorder system by optimizing the exposure setting. Various parameters characterizing the COM recorder system performance can then be established by measurement and observation of the output microform image quality.

5.2 Establishing the COM recorder imaging quality parameters

5.2.1 COM system set-up

Ensure that the COM system is functioning properly before starting these tests.

The system shall be warmed up in accordance with the manufacturer's recommendations. Film known to be capable of producing microimages of suitable quality shall be used. The processor shall be up to temperature and, where appropriate fresh chemicals shall be used, shall be warmed to the specified temperature.

5.2.2 Test grid

Generate a pattern of characters as specified in ISO 8514-1 and check that the image produced is in accordance with ISO 8514-2.

5.2.3 Optimizing the exposure setting

Fill a microfiche or a suitable equivalent length of microfilm with images of the test target, using Target 1 or Target 2 as appropriate. If the system software has the capability to run a series of gradually increasing intensities from column to column, such a series shall be made over a wide range of intensities. If this capability does not exist, then several sets of images shall be produced, each at a different intensity, to uniformly and adequately cover the intensity range.

The optimum exposure level for the target shall be the exposure level which gives an image of the EHN, OCR-B or alternate fonts in which the narrowest line width characters appear underexposed and the thickest line width characters appear overexposed. Either the images on the master microforms or the duplicate are examined depending on user requirements. Record the exposure setting that produced the chosen optimum result.

5.2.4 Establishing the optimum density

Having selected the optimum exposure level, measure the visual diffuse transmission density of the maximum density area within that frame with a densitometer. Record the density of the solid and clear areas (e.g. those corresponding to all dots on and all dots off).

5.2.5 COM reduction ratio

The reduction ratio of the COM recorder shall be determined using the border of Target 1 or the measuring scales on Target 2.

Measure the appropriate distances on the microform, preferably using a travelling microscope or a microscope with an X-Y axis measuring capability. A calibrated microform reader may be used to make these measurements.

On Target 1, the horizontal distance between the border lines is 340,4 mm and the vertical distance is 279,4 mm, when measured on the equivalent full-size original.

On Target 2, the horizontal distance of the relevant part of the measuring scale is 152,4 mm at 1:24, 266,7 mm at 1:42 and 304,8 mm at 1:48, when measured on the equivalent full-size original. The vertical distance of the measuring scale is 152,4 mm at 1:24, 266,7 mm at 1:42 and 152,6 mm at 1:48, when measured on the equivalent full-size original.

Measure the length of both the horizontal and the vertical scale. The vertical and horizontal reduction ratio may be different for different types of recorders.

The reduction ratio is generally fixed in a COM system by the lenses and does not vary except when the lenses are changed. Hence, this test is useful only in determining if the specification for reduction ratio is being met or verified if in question. Typically, the reduction ratio should be within 1 % of the stated value, but the COM system manufacturer's specifications should be consulted.

5.2.6 COM resolving power

The test charts at the four corners and in the centre of Target 2, and in the upper left and right corners of Target 1, shall be used to determine the resolving power obtained on the microform and to check the focus of the image.

The resolving power shall be determined by the smallest or finest test pattern that has an observable line pattern when viewed with a microscope having a minimum magnification equal to the reduction ratio used for the microform images. If a microscope is not available, a microform reader may be used to obtain an approximate value for limiting resolution. The microform reader may indicate a lower resolution due to its optical system and many readers will degrade the image quality, thus reducing the ability to accurately judge the limiting resolution.

5.2.7 Diagonal lines

The diagonal lines shall be checked for straightness and shall be examined for stepping.

5.2.8 COM character legibility areas

The COM character legibility areas shall be used to judge character legibility.

5.2.9 Alternative font area

Check the quality of the characters located in the alternate font area. In routine work, all characters in this area should be easily legible. The characters located in this area are a sample of standard characters recommended for use in making standard (or working) test targets, or are special fonts or script selected by the user.

6 Density of first generation microform

6.1 General

Produce images of the test target on film and make density measurements on these images as follows.

6.2 Density test areas

There are two areas used for the measurement of density. The density measuring area on the right side of the test slide shall be used to measure the maximum density when positive-appearing film is used or to measure the minimum density when negative-appearing film is used. In addition, the centre square density area shall be used to measure the minimum density (base plus fog) on positive-appearing film and the maximum density for negative-appearing film.

The halftone screen area (square density area on the left) shall be used to monitor the consistency of exposure and processing.

6.3 Density values

Table 1 gives recommended visual diffuse transmission density measured on a densitometer that has spectral conformance to ISO 5-3 and geometric conformance to ISO 5-2, or Status M Blue density values.

Table 1 — Summary of acceptable density limits

Film type	Process	Density measurement method	Minimum background density	Maximum clear area density	Minimum density difference
Silver gelatin	Conventional	Printing or visual diffuse	0,75	0,15 or 0,10 plus base [a]	0,60
Silver gelatin	Full reversal or direct positive	Printing or visual diffuse	1,50 (1,80 preferred)	0,20 plus base [a]	1,30
Thermally-processed silver	Heat	Printing ISO type 1	1,00	0,40 plus base [a]	0,60 (0,80 preferred)

[a] Density of the uncoated base.

7 Test procedures

7.1 General

The following test procedures shall be performed for the following purposes:

a) installation and maintenance testing;

b) routine checking.

7.2 Installation and maintenance testing

7.2.1 Equipment set-up and tests

Perform all the tests described in clause 5.

7.2.2 Select optimum settings

Determine and record the optimum COM recorder system settings as specified in clause 5.

7.2.3 Generation of microforms

Adjust the COM recorder to these optimum settings and generate a microfiche or its microfilm equivalent completely filled with images of the test target.

7.2.4 Record data

Record the densities obtained from the density test areas, comment on the font samples which produce the best results for legibility, record the smallest test pattern from the test chart that is resolved and determine the reduction ratio obtained. A sample microfiche should be kept.

7.3 Routine checking

This test should be performed periodically as part of the regular maintenance procedure, or at any time when the image quality is questioned.

7.3.1 Generate microforms

Generate a complete microfiche or its microfilm equivalent and duplicates, if required by the user's application, with images of Target 1 or Target 2 using the same exposure and processing conditions as recorded during the testing performed as specified in 5.1.

7.3.2 Compare resulting quality

Check that the results obtained are acceptable (i.e. within acceptable tolerance) with those recorded for the reference microform obtained in 7.2.

7.3.3 Adjustments or maintenance

Make the necessary adjustments or changes if the results are not acceptable and generate a confirmation microfiche and duplicates as required for record keeping.

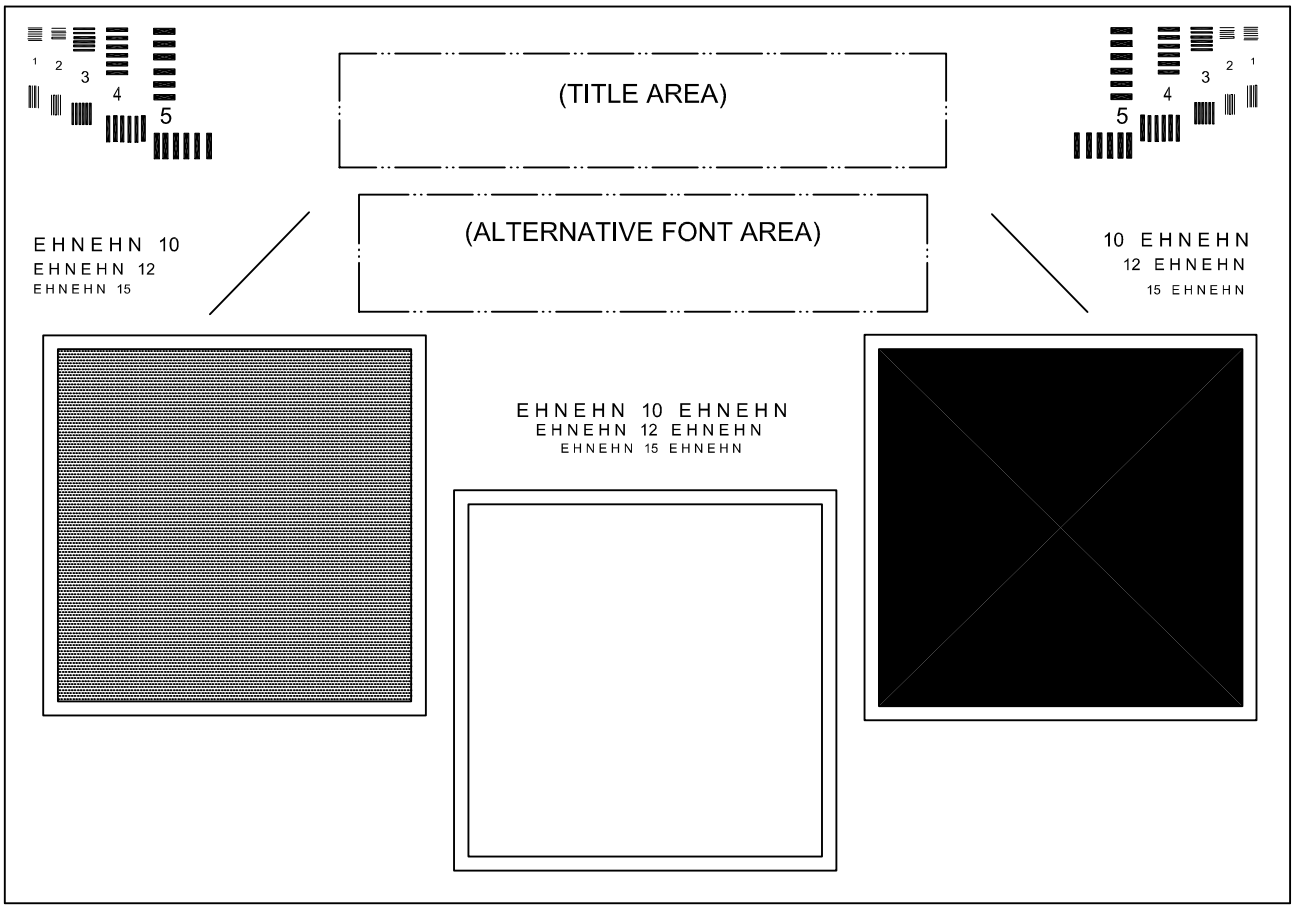

Figure 1 — Sample layout of Target 1

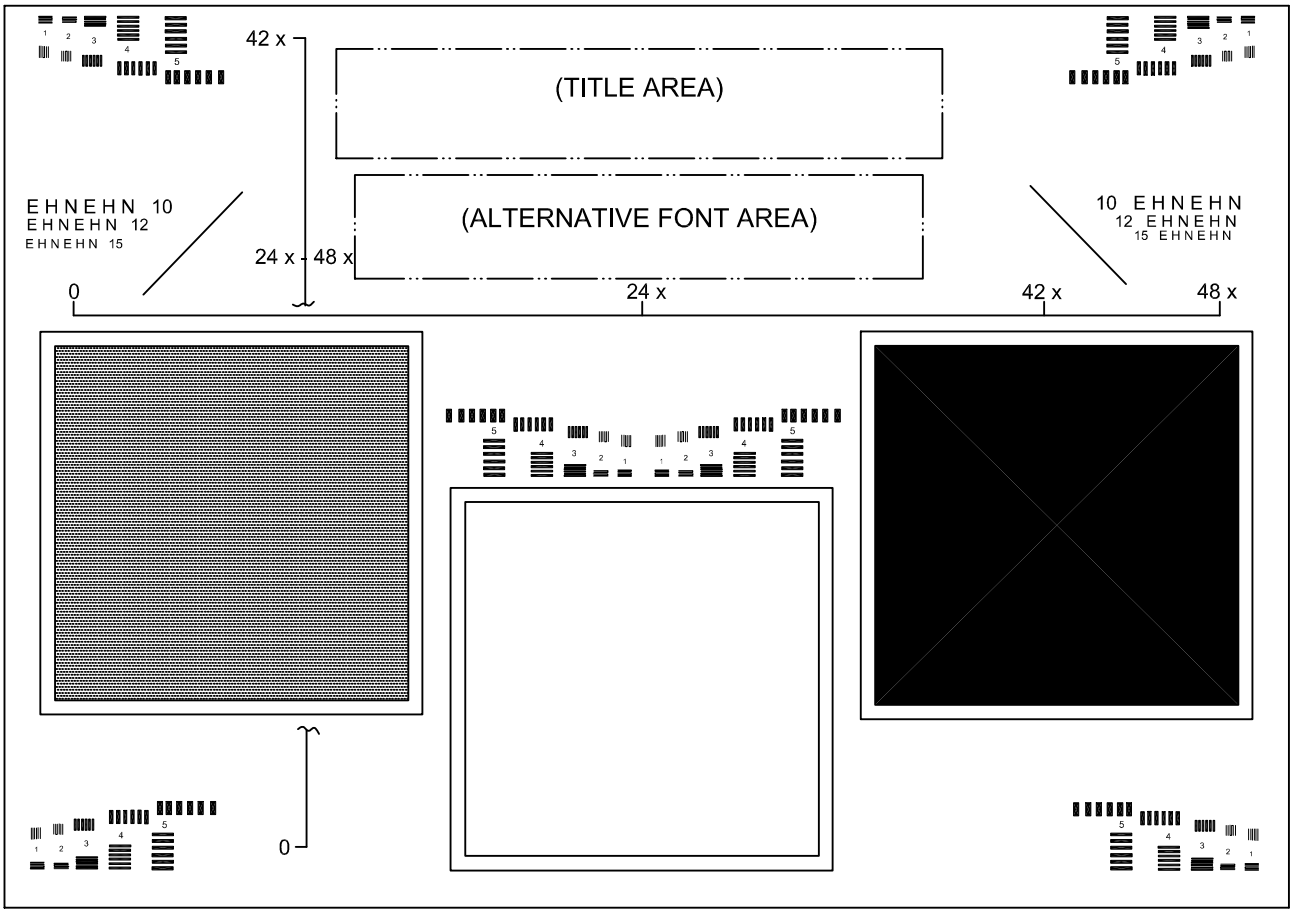

Figure 2 — Sample layout of Target 2

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