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**Document imaging applications —  
Microfilming of achromatic maps on 35 mm  
microfilm**

*Applications en imagerie documentaire — Microfilmage des cartes  
achromatiques sur microfilm de 35 mm*

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## Foreword

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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 12650, was prepared by Technical Committee ISO/TC 171, *Document imaging applications*, Subcommittee SC 2, *Applications issues*.

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## Introduction

This International Standard has been prepared to help microfilmmers of maps. It supplements ISO 3272-1, ISO 3272-2 and ISO 3272-3, which apply to technical drawings as well as to maps. However, reduction ratios for technical drawings can be unsuitable for maps because maps often have thinner lines and smaller details than those specified for technical drawings.

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# Document imaging applications — Microfilming of achromatic maps on 35 mm microfilm

## 1 Scope

This International Standard specifies special requirements for recording achromatic maps on 35 mm microfilm in the form of rolls or aperture cards.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 446:1991, *Micrographics — ISO character and ISO test chart No. 1 — Description and use.*

ISO 3272-1:1983, *Microfilming of technical drawings and other drawing office documents — Part 1: Operating procedures.*

ISO 3272-2:1994, *Microfilming of technical drawings and other drawing office documents — Part 2: Quality criteria and control of 35 mm silver gelatin microfilms.*

ISO 3272-3:—<sup>1)</sup>, *Microfilming of technical drawings and other drawing office documents — Part 3: Unitized aperture card for 35 mm microfilm.*

ISO 3272-4:1994, *Microfilming of technical drawings and other drawing office documents — Part 4: Microfilming of drawings of special and exceptional elongated sizes.*

ISO 3334:1989, *Micrographics — ISO resolution test chart No. 2 — Description and use.*

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

ISO 6196-2:1993, *Micrographics — Vocabulary — Part 2: Image positions and methods of recording.*

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

ISO 6196-4:1987, *Micrographics — Vocabulary — Part 4: Materials and packaging.*

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 6196-8:1998, *Micrographics — Vocabulary — Part 8: Use.*

ISO 6199:1991, *Micrographics — Microfilming of documents on 16 mm and 35 mm silver-gelatin type microfilm — Operating procedures.*

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1) To be published. (Revision of ISO 3272-3:1975)

### 3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 6196 and the following apply.

**3.1 achromatic map**  
map having a white or near-white base on which information is printed using a spectrally neutral medium

### 4 General requirements

#### 4.1 Roll microfilm

Maps shall be recorded on 35 mm roll microfilm in accordance with ISO 3272-2 requirements for matters not specified in this standard.

#### 4.2 Quality

The quality of silver-gelatin type films shall comply with ISO 3272-2 requirements for matters not specified in this standard.

#### 4.3 Aperture cards

Aperture cards shall comply with ISO 3272-3.

### 5 Reduction

#### 5.1 Reduction ratios

The nominal reduction ratio shall be 1:24 ; 1:21,2 ; 1:15 ; 1:10 ; or 1:7,5. The reduction ratio selected shall normally be the lowest that will wholly accommodate the map in a frame of 35 mm microfilm. To ensure legibility, the optical class of characters and quality index described in ISO 6199 should be taken into account when selecting reduction ratios.

#### 5.2 Resolution

To ensure that all information can be recorded when tested in accordance with ISO 3272-2, the quality of all processed microfilm shall be such that the ISO character sizes or the pattern numbers shown in Table 1 for the appropriate generation and reduction ratios shall be resolved.

Table 1 — Resolution requirements

Reduction ratio	ISO test chart 1 character size mm/100			ISO test chart 2 pattern number		
	1st generation	2nd generation	Distribution	1st generation	2nd generation	Distribution
1:24	80	90	100	5,0	4,5	4,0
1:21,2	71	80	90	5,6	5,0	4,5
1:15	56	63	70	7,1	6,3	5,6
1:10	45	56	63	8,9	7,9	7,1
1:7,5	45	56	63	10,0	8,9	7,9

## 6 Test target

At the start of the roll, the test target (see Figure 1) shall be microfilmed once at the lowest reduction ratio used for example, at 1:15 or 1:16 for 35 mm film. At the end of the roll, the test target shall be microfilmed once for each reduction ratio used or each time the reduction ratio is changed.

The test target shall comprise the following features, arranged as shown in Figure 1:

- ISO test charts of the same type;
- centre markings and sheet size markings for 3 reduction scales;
- a reflectance target ; that is, a grey, spectrally neutral, matt-finished patch at least 150 mm x 150 mm with a reflectance within the range  $50 \% \pm 3 \%$  and a dark, spectrally neutral, matt-finished patch with a reflectance within the range  $6 \% \pm 0,4 \%$ ;
- a reduction-ratio test strip that contrasts sufficiently with the background so that the length of the image recorded on the microfilm can be measured easily and that is 10 times as long, in millimetres, as the reduction used;
- an identification card placed on a clear space on the test target and microfilmed at the start of the roll;
- a test target for each reduction ratio or for several reduction ratios combined;
- a symmetrical, orthogonal grid of crosses marking subdivision of the area into squares of 100 mm in a side. The centres of the crosses shall represent the reference point locations. The position of a reference point with respect to the neighbouring reference points shall not differ from the nominal value by more than  $\pm 0,1 \%$ . Furthermore, the entire grid shall not differ by more than 0,5 % in any direction from the nominal size.

The test target shall be exposed so that the density of the grey patch (50 % reflectance) is between 1,0 and 1,2. Each of the five resolution test charts on each frame shall be examined under a microscope. When ISO test chart 1 is used (see ISO 446), the magnification of the microscope shall be between 50:1 and 60:1. When ISO test chart 2 is used (see ISO 3334), the magnification shall be between 0,5 and 1 times the number of line pairs per millimetre to be resolved.

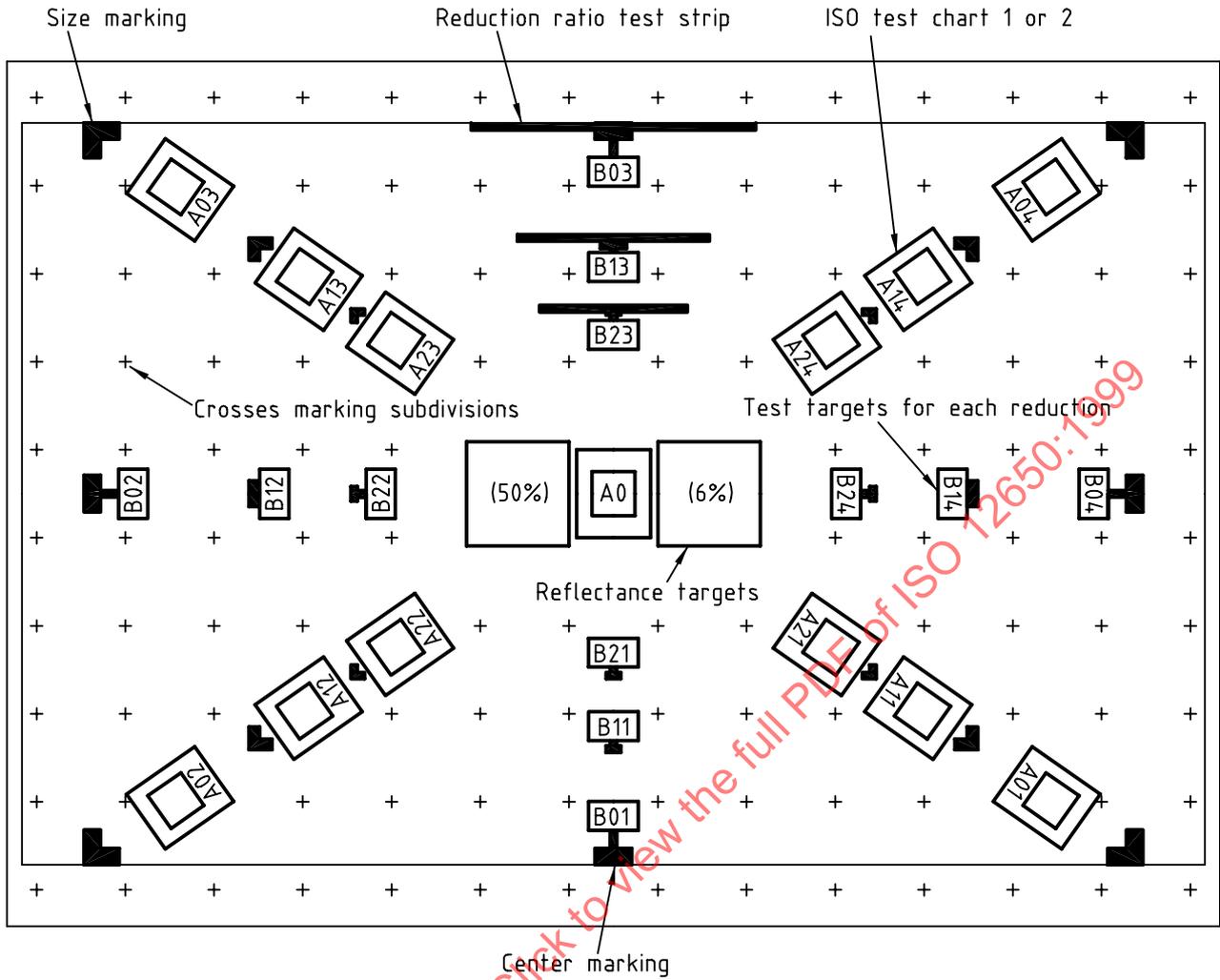


Figure 1 — Test target