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Cinematography — 35 mm motion-picture film perforated 16 mm (1-3-0) — Cutting and perforating dimensions

Cinématographie — Film cinématographique 35 mm *à perforations* 16 mm *(1-3-0) — Dimensions de coupe et de perforation*

Reference number
ISO 3022 : 1988 (E)

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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3022 was prepared by Technical Committee ISO/TC 36, *Cinematography.*

This third edition cancels and replaces the second edition (ISO 3022 : 1982), of which it constitutes a minor revision, the annex having been replaced.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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INTERNATIONAL STANDARD ISO 3022 : 1988 (E)

Cinematography — 35 mm motion-picture film perforated 16 mm (1-3-0) — Cutting and perforating dimensions

1 Scope and field of application

This International Standard specifies the cutting and perforating dimensions for 35 mm motion-picture raw stock with three rows of 16 mm perforations in positions 1-3-0, as well as the width of the 16 mm strip after processing and slitting the print stock.

2 References

ISO 69, *Cinematography — 16 mm motion-picture raw stock film — Cutting and perforating dimensions.*

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

NOTE — ISO 69 is included as 16 mm film is commonly used in this format.

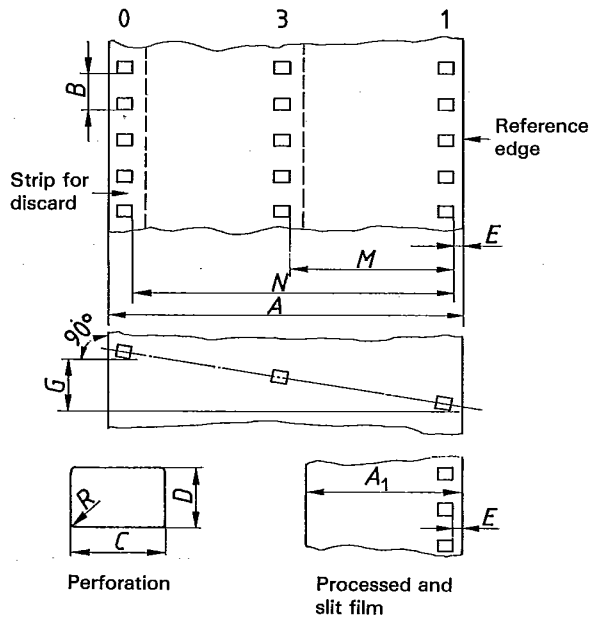

Figure — 35 mm film perforated 16 mm

3 Dimensions

The dimensions and tolerances shall be as shown in the figure and given in the table; they apply to safety raw stock film as described in ISO 543, immediately after cutting and perforating.

The dimensions apply at the time of cutting and perforating for film adjusted to a temperature of 23 ± 1 °C, and a relative humidity of (50 ± 2) %. The manufacturer may indicate other nominal temperature and humidity conditions under which the dimensions apply.

NOTE — The perforations in the 0 row are discarded after slitting two strips of nominal 16 mm width from the processed print stock. The 0 discard row of perforations should therefore be provided with a visual means of identification (such as ink or round holes). If round holes are used for identification, a 1,0 mm (0.04 in) nominal diameter is suggested and the frequency of occurrence should be between at least every fifth set of perforations.

Table — Dimensions

Dimension	mm	in
A	34,975 ± 0,025	1,377 ± 0,001
A_1	15,93 ± 0,05	0,627 ± 0,002
B	7,620 ± 0,010	0,300 0 ± 0,000 4
B'	7,605 ± 0,010	0,299 4 ± 0,000 4
C	1,830 ± 0,010	0,072 0 ± 0,000 4
D	1,270 ± 0,010	0,050 0 ± 0,000 4
E	0,900 ± 0,050	0,035 5 ± 0,002 0
G	0,025 max.	0,001 0 max.
L	762,0 ± 0,8	30,00 ± 0,03
L'	760,5 ± 0,8	29,94 ± 0,03
M	15,95 ± 0,03	0,628 ± 0,001 0
N	31,34 ± 0,03	1,234 ± 0,001 0
R	0,25 ± 0,03	0,010 ± 0,001 0

NOTES

1 Dimensions B' and L' (short perforation pitch) are provided to fulfil the requirements of continuous sprocket contact printing.

2 Dimensions L and L' represent the length of any 100 consecutive perforation intervals.

3 Dimension E in inches has been taken to one more decimal place than is normal for the millimetre dimension for additional accuracy.

4 There are several dimensions in the table for which the tolerances of the parts are limited by other tolerances.

Annex

Additional data

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

A.1 Uniformity of perforating

The uniformity of pitch, hole size and margin (dimensions B or B', C and D, and E) are important variables affecting image steadiness. Variations in these dimensions within a roll from one perforation to the next are more significant than variations from roll to roll. Actually, it is the maximum variation from one perforation to the next within any small group of consecutive perforations that is the most important variable.

A.2 Dimensional stability

During its life, film can shrink or swell due to changes in temperature or to loss or gain in moisture content. It can also shrink due to loss of solvent or plasticizer. These changes may result in changes in the dimensions. The change is generally uniform through the roll.

A.3 Definition of low-shrinkage film

Low-shrinkage film is film which shrinks no more than 0,2 % from its original dimensions at the time of cutting and perforating, after the film has been

a) kept in the manufacturer's normal commercial packing for six months at recommended storage conditions;

b) exposed;

c) processed and dried as recommended by the manufacturer;

d) stored in roll form, exposed to air, for a period not exceeding 30 days at 18 to 24 °C and 50 to 60 % relative humidity.

The film is measured under the same conditions of temperature and humidity as defined in clause 3.

A.4 Choice of longitudinal pitch

The choice of different pitch (B : long pitch and B' : short pitch), for original and print motion-picture films, depends on the necessity of printing and the type of printer used. In the most common type of printer, the original and print films move continuously over a printing sprocket. Consequently, the original film must be shorter in pitch than the print film in the approximate proportion of the thickness of the film to the radius of curvature of the printing sprocket. With current printing sprocket design, the value for this pitch differential is 0,3 %, with experience showing that a tolerance of $\pm$ 0,1 % is acceptable.

With "low-shrinkage" film base, it is common manufacturing practice to set the aim for the pitch of original films at a value of 0,2 % shorter than that of the films on which they will be printed. The additional shrinkage that occurs in the original film, because of processing and ageing before printing, should result in the desired (0,3 $\pm$ 0,1) % shorter pitch.

A.5 Effect of humidity

It is the common tendency of the film to expand when exposed to high relative humidity. Allowance should be made for this factor in equipment design.

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Descriptors : cinematography, motion-picture film, motion-picture film 35 mm, cutting, perforating, dimensions.

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