
**Microfilming of technical drawings and
other drawing office documents —**

Part 6:

**Quality criteria and control of systems for
enlargements from 35 mm microfilm**

*Micrographie des dessins techniques et autres documents de bureau
d'études —*

*Partie 6: Critères et contrôle de qualité des systèmes pour
l'agrandissement de microfilm de 35 mm*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 3272 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 3272-6 was prepared by Technical Committee ISO/TC 171, *Document imaging applications*, Subcommittee SC 2, *Application issues*.

ISO 3272 consists of the following parts, under the general title *Microfilming of technical drawings and other drawing office documents*:

- *Part 1: Operating procedures*
- *Part 2: Quality criteria and control of 35 mm silver gelatin microfilms*
- *Part 3: Unitized aperture card for 35 mm microfilm*
- *Part 4: Microfilming of drawings of special and exceptional elongated sizes*
- *Part 5: Test procedures for diazo duplicating of microfilm images in aperture cards*
- *Part 6: Quality criteria and control of systems for enlargements from 35 mm microfilm*

Annex A of this part of ISO 3272 is for information only.

Introduction

This part of ISO 3272 gives guidance on methods of producing enlargements from microfilm in accordance with ISO 3272-1.

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Microfilming of technical drawings and other drawing office documents —

Part 6:

Quality criteria and control of systems for enlargements from 35 mm microfilm

1 Scope

This part of ISO 3272 specifies procedures for checking minimum legibility requirements and the quality of the system and hard-copy enlargements.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 3272. 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 3272 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 446:1991, *Micrographics — ISO character and ISO test chart No. 1 — Description and use.*

ISO 3272-1:1983, *Microfilming of technical drawings and other drawings 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 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 6196-4:1998, *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.*

3 Terms and definitions

For the purposes of this part of ISO 3272, the terms and definitions given in ISO 6196 apply.

4 Enlargement ratios

Enlargements shall be made at one of the ratios specified in ISO 3272-1. For continuous enlargement, the enlargement ratio that gives the largest copy containable within the width of the roll of copy material shall be used.

5 Legibility

The legibility of an enlargement made from a test negative that complies with ISO 3272-2 should be such that the ISO No. 1 test character or ISO No. 2 test pattern given in Table 1 or 2 is resolved. The position of the centre lines should be checked and any deviation from the horizontal or vertical noted.

For testing the legibility, optical instruments (for instance magnifying glasses) can be used.

Because the legibility of the microfilm depends, among other things, on the reduction ratio, the quality of the enlargement is also determined by the reduction ratio. Tables 1 and 2 show the values of the test patterns or characters that according to ISO 446 and ISO 3334 must be legible depending on the reduction ratio.

Table 1 — ISO No. 1 test characters to be read at enlargement ratios

Reduction ratio	ISO No. 1 test characters to be read at enlargement ratios				
	(7,5/1)	(10,5/1)	15/1	21/1	30/1
(1:7,5)	100	80	63	56	50
(1:10,5)	125	100	80	71	63
1:15	140	125	112	100	80
1:21	180	160	140	125	112
1:30	250	225	180	160	140

NOTE The values shown in brackets are not given in ISO 3272-1 but are included here for information.

Table 2 — ISO No. 2 test characters to be read at enlargement ratios

Reduction ratio	ISO No. 2 test characters to be read at enlargement ratios				
	(7,5/1)	(10,5/1)	15/1	21/1	30/1
(1:7,5)	4,0	5,0	6,3	7,1	8,0
(1:10,5)	3,2	4,0	5,0	5,6	6,3
1:15	2,8	3,2	3,6	4,0	5,0
1:21	2,2	2,5	2,8	3,2	3,6
1:30	1,6	1,8	2,2	2,5	2,8

NOTE The values shown in brackets are not given in ISO 3272-1 but are included here for information.

Annex A (informative)

Readability of a print from a microfilmed engineering document

The readability of a print from a microfilmed engineering document depends on five factors:

- size of the lettering;
- shape of the lettering;
- spacing of each letter;
- sharpness or resolution;
- contrast.

ISO 3098-1 specifies the size, shape, and spacing for lettering. When a drawing conforms to ISO 3098-1, the readability is then determined by a combination of resolution and contrast. When resolution and density are high, the readability is high. When both are low, the readability is poor. High resolution and low contrast also produces prints of poor readability. This part of ISO 3272 only addresses the measurement of resolution. Contrast must also be taken into consideration when judging the quality of a print. The final criterion of readability is: does the print satisfy the user's need?

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