INTERNATIONAL STANDARD 446

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

Microcopying — ISO No. 1 Mire — Description and use in photographic documentary reproduction

Microcopie — Mire ISO nº 1 — Description et utilisation dans la reproduction photographique des documents

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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.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 46 has reviewed ISO Recommendation R 446 and found it technically suitable for transformation. International Standard ISO 446 therefore replaces ISO Recommendation R 446-1965 to which it is technically identical.

ISO Recommendation R 446 was approved by the Member Bodies of the following countries :

Australia	Hungary	Portugal
Austria	India	Romania
Belgium	Israel	Spain
Brazil	Italy	Sweden
Chile	Japan	United Kingdom
Czechoslovakia	Korea, Rep. of	U.S.A.
Denmark	Netherlands	U.S.S.R.
France	New Zealand	
Germany	Norway	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 446 into an International Standard.

Printed in Switzerland

Microcopying — ISO No. 1 Mire — Description and use in photographic documentary reproduction

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the characteristics of the ISO No. 1 mire (ISO test object) referred to in sub-clause 6.3.2 of ISO 435, and its use in photographic documentary reproduction.

2 REFERENCES

ISO 3, *Preferred numbers — Series of preferred numbers.*

ISO 435, *Documentary reproduction — ISO conventional typographical character for legibility tests (ISO character).*

3 DESCRIPTION

3.1 The ISO No. 1 mire (see figures 1 and 2) consists essentially of "words" made up of ISO characters defined in ISO 435, and grouped as described in clause 6 of that International Standard.

3.2 Different face sizes are used for the various lines, according to the scales specified in ISO 435, sub-clause 4.2.1, i.e. :

— a main series in terms of the R 10 series of preferred numbers (see ISO 3) :

50 63 80 100 125 160

— an intercalated series :

45 56 71 90 112 140

These two series taken as a whole form an R 20 series.[1)]

3.3 The mire (see figure 2) consists virtually of two longitudinal half-strips with lines of characters arranged on each side of an axis such that

— on one half-strip the lines correspond to the R 10 series,

— on the other half-strip the lines correspond to the intercalated series.

The characters on one half-strip are placed symmetrically in relation to those on the other half-strip. Thus, the smallest characters (45 and 50) are near this axis and the largest characters (140 and 160) are near the edges, 10,5 mm from the axis (see figure 1).

3.3.1 A space equal to a line of face size 40 is reserved on the axis of the strip to allow for additions if required.

3.3.2 From the axis outwards, the interline spaces are in arithmetical progression : 10 — 13 — 16 — 19 — 22 — 25, in tenths of a millimetre. This arrangement was adopted in order to bring the lines of smaller face size nearer the axis. The total width of the two half-strips is 24 mm (see figure 1).

3.3.3 To facilitate reading, the face size is indicated at both ends of each line of characters, upright on one side and inverted on the other (see figures 1 and 2).

The face size is identified by the corresponding number of the series, for example the face size of the 45/100 mm characters is identified by the number 45.

3.3.4 These face sizes of the numbers are also in arithmetical progression, selected so as to be proportional to the interline spaces, those for the smallest being larger than the ISO characters themselves and still legible to the naked eye.

3.3.5 In the columns of numbers identifying the face sizes of the characters in each line, a clear distinction is made between the main series and the intercalated series. These columns are framed so that they form transverse bands :

— on one transverse band, all the numbers are printed black on a white background;

— on the next transverse band, the main series numbers are printed black on a white background, and on the other half-band the numbers of the intercalated series remain printed white on a black background.

3.3.6 Thus an ISO mire contains a recurring element comprising, as shown in figure 1, and in the following order, an area with lines of ISO characters on it,

1) This progression, scaled according to the R 20 series, corresponds substantially to that of ratio $\sqrt{2}$: 1, which is of particular significance in the matter of paper sizes. (See ISO 216, *Writing paper and certain classes of printed matter — Trimmed sizes — A and B series.*)

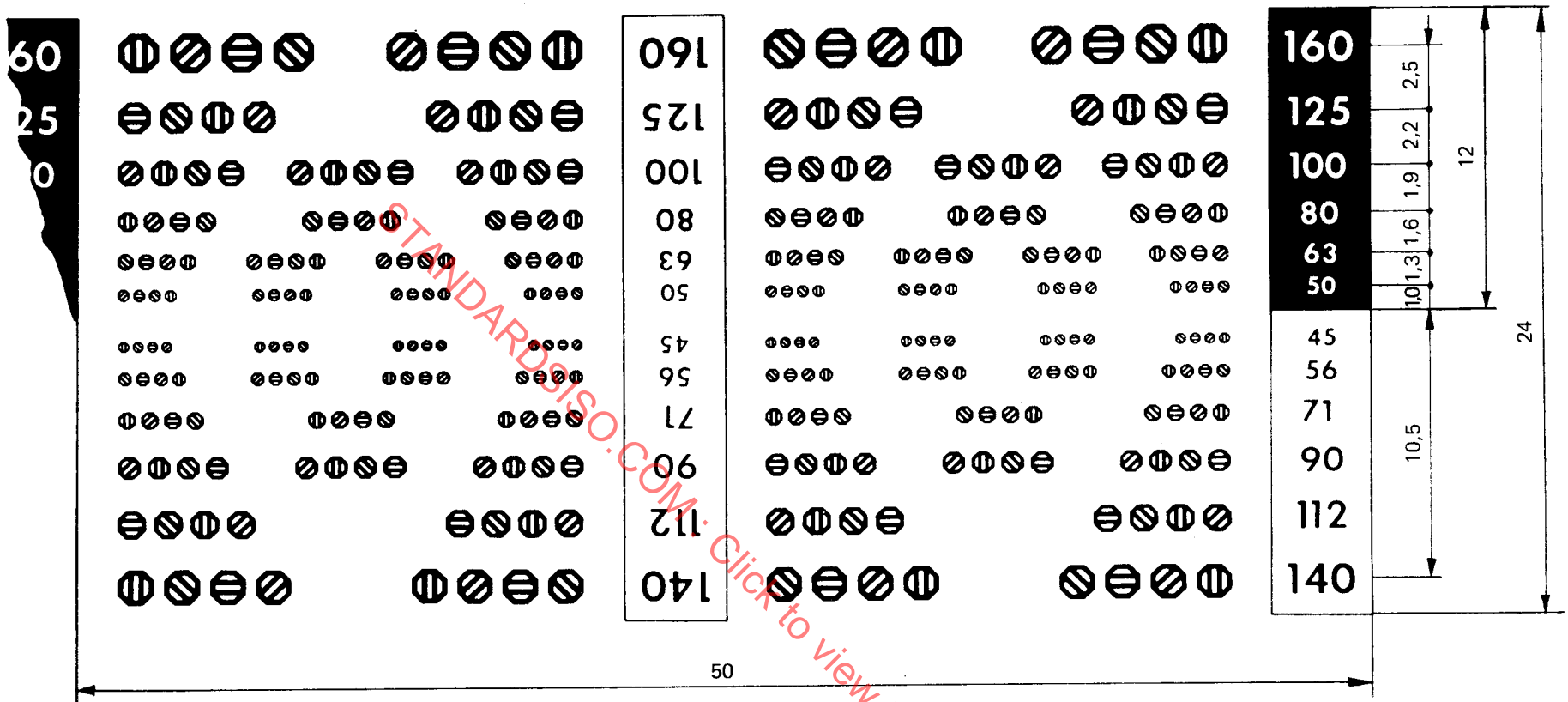

FIGURE 1 — **Magnified ISO mire element; actual dimensions shown in millimetres**

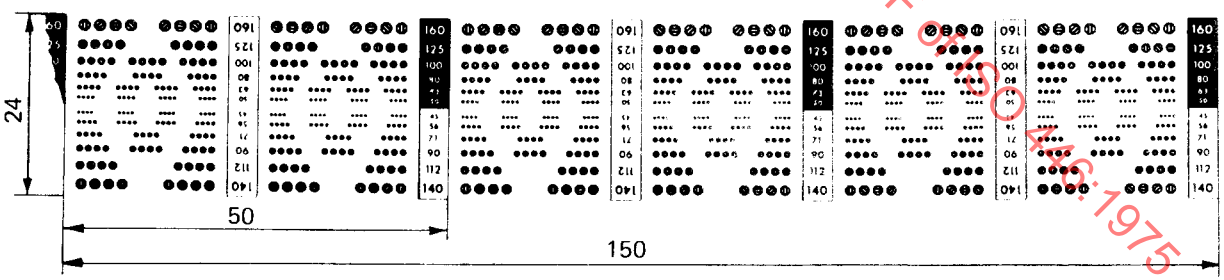

FIGURE 2 — **Diagram of a mire strip, approximate scale 1 : 1; actual dimensions shown in millimetres**

(This reproduction should not be used as an original mire)

a transverse band with all the numbers printed black on white, a second area with lines of ISO characters on it, and finally a second transverse band with one half-band presenting white numbers on a black background and the other half-band presenting black numbers on a white background.

3.3.7 A mire element, thus constituted, is 50 mm long and 24 mm high. The dimensions are measured as shown in figure 1.

3.4 Each mire comprises at least three elements, making a minimum length of 150 mm, measured as shown in figure 2.

3.4.1 At each end, there may in addition be a black area and a white area large enough to permit density measurements.

3.4.2 Only mires complying in every respect with this International Standard and verified by a qualified laboratory may be designated ISO No. 1 mires.[1)]

4 USE OF THE ISO MIRE IN PHOTOGRAPHIC DOCUMENTARY REPRODUCTION

4.1 Principle

4.1.1 The complete procedure for making a photographic microcopy of a document comprises :

- positioning the document;
- adjusting and focusing the camera;
- exposing;
- developing and, if required, making a transparent or opaque microcopy, positive or negative, intended for circulation.

Disregarding problems of colour (which may arise from the properties of the image and base), it can be assumed broadly that black-and-white or almost black-and-white documents are involved.

4.1.2 Under these conditions, the mire can be used to check whether the procedure described in 4.1.1 is generally suitable for making microcopies possessing certain characteristics.

4.2 Procedure

A set of mires complying with the foregoing description is arranged in the camera field in such a way that "characters" of the various sizes required appear in the principal characteristic areas of the field. The other operations listed in 4.1.1 are then carried out.

4.3 Investigation and interpretation of results

4.3.1 The microcopy of the mire, obtained as specified in 4.2, is examined under a microscope with a magnification of 30 X to 50 X.

A line of ISO characters of a given number can be considered as "read" in a given area of the field, if at least seven out of the eight "characters" of a group of two "ISO words" are identified there. [2)]

4.3.2 Experience shows that any roman character of face size equal to or exceeding the sizes of the "ISO character" identified according to 4.3.1, or any detail of the original document of comparable fineness,[3)] will then be correctly reproduced on microcopies of actual documents, provided the same procedure (specified in 4.2) is followed.

4.3.3 It may be useful, for reference, to record at the beginning and end of the series of microcopies of the actual documents, the microcopy of an ISO mire made as indicated in 4.2.

4.4 Additional uses

4.4.1 Since the ISO mire is composed of elements of 50 mm length, this known dimension can be used for various measurements, reduction scale, etc.

4.4.2 The ISO mire can be produced with various densities and various colours of characters and paper, as mentioned in 4.3 of ISO 435. These variations of the ISO mire proper can be useful for research or other special work, but are not covered by an International Standard.

1) To obtain mires conforming to this International Standard, interested parties should apply to their National Standardization Organization, or any other organization accepted by it.

2) It is sufficient to identify the direction (|, –, /, \), even if the image is imperfect.

3) It should be noted, in particular, that a handwritten text should not be considered according to the overall size of its characters, but rather according to the fineness of the lines composing them as compared with that of the lines composing the ISO character, regardless of the colour of ink used.