International Standard ISO 3022

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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*

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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.

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

This second edition was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 3022-1975), which had been approved by the member bodies of the following countries :

Australia	Italy	Sweden
Belgium	Japan	Switzerland
Bulgaria	Korea, Rep. of	Thailand
Canada	Mexico	United Kingdom
Czechoslovakia	Netherlands	USA
France	Poland	USSR
Germany, F. R.	Romania	
India	South Africa, Rep. of	

No member body had expressed disapproval of the document.

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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.

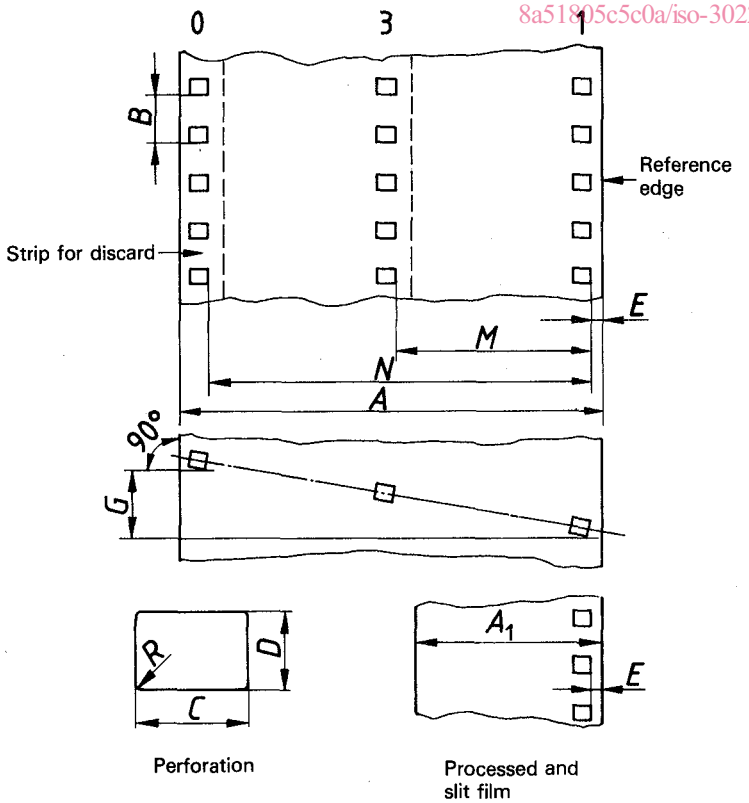

Figure — 35 mm film perforated 16 mm

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

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_1 *)	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_1 *)**)	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

*) Dimensions B_1 and L_1 (short perforation pitch) are provided to fulfil the requirements of continuous sprocket contact printing.

**) Dimensions L and L_1 represent the length of any 100 consecutive perforation intervals.

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

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

Annex

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

A.1 Uniformity of perforations

The dimensions given in this International Standard represent the practice of film manufacturers in that the dimensions and tolerances are for film stock immediately after cutting and perforating. (Except for dimensions A_1 and E which are for film after processing and slitting.) The punches and dies themselves are made to tolerances considerably smaller than those given, but since film is a plastic material, the dimensions of the slit and perforated film stock never agree exactly with the dimensions of the slitters, punches, and dies. Film can shrink or swell due to loss or gain in moisture content or can shrink due to loss of solvent. These changes invariably result in changes in the dimensions during the life of the film. The change is generally uniform throughout a roll.

The uniformity of pitch, hole size, and margin (dimensions B, C, D and E) is an important variable affecting steadiness. Variations in these dimensions from roll-to-roll are of little significance compared to variations from one perforation to the next. Actually, it is the maximum variation from one perforation to the next within any small group of consecutive perforations that is important.

A.2 Choice of width

The width for 35 mm film is controlled by the shrinkage characteristics of the films involved. Thus, there have been standards for the width of 35 mm stock of the "usual" shrinkage and for stock of "low-shrinkage" characteristics. The purpose was to obtain films of approximately the same width regardless of the type of film base during their useful life. This International Standard is based on the values adapted to "low-shrink" film base since nearly all films now manufactured meet the definition given below :

For the purpose of choice of width, low-shrinkage film base is film base which :

- when coated with emulsion and any other normal coating treatment,
- perforated,
- kept in the manufacturer's normal commercial packings for 6 months at 18 to 24 °C (65 to 75 °F),
- exposed,
- processed,
- stored exposed to air for a period not to exceed 30 days at 18 to 24 °C and 50 to 60 % relative humidity,
- measured under like conditions of temperature and humidity,

has not shrunk more than 0,2 % from its original dimensions at the time of perforating.

This definition of low-shrinkage film stock has been found by experience to be useful as a guide to film manufacturers in slitting their film. Departure from this definition should not be cause for rejection of the film. Note that this definition of shrinkage differs from the criterion applying to the choice of longitudinal pitch, where greater periods of time are involved and where short-time tests can be deceptive.

Allowance has been made in arriving at these values for the common tendency of film to expand when exposed to high relative humidity. Allowance should be made for this factor in equipment design.